



**CANADA**  
4-H Ontario

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## 4-H ONTARIO PROJECT



# Agricultural Hazards Project

## REFERENCE MANUAL

## **The 4-H Pledge**

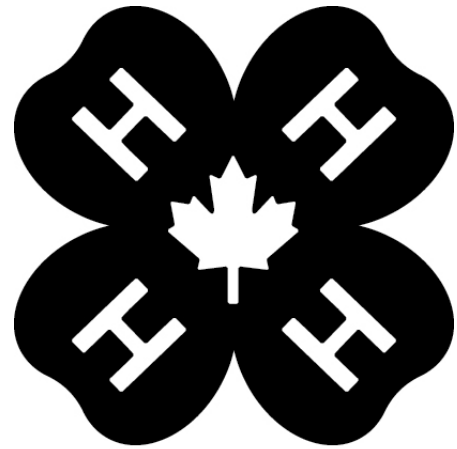
I pledge my Head to clearer thinking,  
my Heart to greater loyalty,  
my Hands to larger service,  
my Health to better living,  
for my club, my community and my country.

## **The 4-H Motto**

Learn To Do By Doing

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4-H Ontario grants permission to 4-H Volunteers to photocopy this 4-H project resource for use in their local 4-H program.

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# INTRODUCTION

## Welcome to 4-H Ontario's 'Agricultural Hazards' Project!

Agriculture is one of the most hazardous occupations in Ontario. Farming safely is a skill. This project covers a variety of topics to make you more aware of the hazards that can exist.

### Objectives

1. To identify areas of the farm where safety is a top priority.
2. To react properly in case of an emergency.
3. To identify a potential hazard and how to eliminate the hazard.
4. To use proper safety equipment.
5. To use a buddy in a rescue situation.
6. To alert others about potential hazards with warning signs.
7. To learn about the elements of judging and public speaking.
8. To learn the proper use of parliamentary procedure.

**From 1990-2008 the top five causes of agricultural fatalities in Ontario were:**

- machine rollovers (23%)
- machine runovers (21%)
- machine entanglements (8%)
- animal-related incidents (6%)
- being struck by a non-machine object (6%)

*Source: Agricultural Fatalities and Hospitalizations in Ontario 1990-2008, Canadian Agricultural Injury Reporting (CAIR), 2011*

## How to Use This Manual

4-H Ontario's Agricultural Hazards project is made up of 2 parts:

### 1. The Reference Book

The reference book is laid out into 6 meetings:

Meeting 1 – Let's Keep Mooooving Safely!

Meeting 2 – No Room to Breathe

Meeting 3 – Chemical Warfare

Meeting 4 – Fire Light, Fire Bright

Meeting 5 – Caught in the Flow – Machinery Hazards

Meeting 6 – Solar and Wind Electrical Safety

Each meeting has been broken down into an Introduction with Sample Meeting agendas, References and Resources, Topic Information and Activities.

*Sample Meeting Agendas:* are at the beginning of each meeting. The agendas give suggestions for topic information, activities, recipes and judging and/or communications activities along with suggested times for each section. These are only suggestions – you will know your group best and will know the skill and attention level of your members. There is more topic information and activities than what can be completed in a two hour meeting. Be creative!

Activities: should be used in combination with the discussion of topic information to teach members in a hands-on, interactive learning environment.

## 2. The Record Book

This booklet is designed to make it easier for members to record information throughout the club. Members are to record their expectations and goals for the project in addition to contact information, meeting dates, roll calls and records of recipes made at the meetings and at home. Print or photocopy pages from the Reference Book that you think will benefit the members either as a resource or an activity. Answers for the Activity Pages can be found at the back of the Record Book.

The Record Book should be given to each member at the beginning of the first meeting. Ask members to keep it in a binder or duotang so they can add to it easily.

Go through the Record Book with the members and explain the charts and forms. Encourage them to use their Record Books at every meeting and record as much information as possible. As an added incentive, a prize could be given at the end of the project for the best Record Book.

## Including STEM in the 4-H Agricultural Hazards Project

### What is STEM and why is it important?

Since 1915, 4-H in Ontario has engaged youth in science, technology, engineering, and math (STEM). This has traditionally meant a solid focus on agricultural science, mechanics, entrepreneurship, natural sciences and household science. Today, 4-H has grown to include rocketry, robotics, computer science, environmental sciences, and more. 4-H provides hands-on learning experiences to encourage learning about the world around us. Our lives are completely immersed in science and technology.

Understanding how science, engineering, and technology impact our lives, solve problems and create new ones makes it easier to navigate our modern world.

In school, science classes need to cover a broad range of topics in a limited amount of time while STEM in 4-H allows members and leaders time to dig deeper into ideas and concepts and to spend as much time as desired to work on projects based on personal interests, questions, and skills.

STEM in 4-H allows a person to work on their own questions, design their own tests, create their own models, build their understanding, and share their work with others – learn to do by doing. That's what science and engineering are, trying to understand the natural universe and develop solutions to the problems faced in our world today. Science is inquiry that uses a specific approaches and skills. But all learning is an inquiry process so working with science helps develop your learning muscles.

Within 4-H, the STEM process can go even further to include the Arts, thus changing the acronym to STEAM – Science, Technology, Engineering, Art & Math.

## STEAM in 4-H Ontario Projects

As you work through the Agricultural Hazards Project, you will see STEAM integrated throughout the project within almost all of the activities provided. Examples of activities include 'Deadly Gases', 'Bad Things Come in Threes!', 'Make Your Own Fire Extinguisher', 'Performing the Grain Raisin Rescue', 'Model Eardrum', 'Make Your Own Solar Panel', 'Make A Pinwheel', amongst many others.

STEAM can be challenging but it can also be fun! Be sure to try out the activities. Observe what works and what doesn't and how activities can be changed slightly to get different results. It's all a part of the STEAM learning process!

## Planning a Meeting

Plan your meetings well. Review all the information well in advance so you are prepared and ready to cook up a storm!

Before Each Meeting:

- Read the topic information and activities and photocopy any relevant resources for the members' Record Books.
- Be familiar with the topic information for each meeting. Think of imaginative ways to present the information to the members. Do not rely on just reading the information out loud. Review available resources, plan the meetings and choose activities and themes that complement the ages and interests of your members. The Record Book contains extra activities that can be used if you need to fill in time or if one of the suggested meeting activities does not suit your group of members.
- Gather any equipment, ingredients and/or resources that will be needed to complete the meeting.
- At least 12 hours of club meeting time is required for every project; including club business, specific project information and social recreation. The delivery format for that material is left to the discretion of the leaders. Before each meeting, create a timeline to ensure that you are providing an adequate amount of instructional time for club completion. Note: the best practice recommendation is that a club have multiple meeting times for each project.

Included on the following page is a Leader's Planning Chart to help with the planning of meetings. In addition to the chart, keep track of what went well and what should be changed next time. That way, each time this project is run, the content of the meetings can be different!

When planning each meeting, a typical 4-H meeting agenda should include the following:

- Welcome & Call to Order
- 4-H Pledge
- Roll Call
- Parliamentary Procedure:
  - Secretary's Report



## INTRODUCTION

- Treasurer's Report (if any)
- Press Report
- New Business: local and provincial 4-H activities/opportunities, upcoming club activities
- Meeting content, activities and recipes
- Clean-up
- Social Recreation and/or refreshments
- Adjournment

## Judging and Communications

Each meeting must include either a judging or public speaking activity.

- Judging gives the members an opportunity to use judging techniques as part of the learning process. Through judging, members learn to evaluate, make decisions and communicate with others. They also develop critical thinking skills, confidence and self-esteem. Many examples are used in this reference book but use your imagination! As long as members are setting criteria and critically thinking about where items fit within that set of criteria, they are learning the basic skills of judging!
- A communications activity has been provided for each meeting but can be included in the Roll Call or social recreation time. These activities do not need to involve the topic of milk as the outcome is more about understanding the concepts of effective communication.

# Stop Think Act

Stop Think Act is a simple but powerful tool. Over 90 percent of accidents are due to people not taking the time to consider how their actions may put them at risk.

Stop Think Act helps you take that first step to see hazards and protect yourself and others from them.

The message is very straightforward and can be adapted to any situation at home, work or play.

Stop

Think

Act

**Before and during a task**

- What could go wrong?
- How bad could it be?
- Has anything changed?


  

- Do I clearly understand the task?
- Am I physically and mentally ready?
- Do I have the right tools and equipment?

- Make it safe.
- Use the right tools and procedures.
- Reduce risks.

**Stop if it can't be done safely!**



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Use Stop Think Act to remind yourself to put on your helmet or other personal protective equipment, work with a buddy, ask for clearer instructions... use Stop Think Act to find ways to make it safe.

## Have you ever...

- Ridden a horse without a helmet?
- Groomed your calf without wearing work boots?
- Jumped from the second step of your tractor?
- Used a welder or grinder inside a farm building
- Worked with or near flowing grain?
- Worked on or around operating equipment?
- Mixed chemicals without using the right personal protective equipment?

Think about the tasks or chores do you do that may pose risks if not done safely.

## For example, working near a power take-off:

**Stop:** What could go wrong? How bad could it be?

- Clothing or shoe laces can quickly get entangled resulting in severe injury or death.
- I could be very severely injured, or worse.

**Think:** Do I clearly understand the task? Am I physically and mentally ready?

- A PTO shaft spins between nine and 16 times a second and is two feet off the ground.
- I need to ask for help if I don't understand or feel uncomfortable.
- If I feel unsafe or unsure, I should stop what I'm doing and tell an adult or supervisor.
- I may be tired, hungry, distracted... and I should **never** step over a PTO.

**Act:** Make it safe. Reduce risks.

- Walk around the entire unit instead of taking the shortcut.
- Better yet, turn the unit off as well.

4-H Ontario, Workplace Safety & Prevention Services (WSPS) and Esso encourage you to Stop Think Act before beginning a task to make sure it can be done safely.

For more info on Stop Think Act and/or health and safety resources for farming, call 1-877-494-9777 or visit [www.wsps.ca/farmsafety](http://www.wsps.ca/farmsafety)



## Leader's Planning Chart

Meeting #	Date/Place/ Time	Topics Covered	Activities	Materials Needed

As a club volunteer your responsibilities are to:

- Complete the volunteer screening process and to attend a volunteer training session.
- Notify the local Association of the club, arrange a meeting schedule and participate in club meetings, activities and the Achievement program.
- Review the project material in the Reference, Record and Recipe books to familiarize yourself with the information and adapt it to fit your group. Be well organized and teach the material based on your group's age, interest and experience level.
- Organize the club so members gain parliamentary procedure, judging and communication skills.
- Have membership lists completed and submitted along with fee collected (if applicable) by the end of the second meeting.
- Have members fill out a Participant Agreement Form and identify any health concerns. Ensure that all members, leaders and parent helpers know the appropriate actions during any emergency. Check with members for any food allergies or dietary restrictions and plan snacks accordingly.

As a club member your responsibilities are to:

- Participate in at least 2/3 of his/her own club meeting time. Clubs must have a minimum of 12 hours of meeting time.
- Complete the project requirements to the satisfaction of the club leaders.
- Take part in the project Achievement Program.
- Fill in and complete the Record Book.
- Complete any other project as required by the club leaders.

## Achievement Program Ideas/Suggestions

- Volunteer at a farm safety day. Create a Kid's Centre with activities geared specifically to young children.
- Attend a Progressive Ag Safety Day.
- Make a display and exhibit it at your local fair.
- Have members make a presentation at school about an aspect of farm safety.
- Create a skit showing what to do in a farm emergency.

## Special Projects

These projects are done outside of meeting time and are for members interested in doing more – often senior members. It's up to you as the leader to decide if you will require members to complete a Special Project for club completion. Some ideas include:

- Write a press release about how kids can stay safe on a farm.
- Interview a farmer and write a press release for the newspaper about what they do on their farm to create a safer working environment.
- Create a display about an aspect of farm safety.
- Create a video about one particular aspect of agriculture, the safety considerations needed and post it on YouTube.
- Create an activity booklet for young children to teach them about agriculture safety.
- Attend a Farm Safety Association Meeting.
- Interview a paramedic, police officer or firefighter about any experiences they might have had with farm accidents.

**Tour and Guest Speaker Ideas:** appear throughout the project manual and coincide with the information with each meeting.

### Fact

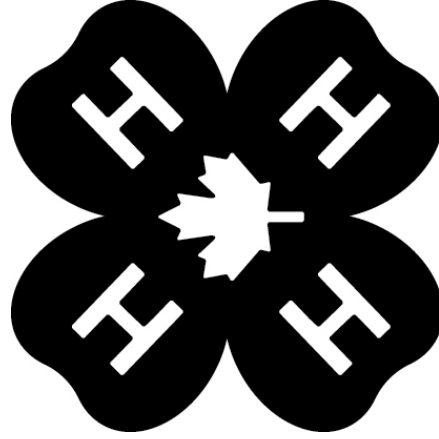
**From 1990-2008, the top causes of agricultural injury hospitalizations in Ontario were animal-related and entanglement/caught in machinery (each with 16%), falls from height (14%) and machine run-over (10%).**

- **Of the animal-related hospitalizations, 47% were cows/bulls/calves.**
- **Of the entanglement hospitalizations, 20% involved an auger.**
- **Of the fall from height hospitalizations, 41% fell from the barn loft/rafters.**
- **Of the machine run-over hospitalizations, 30% were unmanned machines (machines had been bypass started, left running or left unblocked on a slope).**

*Source: Agricultural Fatalities and Hospitalizations in Ontario 1990-2008, Canadian Agricultural Injury Reporting (CAIR), 2011*



**I pledge my Head to clearer thinking,  
my Heart to greater loyalty,  
my Hands to larger service  
my Health to better living  
for my club, my community and my country.**



**CANADA**  
4-H Ontario

## Acronyms

ATV - All Terrain Vehicle

ORV – Off Road Vehicle

PPE – Personal Protective Equipment

SCBA – Self-Contained Breathing Apparatus

SPIH – Self Propelled Implement of Husbandry e.g. swather, combine, harvesters, sprayers (but does not include tractors)

WHMIS - Workplace Hazardous Materials Information System

WSPS - Workplace Safety Prevention Services

## Additional References and Resources

A Health and Safety Guide for Handling Farm Animals and Poultry, Farm and Ranch Safety and Health Association, British Columbia [http://www.farsha.bc.ca/online\\_assets/category1\\_item198.pdf](http://www.farsha.bc.ca/online_assets/category1_item198.pdf)

Alberta Agriculture and Forestry <http://www1.agric.gov.ab.ca>

Canadian Agricultural Injury Reporting (CAIR) <http://www.cair-sbac.ca/>

Canadian Agricultural Safety Association <http://casa-acsa.ca/>

Canadian Centre for Occupational Health & Safety <https://www.ccohs.ca>

Canadian Food Inspection Agency <http://www.inspection.gc.ca>

Canadian Red Cross <http://www.redcross.ca>

Centre for Disease Control and Prevention  
<http://www.cdc.gov>

Farm and Food Care Canada [www.farmfoodcare.org](http://www.farmfoodcare.org)

Farm and Food Care Ontario [www.farmfoodcareon.org](http://www.farmfoodcareon.org)

Farm and Food Care (OFAC) Producer Factsheet Barn Fires <http://www.ontariogoat.ca/wp-content/uploads/2015/08/OFAC-Producer-Factsheet-Barn-Fires.pdf>

Health Canada <http://www.hc-sc.gc.ca>

Hydro One <http://www.hydroone.com>

MTO – Ministry of Transportation <http://www.mto.gov.on.ca>

National Ag Safety Database <http://nasdonline.org>

National Collaborating Centre for Environmental Health <http://www.ncceh.ca>

### Fact

**From 1990-2008, 93% of those fatally injured in farm accidents were male.**

*Source: Agricultural Fatalities and Hospitalizations in Ontario 1990-2008, Canadian Agricultural Injury Reporting (CAIR), 2011*

National Farm Animal Care Council – Codes of Practice <http://www.nfacc.ca/codes-of-practice>

Ontario Ministry of Agriculture, Food & Rural Affairs [www.omafra.gov.on.ca](http://www.omafra.gov.on.ca)

Ontario Ministry of Labour – Farm Equipment [https://www.labour.gov.on.ca/english/hs/pubs/farming/gl\\_equipment.php#shear](https://www.labour.gov.on.ca/english/hs/pubs/farming/gl_equipment.php#shear)

Ontario Pesticide Education Program <https://www.opec.ca>

Ontario Poison Centre 1-800-268-9017 <http://www.ontariopoisoncentre.ca>

Ontario Solar Farms <http://ontariosolarfarms.com>

Ontario Veterinary College <http://ovc.uoguelph.ca>

Real Agriculture <https://www.realagriculture.com>

Smokey The Bear <https://smokeybear.com>

Public Health Agency of Canada [www.publichealth.gc.ca](http://www.publichealth.gc.ca)

University of Guelph [www.uoguelph.ca](http://www.uoguelph.ca)

University of Maine <https://extension.umaine.edu>

University of Saskatchewan, Institute of Agricultural Rural and Environmental Health  
<http://aghealth.usask.ca>

Workplace Safety Prevention Services <http://wsps.ca>



## MEETING 1 - LET'S KEEP MOOOOVING SAFELY!

### Objectives

- Learn the election procedure for establishing an executive.
- Discover what a zoonotic disease is and which ones are prevalent in Canada.
- Learn about biosecurity and why it is important.
- Learn about respect for animals, safe animal handling practices and safe use of medications
- Learn how animal responses differ from a person's response
- Become familiar with the National Livestock Codes of Practice for the Care and Handling of Farm Animals

### Roll Calls

- Have you ever worked with animals? If so, what kind of animals? Do you feel threatened or scared around the animals?
- What is your reason for wanting to learn more about Agricultural Hazards?
- Do you think an animal's sense of touch is better or worse than that of a human? Why?

### Sample Meeting Agenda – 2 hrs. 35 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Public Speaking/Judging Activity	Activity #1 – Get to Know Each Other Game – Tower of Trust (instructions at the end of this meeting)	20 min
Parliamentary Procedure	Elect executive, hand out Record Books and discuss club requirement. Fill out club and member information in Record Books, and have each member fill out their “Member Expectations and Goals” page.	30 min
Topic Information Discussion	Discuss Zoonosis, Biosecurity, Handling Animal Medications, Animal Behaviour, First Aid and National Livestock Codes of Practice	40 min
Activity Related to Topic	Choose from: Activity #2 – Sensational Comparison Activity #3 – Being An Animal Activity #4 – Judging Footwear Activity #5 – Animals Deserve Respect – Demonstration Activity #6 – Calling 911/Emergency Help – What to Say Activity #7 – Tour of the Inside of an Ambulance	40 min
Wrap up, Adjournment & Social Time!		10 min
At Home Challenge	Choose one of the At Home activities to complete.	



## Electing Your Executive

Elections can be chaired by a youth leader, senior member or club leader. The person chairing the elections is not eligible for any positions.

### Procedure:

1. All positions are declared vacant by the chairperson, who indicates this by saying "I'd like to declare all positions vacant."
2. The group decides on the method of voting (i.e. show of hands, ballot or standing).
3. The chairperson accepts nomination from members for each position being filled. Nominations do not require a seconder. Nominations are closed by motion or declaration by the chairperson.
4. Each member nominated is asked if he/she will stand for the position. Names of members who decline are crossed off.
5. Voting takes place by selected method and majority rules (i.e. member with most votes).
6. Announce the name of the successful member. Offer congratulations and thank all others that ran for the position.
7. If ballots are used, a motion to destroy the ballots is required and voted on.

### Steps in Making a Motion

The motion is a very important key to having good meetings. Motions are a way of introducing topics for discussion and allowing each member to speak and vote. Any member can make a motion.

#### Steps in Making a Motion:

1. Address the chairperson (i.e. raise your hand).
2. Wait for the chairperson to acknowledge you.
3. Make the motion: "I move that..."
4. Another person seconds the motion: "I second the motion."
5. Chairperson states the motion.
6. Chairperson calls for discussion of the motion.
7. Chairperson restates the motion.
8. Chairperson calls the vote: "All in favour? Opposed?"
9. Chairperson announces the result of the vote: "Motion carried" or "Motion defeated."

## Topic Information

### What is Zoonosis?

A zoonotic disease is a disease of animals that can be passed to humans. There is a long list of zoonotic diseases that can affect humans. Several hundred are found in North America, but only a few dozen of these are likely to affect people in Canada. Major zoonotic diseases in Canada are described in the chart below:

Disease	How it is transmitted	Effects of Disease	Prevention	Type of Animal Affected
Anthrax	<ul style="list-style-type: none"> <li>Contact with anthrax spores by either touching spores (could be from the soil or animal hide)</li> <li>Eating contaminated meat</li> <li>Breathing in spores</li> </ul>	<ul style="list-style-type: none"> <li>Can affect in 3 ways –</li> <li>Skin - bump/blister on skin</li> <li>Ingestion – fever, loss of appetite, vomiting, diarrhea</li> <li>Inhaling – fever, sore throat, feeling unwell and eventual trouble breathing</li> </ul>	<ul style="list-style-type: none"> <li>Vaccinate animals</li> <li>Take antibiotics if exposed</li> </ul>	<ul style="list-style-type: none"> <li>Cattle</li> <li>Sheep</li> </ul>
Campylobacter and Giardia	<ul style="list-style-type: none"> <li>Consuming undercooked meat, contaminated food or untreated drinking water</li> <li>Unprocessed milk</li> <li>Close contact with infected animals or infants</li> </ul>	<ul style="list-style-type: none"> <li>Diarrhea</li> <li>Abdominal pain</li> <li>Fever</li> <li>Nausea</li> <li>Vomiting</li> <li>Lethargy</li> </ul>	<ul style="list-style-type: none"> <li>Proper hand washing</li> <li>Good sanitation</li> <li>Proper cooking methods</li> </ul>	<ul style="list-style-type: none"> <li>Poultry</li> <li>Wild birds</li> <li>Swine</li> <li>Cattle</li> <li>Rodents</li> <li>Household pets</li> </ul>
Brucellosis	<ul style="list-style-type: none"> <li>Unprocessed milk</li> <li>Infected meat</li> </ul>	<ul style="list-style-type: none"> <li>High fever</li> <li>Headache</li> <li>General discomfort</li> </ul>	<ul style="list-style-type: none"> <li>Good sanitation</li> <li>Avoid consumption of raw milk</li> </ul>	<ul style="list-style-type: none"> <li>Cattle</li> <li>Goats</li> <li>Swine</li> </ul>
E. Coli	<ul style="list-style-type: none"> <li>Transmitted through animal feces</li> <li>Contaminated food or water</li> <li>Unpasteurized milk or apple cider</li> </ul>	<ul style="list-style-type: none"> <li>Gastro-intestinal illness (stomach cramps, diarrhea)</li> </ul>	<ul style="list-style-type: none"> <li>Proper hand washing</li> <li>Safe food handling and preparation</li> </ul>	<ul style="list-style-type: none"> <li>Any animal</li> </ul>

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Hantavirus	<ul style="list-style-type: none"> <li>Inhaling the dust from rodent excrement</li> </ul>	<ul style="list-style-type: none"> <li>Pulmonary distress</li> <li>Headaches</li> <li>Myalgia</li> <li>Low blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>Store foods in containers with tight fitting lids</li> <li>Rodent control program</li> </ul>	<ul style="list-style-type: none"> <li>Deer mice</li> <li>Wild rodents</li> </ul>
Influenza H1N1 (originally known as Swine Flu)	<ul style="list-style-type: none"> <li>person to person through coughing, sneezing or talking by people with influenza.</li> <li>touching something with flu virus on it and then touching the mouth or nose.</li> </ul>	<ul style="list-style-type: none"> <li>fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills and fatigue</li> <li>possible vomiting and diarrhea</li> </ul>	<ul style="list-style-type: none"> <li>seasonal flu vaccine</li> <li>proper hand washing</li> </ul>	<ul style="list-style-type: none"> <li>Does not affect animals – spread from human to human contact</li> </ul>
Influenza H5N1 (also known as Asian Avian Influenza)	<ul style="list-style-type: none"> <li>direct or close contact with sick or dead poultry that were infected with the virus</li> </ul>	<ul style="list-style-type: none"> <li>conjunctivitis</li> <li>fever, cough, sore throat, muscle aches</li> <li>pneumonia</li> </ul>	<ul style="list-style-type: none"> <li>Avoid contact with poultry</li> <li>For those working with poultry, use recommended biosecurity and infection control practices</li> </ul>	<ul style="list-style-type: none"> <li>Poultry</li> </ul>
Leptospirosis	<ul style="list-style-type: none"> <li>Contact with urine from infected animals</li> <li>Contact with water, soil, or food contaminated with the urine of infected animals</li> </ul>	<ul style="list-style-type: none"> <li>High fever</li> <li>Headache</li> <li>Chills</li> <li>Muscle aches</li> <li>Vomiting</li> <li>Jaundice</li> <li>Red eyes</li> <li>Abdominal pain</li> <li>Diarrhea</li> <li>Rash</li> </ul>	<ul style="list-style-type: none"> <li>Vaccinate pets</li> <li>Rodent control program</li> <li>No swimming or wading in water that might be contaminated with animal urine</li> </ul>	<ul style="list-style-type: none"> <li>Cattle</li> <li>Pigs</li> <li>Horses</li> <li>Dogs</li> <li>Rodents</li> <li>Wild animals</li> <li>Pets</li> </ul>
Lyme Disease	<ul style="list-style-type: none"> <li>Infected ticks</li> </ul>	<ul style="list-style-type: none"> <li>Skin rash</li> <li>Joint pain</li> <li>Fatigue</li> <li>Potential serious neurological disorders</li> </ul>	<ul style="list-style-type: none"> <li>Wear protective clothing</li> <li>Use insect repellent containing DEET</li> <li>Shower/bathe within 2 hours of being outdoors</li> <li>Keep lawns and yards well maintained</li> </ul>	<ul style="list-style-type: none"> <li>Ticks</li> </ul>

## MEETING 1

Rabies	<ul style="list-style-type: none"> <li>Saliva from infected animal bite or sore</li> </ul>	<ul style="list-style-type: none"> <li>Affects central nervous system</li> <li>Can cause death if not vaccinated</li> </ul>	<ul style="list-style-type: none"> <li>Vaccination shots for farm animals and pets</li> </ul>	<ul style="list-style-type: none"> <li>All</li> </ul>
Ringworm, Scabies	<ul style="list-style-type: none"> <li>Contact with infected skin or clothing (caused by a fungus)</li> </ul>	<ul style="list-style-type: none"> <li>Scaly, crusted, itchy rash</li> </ul>	<ul style="list-style-type: none"> <li>Use fresh towels</li> <li>Use caution when working with animals</li> </ul>	<ul style="list-style-type: none"> <li>Cattle</li> <li>Cats</li> <li>Dogs</li> </ul>
Salmonella	<ul style="list-style-type: none"> <li>Contaminated feed or water</li> </ul>	<ul style="list-style-type: none"> <li>Stomach cramps</li> <li>Fever</li> </ul>	<ul style="list-style-type: none"> <li>Good sanitation</li> <li>Proper storage and cooking</li> </ul>	<ul style="list-style-type: none"> <li>Poultry</li> </ul>
Toxoplasmosis	<ul style="list-style-type: none"> <li>Contact with infected cat feces</li> <li>Consuming undercooked, contaminated meat</li> </ul>	<ul style="list-style-type: none"> <li>Fever</li> <li>Sore throat</li> <li>Muscle aches</li> <li>Swollen glands</li> <li>Can cause serious health problems for pregnant women and those with compromised immune systems</li> </ul>	<ul style="list-style-type: none"> <li>Proper hand washing</li> <li>Proper cooking methods</li> </ul>	<ul style="list-style-type: none"> <li>Cats</li> <li>Swine</li> <li>Sheep</li> <li>Venison</li> </ul>
Trichinosis	<ul style="list-style-type: none"> <li>Eating uncooked or partially cooked pork</li> </ul>	<ul style="list-style-type: none"> <li>Tiny parasites get into stomach</li> <li>Can be fatal</li> </ul>	<ul style="list-style-type: none"> <li>Cook pork thoroughly</li> <li>Good sanitation</li> </ul>	<ul style="list-style-type: none"> <li>Swine</li> </ul>
Tuberculosis	<ul style="list-style-type: none"> <li>Consuming infected milk</li> </ul>	<ul style="list-style-type: none"> <li>Bad cough</li> <li>Chest pain</li> <li>Fatigue</li> <li>Weight loss</li> <li>Chills</li> <li>Fever</li> </ul>	<ul style="list-style-type: none"> <li>Avoid consumption of raw milk</li> <li>Vaccinate milk producing cattle</li> </ul>	<ul style="list-style-type: none"> <li>Cattle</li> </ul>
West Nile Virus	<ul style="list-style-type: none"> <li>Bite from an infected mosquito</li> </ul>	<ul style="list-style-type: none"> <li>High fever</li> <li>Severe neurological diseases</li> <li>Can be fatal</li> </ul>	<ul style="list-style-type: none"> <li>Eliminate breeding grounds for mosquitos</li> <li>Wear insect repellent</li> <li>Wear proper clothing</li> </ul>	<ul style="list-style-type: none"> <li>Wild crows</li> <li>Exotic birds</li> </ul>

## Biosecurity on Farms

The Canadian Food Inspection Agency (CFIA) works to develop national farm-level biosecurity standards and guidance for farmers for several crop and animal-based sectors. They develop national biosecurity standards, protocols and strategies designed to protect animal resources in collaboration with producer organizations, provincial/territorial governments and universities. These standards provide a proactive approach to minimize the introduction and spread of diseases and pests.

Putting preventive measures in place to keep animals healthy has been a long-standing and successful practice on Canadian farms. Biosecurity planning helps to ensure that practices routinely carried out on farms are beneficial to animal health.

By following the principles below and working with a veterinarian, farmers can play a significant role in keeping animals and the farming industry as healthy as possible.

### Access Management

- Designate distinct zones where varying levels of protection are needed. Define these zones with fences (or other features) and identify them with signs.
- Control movements in and between designated zones

### Animal Health Management

- Manage animal movements including identifying all animals and keeping records for traceability
- Observe animals for signs of disease
- Establish response plans for potential disease situations

### Operational Management

- Properly dispose of deadstock
- Manage manure according to regulations
- Keep the premises, buildings, equipment and vehicles clean
- Maintain the facilities in a state of good repair
- Purchase production inputs such as feed and bedding from reliable sources. Ensure the water supply is free of contamination
- Control pests
- Have a written biosecurity plan that is updated regularly. Ensure that employees receive proper training and training materials so they can continue to follow the plan

For further information about biosecurity on farms, the Canadian Food Inspection Agency has a series of brochures and videos that can be found in the Biosecurity – Tools section at: <http://inspection.gc.ca/animals/terrestrial-animals/biosecurity/tools/eng/1344790074044/1344790183249>



## Handling Livestock Medications

Proper handling of livestock medications involves many aspects:

### Storage Facilities for Livestock Medicines

The ideal location for a storage unit is a clean, dry, frost-free area such as a farm office or utility room. The storage unit should protect products from changes in temperature, sunlight, dust, moisture, animals and insects.

Products should be protected from temperature extremes and fluctuations as these may alter the products' chemical structure and reduce potency, shelf life and safety.

If possible, have a separate storage cabinet for each group of products, such as antibiotics, vaccines and wound dressings, injectable vitamins and needles, as this will further reduce the chance of errors in product selection. Lock storage units to prevent access by children or unauthorized persons.

### Managing Livestock Medicine Inventory

Careful management of the medicine inventory on the farm insures that medications are purchased as needed. Fresh supplies will be readily available when needed. This will reduce costs resulting from medicine wastage.

The medicine inventory on the farm can be managed using the following procedures:

- Purchase medicine in quantities which will be used in a reasonable amount of time
- Check product expiry dates before purchase
- Clean and reorganize the medicine cabinet regularly
- Use products with older dates first
- Discard all expired products

### Using Livestock Medicines

At all times, livestock producers are encouraged to work with and under the guidance of a registered veterinarian so that their animals are in the best possible health.

Treatment must be given correctly to be effective and to prevent complications. Use the following guidelines to develop good treatment habits. Treatments should only be given by those who have been trained properly by a veterinarian or an experienced livestock producer.

- Wash your hands before and after handling livestock medicines
- Use proper equipment: Choose the correct syringe and needle size for the animal size, the dosage and the type of injection to be given.
- For intramuscular injection use a 3.75cm (1 & 1/2 inch) 16 or 18 gauge needle to insure the drug goes in the muscle and not under the skin. Before injecting, pull back on the plunger to insure the needle tip is not in a blood vessel. Select appropriate injection sites with the help of your veterinarian. Read the label for the maximum amount to be injected in one site

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- For subcutaneous injection (under the skin), use a 1.25cm to 2.5m (1/2" to 1"), 16 or 18 gauge needle. Check that the needle tip is moveable. Inject a small amount of drug to see if a “bleb” of skin starts to rise in the area of the needle tip. This will verify that the needle is under the skin and not in the muscle. Inject only in sites recommended by your veterinarian
- Inject only in clean body sites
- Use clean equipment. Single use, sterile, disposable needles and syringes are preferred
- Give repeated injections in different body sites
- Before infusing antibiotics into the udder, wash and dry your hands. Wash and dry the teat with single use paper towels. Disinfect the teat end with the alcohol swab provided in the medication package. Avoid touching the infusion canula at the end of the treatment tube. Use only single dose infusion products in disposable syringes. Teat dip the teat after infusion of medication

*Repeat treatments:* Determine the number of treatments to be given from the product label or as recommended by the veterinarian. The duration of treatment should result in a cure without risk of relapse yet be short enough to insure withholding times are not extended.

*Withholding times:* Withholding times for milk and meat are given on product labels. This is also known as withdrawal times. A withdrawal day is a full 24 hours starting after the time of treatment.

*Prevent residues:* Simple management practices will prevent contamination of milk or meat. To prevent residues:

- record all treatments given and adhere to withdrawal times
- visibly mark all treated cows
- inform all people involved in milking of treated cows
- milk treated cows last or use separate “bypass” equipment to insure that no contaminated milk enters the milk supply
- discard milk from all quarters of treated cows
- discard milk from all cows calving within 30 or 42 days of dry treatment according to label directions
- discard milk from fresh cows for the required period if dry treatment was used

### Disposal of Livestock Medicines

Safe disposal of livestock medicines is essential to protect farm employees, family members, untreated livestock and the environment from accidental exposure to potentially hazardous chemicals.

Expired livestock medicines can be disposed of by returning them to the supplier. Increasingly, many veterinarians and manufacturers are willing to accept returns of products at the location of purchase. In some municipalities, medicines can be disposed of on Household Hazardous Waste Days.

Cattle anti-parasiticide products, such as injectable and topical wormers, are pesticides. Dispose of these products like pesticides applied to crops.

Do not reuse livestock medicine containers. Puncture all non-aerosol containers to prevent their reuse. Store containers that are to be discarded in a way that prevents access to children, other livestock and pets. Dispose of them promptly. Dispose of washed containers in municipal landfill.

## Animal Behaviour – Signs to Watch for!

Anyone who works with or around animals and livestock should have a strong understanding of animal behaviour. Those working with or around animals can experience injuries. Animals can kick and bite, step on people or squeeze someone against a wall or fence, causing serious and sometimes fatal injuries.

Many behaviours are common to all farm animals, regardless of species.

- No two animals are exactly the same even if they are the same gender and species. They will react to circumstances and events differently.
- Many animal reactions are predictable and a skilled handler can learn to expect these reactions and work with them. However, any animal can also be unpredictable at times.
- An animal that is normally calm and slow-moving in its own surroundings may become upset in a new environment or when surrounded by new people or animals.
- Animals fear fire and may begin to react to smoke in the air (sometimes even before humans can smell the smoke).
- Animals have the ability to remember incidents. They remember both good and bad situations and people. Animals will especially remember the incident if it was negative, stressful or frightening. They will also remember incidents in which they were handled rough and with cruelty.
- Routine is comforting and reassuring to animals. Animals are most content when familiar with feeding, movement and handling patterns. Change is disturbing to animals and must be introduced gradually and calmly.
- Excitement and agitation are contagious amongst animals. One upset animal can often affect the whole group.
- All animals are territorial to varying degrees and will react protectively and sometimes show aggression when disturbed during feeding, mating or when offspring are present.
- All farm animal behaviour is rooted in the instinct for survival. An farm animal's 'flight or fight' response will be activated by stressful, unfamiliar or frightening situations. Unrestrained animals usually begin to react to a perceived threat by trying to move away (the 'flight' instinct) but if the animal feels that flight is not an option, they will strike out (the 'fight' instinct).
- Each animal species is very aware of its own natural defenses – weight, strength, teeth, sharp hooves, claws or spurs, horns, tusks, antlers to name a few. Animals will use their natural defenses when they feel the need to. Depending on the species, they can head-butt, paw, kick, claw, peck, bite or gore.

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Animals show their fear, distress or alarm through their behaviour. Animal handlers must learn to 'read' these signs. Some are common in all animals while other behaviours are unique to each species.

Common Signs of Aggression to watch for (and warning of a possible attack):

- Pinned or raised ears
- Dilated nostrils
- Wide open eyes
- Head held high or low (not in its normal position)
- Raised tail
- Rapid tail movements, flicking or repetitive swinging
- Hairs raised on the back of the neck
- Pawing
- Snorting or snarling
- Baring teeth
- Threatening to charge

***“The three most common mistakes made by (animal) handlers are rough handling, excessive prodding and overcrowding”***

***Dr. Temple Grandin***

## Safe Animal Handling

An animal goes through a sequence of reactions as it becomes agitated. Know your animal and understand its behaviour. When both you and your animal are calm, you will have time to see what frightens and stresses the animal.



***Cattle Handling System***

***Image Credit:***

***[www.LIVestockNewMedia.com](http://www.LIVestockNewMedia.com)***

### Tips for Safe Animal Handling:

1. Before starting to work with animals, scan your surroundings. Plan where you will stand and always plan an escape route in advance
2. Design and maintain good working spaces
  - As much as possible, ensure that all working areas have evenly distributed light with a minimum of shadows

- Alleyways should be just wide enough for a single animal to pass at a time
  - Floors should be stable and non-slippery
  - Design ramps/loading chutes with the most gradual slope possible
  - In pens and chutes, use solid-sided walls
  - Any animal enclosure should contain escape routes just big enough for a human to escape
  - Try to minimize startling noises such as putting rubber stoppers on metal gates and keeping fans and equipment well-lubricated.
  - Gates should work quietly and smoothly and have easy-to-operate locking devices
  - Remove electrical cords or other hazards that animals may try to chew on
3. Stay calm and quiet when working with animals
  4. Never move very quickly around animals
  5. Always approach an animal in its field of view. Never approach from directly in front or behind.
  6. Never tie an animal to yourself or to a moveable object.
  7. Never leave a tied or restrained animal unattended.
  8. When possible, do not separate an animal out on its own from the herd
  9. Never turn your back on an animal or become distracted
  10. Be confident. Animals sense fear and uncertainty and will take advantage of it
  11. Be alert when working with animals. Take a break if you are getting tired or impatient
  12. When working with large animals, never work alone
  13. Young or in-experienced people should receive training in animal handling
  14. Children should be supervised at all times around animals
  15. Always wear proper protective equipment when working with animals such as steel-toed workboots, helmets for riding, etc.
  16. Always wash and dry your hands after working with animals
  17. Learn respect for the animals you are working with

### **Birthing**

Certain species of farm animals such as cattle and horses can present some significant safety concerns during calving and foaling. Farmers can suffer serious injuries as cows and mares can become quite agitated during this process and afterwards.

## MEETING 1

The following increases your chance of injury:

1. Not having the proper animal handling equipment or work space during the birthing process
2. Not following many of the tips listed for general safe animal handling
3. Getting between the mother and offspring without a barrier or other protection, especially when weighing, inspecting, ear tagging or any other procedures being done on the newborn
4. Dogs irritating mothers with offspring
5. A bellowing calf or foal which agitates the mother
6. Long hours making you less aware of an aggressive mother and delaying your response time and action

## First Aid on the Farm

Farms are sometimes in remote areas where help can be a long time coming. A quick response is critical and can increase the chance of someone's survival.

The following are the minimum basics for first aid on the farm:

1. Get trained. Check in your local community for first aid training courses.
2. Locate first aid kits in farm buildings and machinery. Know where the closest kit is and ensure kits are well labelled.
3. List emergency numbers at each phone along with the full address of the farm.
4. If possible, have a cell phone with you out in the field.
5. In an emergency stay calm. Remember the Stop, Think, Act steps to handling any emergency. The victim will be reassured by your confidence. Give first aid and seek proper medical attention as necessary.

Every farm family should have a first aid kit. By having a complete first aid kit in busy work areas such as in the tractor, barn, shop or kitchen, you can be prepared to save a limb or even a life if and when the worst does occur.

Putting together your farm first aid kit begins by looking around your home. Be imaginative! Dressings and bandages can be made from old sheets or hockey tape could be substituted for adhesive tape. Many of these items can be found in your own home.

A first aid kit should contain the following:

1. Emergency telephone numbers for EMS/911, poison control centre and your local doctors
2. Home and office numbers for family members, friends or neighbours who can help
3. Sterile gauze pads (dressing) in small and large squares to place over wounds
4. Adhesive tape

5. Roller and triangular bandages to hold dressings in place or to make an arm sling
6. Adhesive bandages in assorted sizes
7. Scissors
8. Tweezers
9. Safety pins
10. Instant ice packs
11. Disposable non-latex gloves, such as surgical or examination gloves
12. Flashlight, with extra batteries in a separate bag
13. Antiseptic wipes or soap
14. Pencil and pad of paper
15. Emergency blanket
16. Eye patches
17. Thermometer
18. Barrier devices such as a pocket mask or face shield
19. Coins for a pay phone
20. First aid manual

**Ontario Poison  
Centre**  
**1-800-268-9017**

*Source: Canadian Red Cross*

## National Livestock Codes of Practice for the Care and Handling of Farm Animals

The Codes of Practice are nationally developed guidelines for the care and handling of farm animals. The Codes serve as a national understanding of animal care requirements and recommended practices. It is a scientifically based, practical document that reflects society's expectations for responsible farm animal care. There have been Codes of Practice developed for the following livestock and aspects of farm practice:

1. Beef Cattle
2. Chickens, Turkeys and Breeders
3. Dairy Cattle
4. Equine
5. Farmed Deer
6. Farmed Fox

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7. Goats
8. Mink
9. Pigs
10. Sheep
11. Transportation

At the time this manual was produced, the following were in the revision stage:

1. Bison
2. Poultry – Layers
3. Rabbits
4. Veal Cattle

For the most up to date list and Codes of Practice, visit the National Farm Animal Care Council at: <http://www.nfacc.ca/codes-of-practice>



## BEFORE THE NEXT MEETING

Try these activities at home:

1. Create a book that could be used for a farm to keep track of any medication treatments given to animals. Be sure to include headings for date, animal ID, details of the sickness (i.e. how the animal looks, behaves, animal's temperature, etc.), type and amount of medication given, who administered the medication, withdrawal date(s) and any other details you think should be included.
2. Interview someone who processes farm animals through an animal handling system. Ask them questions such as:
  - Why did they choose the animal processing system that they have?
  - Have they changed the system since they bought it? If so, what changes did they make?
  - If they could make changes to the system they have, what would they like to do?
  - How many people are needed to process animals?
  - What types of procedures are done to the animals?
  - Have they ever been hurt when working with animals?
  - Any other questions you can think of.

Record your findings in your Record Book.

3. Choose a situation working with animals that could be potentially dangerous. Go through the steps of Stop, Think, Act (found in the introduction of this reference manual) to outline what the activity is and why a person should:

*Stop briefly:* What could go wrong? How bad could it be?

*Think:* Do I understand the activity? Do I have the right tools? What potential risks are there?

*Act:* What action should I take to avoid the dangers? Make it safe!

AND, stop if it cannot be done safely!

## MEETING 1

## DIGGING DEEPER

For Senior Members

### Animal Behaviour

Anyone who has worked with livestock realizes that each animal has its own personality. Other than the obvious physical differences, an animal's senses are a great deal different from a human's. Having an appreciation and respect for these differences is the first step in developing good animal handling techniques.

Sudden exposure to noise and crowds, especially in a barn, may make the animals nervous and difficult to handle. If you have livestock or animals which are high strung or nervous, it is best to limit access. Those who will be handling the animals and will be doing day to day chores should cautiously move around the animals and talk to get the animals more comfortable with them. Keep children away from animal confinement areas.

Interview an animal scientist, a farmer or a salesperson who sells animal handling equipment or research at the library or on the Internet (be careful to research using reputable websites) to find out how the following senses differ from a human's senses.

- Sight
- Hearing
- Smell
- Taste
- Feel
- Flight zone

## DIGGING DEEPER II

For Senior Members

### Farm First Aid Kits – Specialty Kits

Injuries vary from job to job in agriculture so first aid kits should be tailored to the potential injury that could result from a particular job. Listed below are specialty kits and recommended items, in addition to the basic items outlined within the meeting, for inclusion in each kit.

Specialty First Aid Kits		
Type of Specialty Kit	Types of Injury	Kit Items
Tractor/Combine	Small wounds, minor or major bleeding, fractures, sprains, or severed limbs, amputation, or entanglement	<ul style="list-style-type: none"> <li>Basic first aid manual</li> <li>Two triangular bandages (36 in.)</li> <li>Antiseptic spray</li> <li>Six large adhesive bandages</li> <li>Four safety pins</li> <li>Sterile compress bandages (four 2 in. by 2 in. bandages and four 4 in. by 4 in. bandages)</li> <li>Roll of 2 in. wide tape</li> <li>Two pressure bandages (8 in. by 10 in.)</li> <li>Scissors</li> <li>Two rolls of elastic wrap</li> <li>Five clean plastic bags (varied sizes from bread bags to garbage bags)</li> </ul>
Amputation	Amputation of a finger or limb	<ul style="list-style-type: none"> <li>Plastic bags of varying sizes (one large garbage bag, four medium kitchen garbage bags, and eight small plastic bread bags)</li> <li>Closable container to store bags</li> </ul>
Dressing Supplies	Major trauma	<ul style="list-style-type: none"> <li>Sterile compresses (2 in. by 2 in. and 4 in. by 4 in.)</li> <li>Gauze roller bandages (1 in., 2 in., and 6 in. wide)</li> <li>Adhesive tape</li> <li>Triangular bandage</li> <li>Tongue depressors</li> <li>Heavy-duty scissors</li> <li>Chemical ice packs</li> <li>Disposable rubber gloves</li> <li>Goggles</li> <li>Tweezers and safety pins</li> <li>Emergency blanket</li> <li>Antiseptic spray</li> </ul>
Fracture (for immobilization of an injured limb)	Broken bone	<ul style="list-style-type: none"> <li>Wooden or plastic splints</li> <li>Roll of elastic wrap</li> <li>Tongue depressors</li> </ul>
Pesticide Exposure (for use during pesticide application season or to keep in pesticide storage area)	Ingestion of or contact with pesticide	<ul style="list-style-type: none"> <li>Emergency and poison control center contact information</li> <li>Two 1 qt. containers of clean water</li> <li>Ipecac syrup</li> <li>Emergency blanket</li> <li>Plastic bags</li> <li>Tape</li> <li>Disposable rubber gloves</li> <li>Goggles</li> </ul>

Source: U.S. Cooperative Extension System <https://campus.extension.org/>

Are there any other areas on the farm that should have a specialty first aid kit? If so, what special items should be included in the kit? Create kits for various areas on your farm, shop and home.

## ACTIVITIES

### Activity #1 – Tower of Trust

**Items Needed:**

- Newspaper, tape, five paper clips, 30cm of string and scissors for each group
- Or
- 50 to 100 plastic cups
- Or
- 10 to 25 pipe cleaners

Divide members into small groups. Give each group two newspaper sheets, tape, five paper clips, 30cm of string and a pair of scissors. This activity could be modified with 50 to 100 cups or 10 to 25 pipe cleaners. Challenges could also be added, such as completing it with one hand or without speaking. Give each group 15 minutes to build the tallest tower before measuring each tower to determine who built the tallest one. Ask the group to describe their approach to building their tower, challenges they faced and what they learned about working together as a trusting team.

### Activity #2 – Sensational Comparison

**Items Needed:**

- Worksheet and Answer Sheet (found at the end of this meeting)
- Pen/pencil

Using the worksheet at the end of this meeting, compare your senses to that of a typical animal's senses.

When completed, discuss as a group why you chose the answers you have on your sheet. Ask questions such as:

- How does having blurry vision affect an animal's behaviour?
- Does waving a red flag really anger bulls? Does the colour matter?
- How does an animal see differently than a human by having 360 degree vision?
- What advantages does an animal have by being able to smell scents, hear better and have a better sense of taste than a human?

## Activity #3 – Being An Animal

### *Items Needed:*

- Two pairs of dark sunglasses
- Petroleum jelly
- Signs, posters, newspapers, books
- Enough paper to make four large cones to fit ears and two smaller cones to fit over the nose
- Tape or string to hold the objects on each person's face
- Two winter coats
- Two pairs of mitts
- Two blindfolds

Break into groups of three. Two people will be an animal and the other will be a helper.

### *Sight - clarity:*

To find out what an animal's eyes are like, cover two pairs of dark sunglasses with petroleum jelly. Have member's try to read signs, newspapers, books, watch TV, etc. while wearing the glasses to see how much they can see.

### *Hearing:*

To simulate the hearing capabilities of an animal, make four cones out of paper which will fit over your ears. Find a way to attach them to a person so they will stay with tape, bobby pins or string. Have one person in the group stand at varying distances away from the person wearing the cone and say a phrase that the person wearing the cone has to repeat. See how far away a person can get before the person wearing the cone cannot hear. Repeat the activity without using the cones for ears.

### *Smell:*

Make two more cones to fit over noses to mimic an animal's ability to smell. Have a person smell three or four items to see if they can smell them. Then use the cones and try smelling again to see if the ability to smell has improved.

### *Touch:*

Because an animal does not feel as well as a human, have two members in your group who will become the animal put on winter coats and mitts. The coats and mitts will reduce your sense of touch. Blindfold the "animals" and give them items to identify. Remove the blindfolds to show the "animals" how many items they got correct.

### *Sight – Range of Vision:*

To obtain the 360 degree range of animal's eyesight, two members stand back to back and link

arms together. Dimming the lights will reduce the animal's sense of colour and increase its black and white vision.

The third person of the group must lead the "animal" through a pre-set course or doorway.

Change the positions so everyone gets to be an animal and a person leading the animal. The two people who are the animal must say what they see and hear because they are back to back and may not know what their other is experiencing. This represents the animal's mind in action.

## Activity #4 – Judging Footwear – Handling Animals

### *Items Needed:*

- Four sets of footwear (one set should be steel-toed workboots)
- Judging Worksheet (found at the end of this meeting)
- Pen/pencil

Which set of footwear would be the safest for handling animals? Why do you think your choice is the best?

## Activity #5 – Animals Deserve Respect – Demonstration

### *Items Needed:*

- Labels
- Worksheet and Answer Key (found at the end of this meeting)
- Pen/pencil

This activity could be led by a senior member. Lay out the barn in your mind and tell the members where the gates are. Large labels might be helpful or you could go to a barn and use an actual pen. Tell the members what your objective is. It could be to move a cow up a ramp or to move a pig from one pen to another. Then leave the room and announce your presence from outside the room and then enter. Be calm! Move slowly. Move the animal around the make believe pen to where you want it to go. Do not prod it. Make sure you always have an escape route. The idea is that the members should be able to obtain the seven points, found on the answer sheet (at the end of this meeting) from your demonstration.

For a different twist you could do the demonstration again, only do everything wrong: don't announce your presence, yell at the animal, act frightened, prod it, work yourself into a no escape position, call it names to show lack of respect, lose your patience, pull, yank, etc. You may want to set this up with some members in advance.

From the demonstration, have members list seven important factors when working with an animal. Then discuss why these factors are important.

## Activity #6 – Calling 911/Emergency Help – What to Say

Practicing what to say will help when a real emergency arises. Give members various scenarios to practice:

- Someone has had been run over by cattle in a pen
- Someone has been kicked by a horse and is unconscious
- The barn is on fire
- Someone has caught their arm in a piece of machinery
- Someone has been caught in an auger
- Someone has received an electrical shock
- There has been a tractor roll-over
- Someone has been burnt by a welding machine
- Someone has been cut by a grinder

Make sure when practicing that the following tips are followed:

1. *Don't panic* - when you are making a call to emergency services, you will be excited and have a lot of adrenaline flowing through your veins. However, this will impede your speech and may cause you to start talking too fast, too slow, begin stuttering, etc. Stay as calm as possible. Instead, begin to plan what you will say to the dispatcher (see below). Remember, panic is the enemy in this race against time.
2. *Find a phone* – a land line or a cell phone will do the trick.
3. *Call 911* - dial 911. Be aware that, sometimes, it takes time for the phone to route to the correct answering point. Do not hang up if you do not connect immediately.
4. *Know what you will be asked* – make sure you are aware of the following:
  - Where is the emergency?: The emergency is not always located where you are calling from. Always be aware of your surroundings and where you are. Try to keep a watch out for the road signs, business names and intersections whenever you travel.
  - Nature of the emergency: Do you require assistance from law enforcement, medical professionals, and/or fire fighters? In certain areas, the dispatcher or a computer will tell you to dial certain numbers to help them know which department to connect you with and whom you should talk to.
  - A detailed, yet concise, description: What happened? How many details do you know? What should have the most importance? In general, the most important thing is why you need assistance (a gunshot wound, for example), followed by what caused you to need assistance (say, a hunting accident).
  - The phone number of your phone. The dispatcher will need instructions on how to get to where you are, and may need to call back for more information. Know the phone number of your phone.

- Location. Give the dispatcher your name and address
5. *Listen to the dispatcher* - follow orders. The better and faster you follow orders, the higher everyone's rate of survival will be. Even in a non-lethal situation (broken bones, etc.) this is of vital importance. Have faith in the dispatcher. And remember that even if the dispatcher is still asking questions or giving instructions, help is on the way.
  6. *Do not hang up until you are instructed to* - anything can happen and emergency services need to know your situation at all times. If the building is on fire, for example, the dispatcher will need to know if there are other people in the building and where any safe exits are.

## Activity #7 – Tour of the Inside of an Ambulance

If possible, have a tour of the inside of an ambulance. Have a paramedic explain what the various items inside the ambulance are used for and what a day in the life of a paramedic is like.



**Activity #2 - Sensational Comparison**

Compare your senses to that of a typical animal's senses and fill in your guesses below.

**HUMAN****ANIMAL****VISION**

(clear or blurry)

**VISION**

(black and white or colour)

**VISION**

(vision in degrees)

**SMELL**

(check which one has the best)

**TOUCH**

(check which one has the best)

**HEARING**

(check which one has the best)

**TASTE**

(check which one has the best)

## Activity #2 - Sensational Comparison – ANSWER SHEET

Compare your senses to that of a typical animal's senses and fill in your guesses below.

### HUMAN

### ANIMAL

clear

#### VISION

blurry

(clear or blurry)

colour

#### VISION

black and white

(black and white or colour)

180 degrees

#### VISION

360 degrees

(vision in degrees)

\_\_\_\_\_

#### SMELL

X

(check which one has the best)

X

#### TOUCH

\_\_\_\_\_

(check which one has the best)

\_\_\_\_\_

#### HEARING

X

(check which one has the best)

\_\_\_\_\_

#### TASTE

X

(check which one has the best)

**JUDGING CARD – FOOTWEAR - SAFE HANDLING OF ANIMALS**

Criteria:

1. Is the item made properly?
2. Does the item serve the purpose for the class it is in?
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

\*\*note: additional requirements can be added to list

Giving Reasons:

I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

I place \_\_\_\_\_ first because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ 4th because.....

For these reasons, I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

Official Placing \_\_\_\_\_.

## Activity #5 – Animals Deserve Respect – Demonstration

Seven Important Factors When Working With An Animal

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

**Activity #5 – Animals Deserve Respect – Demonstration – Answer Key**

## Seven Important Factors When Working With An Animal

1. Be calm and deliberate
2. Announce your presence well in advance
3. Avoid quick gestures/ movements
4. Be patient - never prod an animal when it has nowhere to go
5. Respect livestock - don't fear it
6. Move slowly, gently touch, don't bump or shove
7. Always have an escape route



## MEETING 2 - NO ROOM TO BREATHE

### Objectives

- Learn which deadly gases are produced on farms.
- Learn where and when these deadly gases can be found.
- Obtain an understanding of rescue procedures and equipment

### Roll Calls

- Name one area that hazardous gases could potentially be found.
- What is your full address that you would give to EMS/911 in an emergency?
- Name one effect that hazardous gases could have on a human.

### Sample Meeting Agenda – 2 hrs. 5 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes & Business	10 min
Topic Information Discussion	Discuss Deadly Gases and Places (silo and manure gases), Monitoring Systems, Breathing Equipment, Management Suggestions, Fumes (paint and fuel poisoning), WHMIS	30 min
Activities Related to Topic	Activity #8 – Deadly Gases Activity #9 – Other Deadly Places Activity #10 – A Mock Rescue Activity #11 – Judging PPE Equipment	60 min
Wrap up, Adjournment & Social Time!		10 min
At Home Challenge	Choose one of the At Home activities to complete.	

## Topic Information

### Deadly Gases and Places

***What you smell, can kill....***

***What you cannot smell can kill!***

Hazardous gases on farms can be found in silos, manure storage areas, anaerobic digesters, grain bins, shops and improperly ventilated barns – structures that provide a confined space in which gases can accumulate to dangerous levels or deprive the air of enough oxygen to sustain life.

Never assume that the environment inside a silo or manure storage is safe. Do not enter a liquid manure tank or recently filled silo, under any circumstances, without a pressure-demand remote breathing apparatus. These confined spaces often contain lethal concentrations of hazardous gases. Always have a lifeline attached, with a responsible, trained and competent safety person in view of your work.

Plant material stored in a silo ferments, allowing the crop to be stored for a long time. However, the fermentation process uses up oxygen, produces carbon dioxide and, under certain conditions, nitrogen dioxide, as by-products. This results in an environment unsuitable for humans soon after the silo is filled, lasting for up to 2 weeks.

Manure that is stored for a long time undergoes anaerobic decomposition, which produces manure gases. Warm weather and poor ventilation can increase the concentration of these gases. Liquid manure tanks can contain toxic levels of gases or can have no oxygen. High hydrogen sulphide gas levels can also deteriorate exposed concrete above the liquid manure surface.

### Silo Gas Poisoning

#### ***Carbon Dioxide***

Carbon dioxide (CO<sub>2</sub>) is colourless and odourless. It is, in part, the product of respiration of both plant material and animals, and is found naturally in the atmosphere. The main danger with carbon dioxide is that it can create an oxygen deficiency, resulting in asphyxiation or suffocation.

As part of the ensiling process, living plant material quickly uses up available oxygen and dies. During this respiration process, oxygen is converted to water and CO<sub>2</sub>. Carbon dioxide displaces the oxygen in a sealed silo, making this environment unsuitable for humans without an external air supply.

#### ***Nitrogen Dioxide***

Nitrogen dioxide (NO<sub>2</sub>) is a dangerous chemical asphyxiant produced as a result of chemical reactions that take place almost immediately after plant material is placed into a silo. Even short-term exposure can result in sudden death. NO<sub>2</sub> has a characteristic bleach-like odour and may be visible as a reddish-brown haze. It is heavier than air, so it will tend to stay just above the silage surface. It may also flow down silo chutes and into feed rooms.



Weather conditions and cultural practices will affect the amount of nitrates in plant material, which in turn will set the stage for the production of  $\text{NO}_2$  in the silo. For example, a dry period during the growing season followed by abundant rainfall will encourage a corn crop to take up high levels of dissolved nitrates. If the corn is harvested before the nitrates can be converted to proteins, nitrous oxide ( $\text{N}_2\text{O}$ ) and nitric oxide ( $\text{NO}$ ) are produced. Unstable  $\text{NO}$  combines with oxygen to form deadly nitrogen dioxide.

When inhaled,  $\text{NO}_2$  dissolves in the moisture on the internal lung surface to produce a strong acid called nitric acid. Nitric acid burns the lung tissues, which is followed by massive bleeding and death. Repeated exposure to lower concentrations of  $\text{NO}_2$  will cause chronic respiratory problems, including shortness of breath, coughing and fluid in the lungs.

## Manure Gas Poisoning

### *Ammonia*

Ammonia ( $\text{NH}_3$ ), a colourless gas with a characteristically pungent odour, is produced by the decomposition of nitrogen compounds in animal manures. Classified as an irritant, this gas is lighter than air and can predispose livestock to various respiratory diseases if they are exposed to a significant level for an extended period of time.

Ammonia irritates the eyes and is likely to be found mainly in swine, poultry and rabbit buildings, however, it can also be a problem in manure composting operations. As a guideline, if livestock or humans develop irritated eyes, improve the ventilation in the building.

### *Methane*

Methane ( $\text{CH}_4$ ) is a colourless, odourless, non-toxic but combustible gas, generated by anaerobic digestion of organic material such as manure. If stored and managed properly, it can be used as a fuel source for internal combustion engines or cleaned and injected in the natural gas grid. It is lighter than air and therefore tends to rise from the manure storage. In well-ventilated livestock buildings, methane is unlikely to cause problems, however, in covered and in-barn storages, methane can become trapped, and the concentration can reach dangerously explosive levels.

Agitating manure in a liquid storage results in a rapid increase in the release of manure gases and methane. If allowed to accumulate in an enclosed space, methane gas can cause explosions.

### *Hydrogen Sulphide*

Hydrogen sulphide ( $\text{H}_2\text{S}$ ) is the most dangerous of the manure gases. It is classified as a chemical asphyxiant because it immediately chemically interacts with the blood's hemoglobin (red blood cells) to prevent oxygen from being carried to the body's vital organs and tissues. It is produced from the anaerobic decomposition of organic materials such as manure. Its characteristic rotten egg smell is easy to detect at low concentrations, but at higher concentrations,  $\text{H}_2\text{S}$  paralyzes the sense of smell. In high concentrations, hydrogen sulphide causes instant paralysis and death.

Hydrogen sulphide effects on humans at various concentrations	
H <sub>2</sub> S Concentration, PPM	Effect on Humans
4	Easily detectable, moderate odour
10	Eye irritation
27	Unpleasant odour
100	Coughing, eye irritation, loss of sense of smell after 2–15 min. exposure
200–300	Eye inflammation and respiratory tract irritation after 1 hour
500–700	Loss of consciousness and possible death in 30–60 min.
800–1,000	Rapid unconsciousness, cessation of respiration and death
>1,000	Diaphragm paralysis on first breath, rapid asphyxiation

Source: American Society of Agricultural and Biological Engineers, ASABE EP470 Standard, 2005.

## Monitoring Systems & Warning Systems

All of these hazardous gases can be measured with appropriate test equipment. Although much of the equipment is expensive and requires periodic re-calibration, there are some very reasonably priced gas detection tubes and handheld monitors commercially available from safety and scientific supply stores.

Commercial handheld monitors available from safety and scientific supply stores can also measure hazardous gases. Handheld detectors monitor environmental gases constantly, are compact in size and sound an alarm when a dangerous gas level is detected. They can be equipped with a sampling hose and pump used to monitor the atmosphere of a confined space outside harm's way. When purchasing a gas monitor, note whether the unit can be calibrated at the farm or has to be serviced. Certain units will stop working if the calibration has expired.

### Fact

**From 1990-2008, 50% of agricultural fatalities in Ontario due to toxic substance exposure were attributed to hydrogen sulfide (manure gas) poisoning.**

**Source: *Agricultural Fatalities and Hospitalizations in Ontario 1990-2008, Canadian Agricultural Injury Reporting (CAIR), 2011***

## Breathing Equipment

Air-supplying respirators deliver clean air from a powered source to the respirator wearer. This class of respirator is required when dangerous gases or lack of oxygen pose an immediate

threat to life or health. Examples include a full-face respirator attached by an air-line to a central air source; and a full-face respirator attached to a portable air or oxygen canister (SCBA or self-contained breathing apparatus). Some agricultural activities that require an air-supply respirator are:



## Management Suggestions

### Silo Storage

- Post a “Danger, Deadly Gases” warning sign in a visible location near the silo
- Do not allow children or visitors near the silo for 3 weeks after filling
- Provide sufficient feed room ventilation to exhaust any silo gas that might have slipped down from the silo
- Check with your local fire department to see if pressure-demand remote breathing apparatus is part of their emergency equipment. Self-contained breathing apparatus (i.e. SCBA) equipment is not suitable because of the air tank. It is sometimes too big for climbing the silo chute or the outside ladder-cage or too small to contain enough reserve air to rescue someone.
- During filling, adjust the distributor as needed to level the silage. Do not level the material by hand.
- If it necessary to enter the silo when filling is complete, do so immediately following the last load, on the same day. Remember to leave the blower running while inside.
- Oxygen-limiting silos are a special case and should never be entered. If it becomes absolutely necessary to enter such a silo, it is essential that an external air supply be worn and back-up emergency safety measures are in place.
- A top unloader can ventilate a silo effectively. However, if it becomes necessary to service a defective unloader, assume that gases are present. To expel gases before entering, run the forage blower with the chute doors closed and the roof vent open. Leave the forage blower running while in the silo.
- If someone collapses inside a silo, begin ventilating with the forage blower immediately and contact your local fire department. A fresh air supply is critical for both the victim and rescuers. ***Never attempt to rescue someone yourself.***

*Image Source: Institute of Agricultural Rural and Environmental Health, University of Saskatchewan, Factsheet #13 [http://aghealth.usask.ca/resources/documents/fact\\_13.pdf](http://aghealth.usask.ca/resources/documents/fact_13.pdf)*

## Manure Storage

- Ensure covered manure storages are ventilated by some means to prevent the accumulation of all hazardous gases
- Always maintain at least 0.3m (1 foot) of space between the manure surface and the bottom of the slats in a barn to prevent animals from routinely breathing hydrogen sulphide and carbon dioxide
- Post a “Danger, Deadly Gases” warning sign in a visible location near each pump-out station
- Do not agitate the liquid manure in storage unless absolutely necessary. If agitation is necessary, keep the agitator below the liquid surface and do not direct the stream of agitated manure towards a post or wall. Research has shown that gas levels will increase to lethal levels in seconds when splashing or surface agitation takes place. Remove all livestock, if possible, before agitating and emptying. Monitor gas levels in the barn.
- If the barn has under-floor (pit) ventilation, and the porosity of the slatted floor is such that adequate air velocity can be reached, use the pit ventilation system.
- If the barn does not have under-floor ventilation, or if adequate air velocity cannot be reached, provide maximum room ventilation. Beware, there is a greater risk when there is no under-floor ventilation. Do not enter the barn during or immediately following pumping or agitation. Monitor gas levels in the barn.
- It is highly recommended that a hydrogen sulphide monitor with an alarm be used to monitor gas levels in the barn.
- When flushing gutters, provide maximum ventilation. Do not enter the barn during or immediately following flushing. Monitor gas levels in the barn.
- Ideally, locate all pump-out openings outside the building to eliminate the danger of working in a confined area. Surround them with a safety railing.
- Do not attempt to rescue an animal if the floor collapses during pumping or agitation. Turn off the pump, provide maximum ventilation and wait a reasonable time before entering the barn.
- Avoid any source of ignition, such as smoking, in the barn or near a manure storage facility.
- Avoid operating welding equipment in confined spaces without testing and monitoring gas levels.
- Covered manure storages, even when empty, should only be entered by trained personnel equipped with suitable self-contained breathing apparatus. Never assume that gas levels are safe.
- If a rescue becomes necessary, call your local fire department. ***Do not attempt a rescue on your own.***

- If you suspect that you have been exposed to high levels of manure gas, consult your physician or the poison control centre or call EMS/911 immediately.
- Inspect the safety fence periodically to ensure there are no openings and that warning signs are still in place.
- Ensure that modifications to the ventilation system or any renovations to the livestock building do not affect the venting of hazardous gases in under-barn manure storages.

## Liquid Manure Tankers

- Never assume a tanker is safe to enter, even when empty. Hydrogen sulphide, which is heavier than air, will collect at the bottom of the tanker and remain there, even though there is an opening at the top. ***Never enter a liquid manure tanker unless you are equipped with suitable self-contained breathing apparatus.***
- When working around liquid manures storages and tankers, farm workers can protect themselves by wearing a pocket-sized hydrogen sulphide monitor that will sound an alarm when dangerous gas levels are reached.
- Newer liquid tankers are equipped with safety hatches to prevent unauthorized entry. However, a number of older units in use do not have a safety hatch. Safety hatches can be purchased from a number of farm equipment dealers or can be custom made.

*Excerpts taken from OMAFRA Factsheet #04-017 Hazardous Gases on Agricultural Operations*  
<http://www.omafra.gov.on.ca/english/engineer/facts/14-017.htm>

## Fumes – Paint and Fuel Poisoning

### Paint Fumes

Breathing *solvent paint fumes* for too long can cause headaches, dizziness and nausea. This can happen in a poorly ventilated space or when large areas are being painted or stained. These paints can be deadly if they are inhaled on purpose or “huffed”, to get high. Ensure that whenever solvent paint is being used that the area is well-ventilated.

If someone inhales paint fumes and feels dizzy or light-headed, immediately get them fresh air and call your local Poison Control Centre. In Ontario, contact the Ontario Poison Centre at 1-800-268-9017. NOTE: it is always a good idea to update your list of Emergency numbers each year and confirm that the phone number has not changed.

Even though fumes from *latex and oil paints* can irritate the eyes, nose and throat, they do not poison the body when used as directed. Any irritation should go away once you get into fresh air. If fresh air doesn't help, take a warm shower and wash your hair.

### Fuel Fumes

One of the greatest risks of gasoline exposure is the harm it can do to your lungs when you inhale its fumes. Direct inhalation can cause carbon monoxide poisoning which is why you shouldn't run a vehicle in an enclosed area, such as a garage or shop. Long-term exposure in the open can also damage your lungs.

## MEETING 2

Small, gas-powered engines are especially harmful because they emit more poisons. Carbon monoxide is both invisible and odorless, so you might breathe it in large quantities without even knowing it. This can cause permanent brain damage and even death.

Excessive exposure to fumes warrants a visit to the emergency room or a call to a local poison control center. Ensure the victim is in an area with fresh air and take the following precautions:

- Don't force vomiting
- Don't give the victim milk
- Don't give liquids to an unconscious victim
- Don't leave the victim and yourself exposed to gasoline fumes
- Don't attempt to remedy the situation yourself. Always call for help first.

Pumping fuel into your gas tank isn't generally harmful. However accidental liquid exposure can harm your skin. Wash the skin immediately after exposure with soap and water and remove any clothing that may have also come into contact with the fuel.

## WHMIS

The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard. It came into effect on October 31, 1988. The key elements of the system are hazard classification, cautionary labelling of containers, the provision of (material) safety data sheets ((M)SDSs) and worker education and training programs.



The requirements of WHMIS place the responsibility on employers to ensure that controlled or hazardous products used, stored, handled or disposed of in the workplace are properly labelled, (M)SDSs are made available to workers, and workers receive education and training to ensure the safe storage, handling and use of these products in the workplace. This includes farms with employees.

More information about WHMIS can be found at: [http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/about-a\\_propos-eng.php](http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/about-a_propos-eng.php)



## BEFORE THE NEXT MEETING

Try these activities at home:

1. Do a survey of your own home and/or farm. Make a list of confined spaces or places where deadly gases might occur. If there are potentially dangerous places, design warning signs and post them. Include your list in your Record Book.
2. Bring at least three things that are used in your home which make working with chemicals or pesticides safer. Items could include gloves, goggles or a variety of other items. Be creative! Be prepared to tell the rest of your club what the items are and how they help with safety.
3. Choose a situation working with deadly gases that could be potentially dangerous. Go through the steps of Stop, Think, Act (found in the introduction of this reference manual) to outline what the activity is and why a person should:

*Stop briefly:* What could go wrong? How bad could it be?

*Think:* Do I understand the activity? Do I have the right tools? What potential risks are there?

*Act:* What action should I take to avoid the dangers? Make it safe!

AND, stop if it cannot be done safely!

## DIGGING DEEPER

For senior members

### Respiratory Protection

The farm workplace can pose extreme hazards to the respiratory system. Contaminants in the air range from large nuisance particles, such as harvest dust, to toxic vapours from chemicals. They may cause respiratory irritation, permanent health damage or death in some instances.

With so many possible hazards, it is important to know which respiratory protective equipment is required in various situations. They can be determined by answering the following questions.

1. Is the contaminant a particulate, liquid, gas or vapour?

Particulate are solid or liquid particles suspended in the air (grain dust, fungal spores, molds, pollen or metal fumes from welding).

Common sources of dangerous gases include:

- liquid ammonia fertilizers
- grain and feed storage tanks
- carbon monoxide from engine exhaust, fires or welding gases
- hydrogen sulphide in liquid manure tanks
- nitrogen dioxide and carbon dioxide in silos

Vapours are mainly associated with spray painting and pesticide use. IN both cases, a solvent is used as a carrier. Hence the worker may face a combination of vapour and particulate hazards.

2. What is the route of entry?

A contaminant's route of entry into the body will determine what kind of protection is required. The three possible routes include:

- INHALATION (through the lungs)
  - Quickest, most direct route due to large surface area
- INGESTION (through the digestive tract)
- ABSORPTION (through the skin)

### ***Respiratory Protective Equipment***

Respirators fall into one of two general categories, air purifying and supplied air. Each is designed for a specific application, depending upon the nature of the hazard and the level of concentration.

**AIR PURIFYING RESPIRATORS** remove contaminants from the air and can be used only in an environment that contains sufficient oxygen to sustain life. Respirators are only effective up to their specified concentration limits.

Air-purifying respirators are equipped with filters through which the user breathes. Important: These respirators do not supply oxygen. Therefore, they should not be worn in areas considered immediately dangerous to life or health, such as oxygen-deficient areas (oxygen-



limiting silos, for example) or highly toxic atmospheres (manure storage pits). Air-purifying respirators are good in areas such as barn lofts with moldy hay, fields during tilling or pesticide application, or construction sites where fiberglass or wood dusts are likely to be found. For most air-purifying respirators, the user must pull air through the filter with their own breathing. This type of respirator is often referred to as a “negative pressure” respirator because the user must draw in oxygen (inhalation) through the respiratory unit. Negative pressure air-purifying respirators often put added stress on you. If you suffer or suspect that you suffer from respiratory problems such as asthma, lung or cardiovascular disease, check with a doctor to make sure you are able to wear one. There are several types of air-purifying respirators.

Within this class, there are different types of respirators:

- Mechanical filter respirators
- Chemical cartridge respirators
- Powered-air purifiers

**SUPPLIED AIR RESPIRATORS** deliver air to the wearer’s facepiece, helmet or hood. Supplied-air respirators are the only respirators to be used in areas considered immediately dangerous to life or health.

These respirators can be used in manure pits, sealed silos, or fumigated bins containing high-moisture grain. They supply the wearer with fresh, clean air from an outside source. There are two types of supplied-air respirators. The first, air-line respirators, provide clean air through a hose that is connected to a stationary air pump or tank. The second, a self-contained breathing apparatus (SCBA) has a portable air tank that is carried on the back like those worn by scuba divers and firefighters.

RESPIRATORY HAZARD	REQUIRED TYPE OF RESPIRATORY PROTECTION
Pesticides	Chemical cartridge approved pesticide respirator, half-mask, full-face or vehicle mount helmet system, depending on concentration and type of application
Fumigants (for buildings)	Gas mask with canister, supplied air or self-contained breathing apparatus, depending on type of application
Fumigants (for soil)	Chemical cartridge, full-face organic vapour respirator
Carbon monoxide	Self-contained breathing apparatus
Nitrogen dioxide (silage gas)	Self-contained breathing apparatus (greatest danger 48 hours after filling silo, danger exists up to four weeks after filling)
Hydrogen sulphide (manure pit agitation, ventilation failure)	Supplied-air respirator with full facepiece, helmet or hood or self-contained breathing apparatus
Ammonia (manure pit agitation, ventilation failure)	Chemical cartridge respirator approved for ammonia and methylamines
Chemical additives (powder or solids)	An approved toxic dust respirator
Grain dust	An approved toxic dust respirator
Paint	An approved spray paint respirator
Welding	An approved fume respirator
Fungal spores	An approved toxic dust respirator

***Fitting Your Respirator***

Complete protection is not ensured by selection of the right respirator. A device has to be worn correctly to ensure that no leakage occurs around the seal. If there is a leak, you can be sure the contaminated air will come through. Facial hair, either a full beard or one day's stubble can prevent a good seal. Follow the manufacturer's instructions to make sure you have put the respirator on correctly.

A quick and easy method to check the seal is to use either a positive or negative fit check. For a positive fit check, cover the exhalation valve with the palm of your hand and exhale. The air will build up inside the respirator. If there is a leak in the seal, you will feel it against the skin of your face. To conduct a negative fit check, cover the cartridge(s) with your hands and inhale. The mask should be drawn tightly to your face if there is no leakage.

***Maintenance of Your Respirator***

If your respirator is to be used more than once, regular cleaning, repairing and changing of cartridges is required. A pesticide cartridge does not last forever! The prefilter should be changed after each day's spraying and the organic vapour cartridge should be replaced as soon as the odour of the pesticide penetrates.

Dust filters should be changed when they become difficult to breathe through. If you have a respirator with a rubber facepiece, check to make sure valves are intact and wash the facepiece with warm water and mild soap.

Maintenance-free disposable air-purifying respirator offer the greatest convenience. When their filter is used up, the device is simply discarded and replaced with a fresh, clean respirator.

Store protective equipment in a clean, dry place away from the work area or chemical storage.

Visit a safety equipment distributor to view the various types of respirators. Ask questions and take pictures. Include your findings in your record book. Ensure the proper respiratory equipment is being used on your farm.

## ACTIVITIES

### Activity #8 - Deadly Gases

Items Needed:

- Three jars
- Bleach
- One hard-boiled egg
- Dark paper
- Tape
- Deadly Gases worksheet and answer sheet (found at the end of this meeting)
- Pen/pencil

#### ***Instructions:***

Preparing the three jars:

1. The easiest is the CO<sub>2</sub> gas. Take one jar and put a lid on it. Make sure there is no smell inside of it as carbon dioxide is odourless and tasteless. Cover the jar with dark paper so no one can see in and label it with the letter "B".
2. Hard boil an egg early in the day of the meeting and place it in the second jar. Put a lid on it. Do not refrigerate. Manure gas smells like rotten egg. Cover with dark paper and label with letter "C".
3. Nitrogen dioxide smells like bleach. Place some bleach (about ¼ full to allow the gas to inhibit the rest of the air space) in the container and put the lid on it. Cover in dark paper and label it with letter "A".
4. Just before the meeting, poke holes in the jar lids so the members can smell the gases without removing the lids.

Give each member a Deadly Gases worksheet. Let each member take a whiff of each jar and then try to complete the worksheet for each gas. Ask members questions such as:

- Where have you smelled things like that before?
- Where might you come in contact with a gas that smells, acts or behaves like the one in the jar?

## Activity #9 - Other Deadly Places

### ***Items Needed:***

- Other Deadly Places worksheet and Answer Sheet (found at the end of this meeting)
- Pen/Pencil

### ***Instructions:***

1. Have members brainstorm to come up with a list of other deadly places where gases could be found.
2. Review the answers and have members explain why they listed the places they did as deadly places.

## Activity #10 - A Mock Rescue

### ***Items Needed:***

- Paper
- Pen/pencil
- Worksheet (found at the end of this meeting)

### ***Instructions:***

The object of this activity is to make the members think of the proper procedures by acting out situations. Remember: it is okay to make mistakes and that we learn from our mistakes as we evaluate the role playing.

When evaluating the role plays, keep the following in mind:

- Call for help on the phone
- Work with a buddy
- Wear correct personal protective equipment (PPE)

Example Rescue: Horse Stall. The victim has been trampled by a flighty Thoroughbred. The victim is discovered and is injured and will need medical attention. One rescuer makes the phone call to the ambulance and perhaps a veterinarian. Both rescuers put on work boots and go to the barn to lead the horse out of the stall if it is safe to do so. Rescuers can then tend to the victim until help arrives.

Example Rescue: A man has passed out at the bottom of a silo only two weeks after it has been filled. The ambulance and fire department should be called. If a SCBA is on the farm, then two people can rescue the victim. They can carry a third SCBA to the downed man to give him quick air until help arrives.

Have members come up with other scenarios to act out.

As scenarios are being acted out, have members make notes as to the good and bad points about each rescue. Ask members to discuss the various rescues and ask questions of the role players. Make sure to note any problems with the rescues. A worksheet is included at the end of this meeting for member to take notes.

## Activity #11 – Judging PPE Equipment - Deadly Gases

### ***Items Needed:***

- Four sets of PPE (e.g. breathing equipment, signage)
- Judging Worksheet (found at the end of this meeting)
- Pen/pencil

Which set of PPE would be the safest for entering an area with deadly gases? Why do you think your choice is the best?

## Activity #8 - Deadly Gases Worksheet

Example Jar – Water

Jar A \_\_\_\_\_

dihydrogen oxide (water)

NAME

\_\_\_\_\_

wells, ponds, troughs

WHERE FOUND

\_\_\_\_\_

year round

GREATEST RISK PERIOD

\_\_\_\_\_

lungs, filling, drowning

PHYSICAL EFFECTS

\_\_\_\_\_

ON PEOPLE

H<sub>2</sub>O

CHEMICAL CODE

\_\_\_\_\_

Jar B \_\_\_\_\_

Jar C \_\_\_\_\_

\_\_\_\_\_

NAME

\_\_\_\_\_

\_\_\_\_\_

WHERE FOUND

\_\_\_\_\_

\_\_\_\_\_

GREATEST RISK PERIOD

\_\_\_\_\_

\_\_\_\_\_

PHYSICAL EFFECTS

\_\_\_\_\_

ON PEOPLE

\_\_\_\_\_

CHEMICAL CODE

\_\_\_\_\_

**Activity #8 - Deadly Gases Answer Sheet****Example Jar – Water**dihydrogen oxide (water)

NAME

wells, ponds, troughs

WHERE FOUND

year round

GREATEST RISK PERIOD

lungs, filling, drowningPHYSICAL EFFECTS  
ON PEOPLEH<sub>2</sub>O

CHEMICAL CODE

**Jar B** Jar of airCarbon Dioxide

NAME

top or bottom of silo

WHERE FOUND

after recent silo fill

GREATEST RISK PERIOD

gasp for air, suffocatingPHYSICAL EFFECTS  
ON PEOPLECO<sub>2</sub>

CHEMICAL CODE

**Jar A** BleachNitrogen Dioxidesilos, silo surfaces,  
feed roomssilo filling, up to  
four weeksburning sensation,  
stops oxygen  
supply, burns lungs,  
bleed, instant deathNO<sub>2</sub>**Jar C** Rotten eggHydrogen Sulphidemanure pitsduring agitation and  
pumpinginstantaneous  
death in high levels,  
stop breathingH<sub>2</sub>S

**Activity #9 – Other Deadly Places Worksheet**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_



## Activity #9 – Other Deadly Places – Answer Sheet

**\*\*NOTE:** this list is not inclusive – there could be additional areas that deadly gases can be found

1. Livestock pen
2. Well
3. Grain bin
4. Manure tanker
5. Bathroom
6. Closet
7. Old car
8. Old fridge
9. Manure pit
10. Shop
11. Silo
12. Machinery shed

[illegible]

## JUDGING CARD – PPE Equipment - Deadly Gases

### **Criteria:**

1. Is the item made properly?
2. Does the item serve the purpose for the class it is in?
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

\*\*note: additional requirements can be added to list

### **Giving Reasons:**

I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

I place \_\_\_\_\_ first because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ 4th because.....

For these reasons, I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

Official Placing \_\_\_\_\_.



## MEETING 3 - CHEMICAL WARFARE

### Objectives

- Learn what a pesticide is, its function and how to handle and store pesticides.
- Identify hazardous product symbols.
- Be aware of what personal protective equipment (PPE) is required for various types of chemicals.
- Learn how to safely dispose of pesticide containers

### Roll Calls

- Name a chemical that is dangerous to you and/or the environment. This can be a household, vehicle or farm chemical.
- Name one piece of Personal Protective Equipment (PPE).
- Name one safety rule to keep in mind while working with chemicals.

### Sample Meeting Agenda – 2 hrs. 15 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes & Business	10 min
Topic Information Discussion	Discuss Pesticides, Hazardous Product Symbols and PPE.	30 min
Activities Related to Topic	Activity #12 – Judging PPE Equipment Activity #13 – Hazardous Products Symbols Scavenger Hunt Activity #14 – Safety Equipment Activity #15 – Now We're In The Soup Activity #16 – Proper Labelling Activity #17 – Guest Speakers	70 min
Wrap up, Adjournment & Social Time!		10 min
At Home Challenge	Choose one of the At Home activities to complete.	

## Topic Information

### Which Cide Are You On?

When we look at the word homicide and break it down it means:

HOMI.....MAN

CIDE.....TO KILL

When we reverse the words, homicide means 'To Kill Man.'

So, when we look at the word pesticide, it's a lot easier to understand what it means.

PESTICIDE.....TO KILL PESTS

There are three different kinds of pesticides:

1. Fungicides (kill fungus)
2. Herbicides (kill weeds)
3. Insecticides (kill insects)

To be healthy, we need to eat a variety of foods, especially fresh fruits and vegetables. Pesticides play an important role in making sure there is enough food for everyone, by protecting food and crops from pests (insects, weeds and fungal diseases).

While we have our own native pests to deal with in Canada, globalization has caused the spread of invasive plants and animals not originally from Canada, increasing some pest problems. If not controlled properly, pests can destroy crops and make some fresh fruits and vegetables less available.

Whether to eat organic or conventionally grown produce is a personal choice. Health Canada regulates all products that make pesticidal claims, including products intended to repel pests and protect organic produce. To date, there is no evidence to indicate that there is a health risk from eating conventionally grown produce because of pesticide residues or that organic foods are safer to consume than conventionally produced food.

Health Canada regulates pesticides under the Pest Control Products Act (PCPA) and its Regulations. Under this Act, pesticides must be registered before they can be used in Canada.

Before any pesticide can be registered in Canada, Health Canada must review the scientific information to make sure that it has value and there are no health environmental concerns related to its use.

## Regulation of Pesticides in Ontario

The Ministry of the Environment and Climate Change (MOECC) is responsible for regulating the sale, use, transportation, storage and disposal of pesticides in Ontario. Ontario regulates pesticides by placing appropriate education, licensing and/or permit requirements on their use, under the Pesticides Act and Regulation 63/09. All pesticides must be used in accordance with requirements under the Pesticides Act and Regulation 63/09.

## Purchasing and Applying Pesticides

In Ontario, in order for farmers to be able to purchase and apply pesticides, they must take the Grower Pesticide Safety Course and pass a written exam. By taking the course, farmers learn how to keep themselves, their family and the environment safe when they handle and use pesticides.

The course is only open to those who are a farmer involved in an agricultural operation as defined under Regulation 63/09 of the Ontario Pesticides Act, through the Ontario Ministry of the Environment. Farm employees and farm family members are eligible for the certification as well. Course participants must be at least 16 years old.

## Handling and Storage

When you decide to use a pesticide, choose the most appropriate formulation and application method for your situation. Use only properly calibrated sprayer equipment. Choose less toxic and less volatile alternatives when possible. Take all possible precautions to prevent the exposure of people and non-target organisms to the pesticide. Read the most current pesticide label thoroughly before application. The label provides important information, such as:

- directions for use (e.g., rates of application, crops/sites it can be used on, target pests, crop rotation restrictions, total number of applications, droplet size/nozzle type, application equipment, timing, appropriate weather conditions)
- required personal protective equipment (PPE)
- hazard symbols and warnings
- restricted entry intervals
- pre-harvest intervals
- buffer zones
- precautionary statements
- steps to be taken in case of an accident
- disposal

For more information on hazards, consult the Material Safety Data Sheet (MSDS) or contact the manufacturer.

For safe storage of pesticides, keep in a well-marked storage area that is locked, well ventilated and dry.

### Pesticide Pointers

- Do not dump left over chemicals into streams. Contact your municipality to see if any waste collection days are scheduled and verify whether quantities of agricultural pesticides will be accepted. Or, contact your local dealer for details about the CleanFARMS program which operates a free Obsolete Pesticide Collection Program throughout Ontario every three years.
- Do not wash your pesticide contaminated clothing with other clothes.
- Always inspect pesticide containers for leaks before handling them. Be sure to wear gloves to protect your hands from any possible leakage.
- You should wash before using the toilet if you have been handling pesticides. If you have dangerous chemicals on your hands, don't touch any other parts of your body before washing.
- If a sprayer nozzle plugs in the field, shut off the sprayer and remove the nozzle. But, do not blow through the nozzle. Clean the plugged nozzle with fresh water.
- Never put left over chemicals in other containers to be stored (even if they are labelled). Always store pesticides in original containers and lock them up in a separate building or room.
- Pesticides should never be stored near food supplies.
- Watch for symptoms of pesticide poisoning. Some common symptoms are:
  - Headaches
  - Fatigue
  - Skin irritation
  - Dizziness
  - Nausea
  - Perspiration
- When someone has been poisoned by chemicals, always be sure to take the chemical label and booklet and/or the container to the hospital.
- Never re-use empty pesticide containers.
- The Ontario Empty Pesticide Container Recycling Program, an industry-led program, is available free of charge to growers and commercial applicators. Through this program, you can return triple-rinsed or pressure-rinsed plastic pesticide and fertilizer containers up to 23 L to container collection depots located throughout the province. Remove the cap and booklet from the pesticide container before recycling. To locate the closest container collection depot, visit [CleanFARMS](#) or call your local dealer to see if they will take the empty containers. Do not bury, burn or take empty containers to a landfill site.



## Pesticide Spills

**For major spills**, if a pesticide spill causes, or is likely to cause, an adverse effect that is greater than that which would result from the proper use of the pesticide, you must notify the Ministry of the Environment and Climate Change Spills Action Centre at 1-800-268-6060 (24 hr a day, 7 days a week) and your municipality.

A spill is defined as a discharge of pollutant that is abnormal in quality or quantity, from or out of a structure, vehicle or other container into the environment. An incident such as an overturned pesticide sprayer that results in the loss of the spray solution to the environment is an example of a spill. A pesticide container that ruptures and leaks its contents is another example of a spill. The discharge or spraying of a pesticide in an unapproved area is also considered a spill.

Before you begin to clean up a spill of any nature, remember to protect yourself against pesticide exposure. Wear the proper protective clothing and personal protective equipment. If the spill occurs inside an enclosed area (e.g., a pesticide storage area or a vehicle during transport), ventilate the area first. Once you have protected yourself and removed other persons or animals from the spill site, take additional measures to stop the spill at the source and prevent it from spreading and/or contaminating watercourses. Specific precautions, emergency contact information and first aid procedures may be found on the label.

**For minor spills**, it may be possible to rectify the problem:

- For a liquid spill - Cover the spill with a thick layer of absorbent material such as kitty litter, vermiculite or dry soil. Sweep or shovel the material into a waste drum and dispose of the contents as you would a hazardous waste.
- For a dust, granular or powder spill - Sweep or shovel the material into a waste drum and dispose of the contents as you would a hazardous waste.

For major spills, it is essential to stop the spill from spreading.

The clean-up guidelines above may not be appropriate for all spill situations. Once you have contained the spill, follow directions from the manufacturer and regulatory authorities on cleaning the contaminated area.

Excerpts taken from OMAFRA Using Pesticides in Ontario webpage: <http://www.omafra.gov.on.ca/english/crops/resource/using-pesticides.htm>

## Hazardous Products Symbols

Hazardous product containers have a symbol to warn us about the danger or hazard of the product. The symbol is made up of two parts, a frame and a picture. The frame shows the degree of the hazard. The picture shows the type of hazard. These symbols are found on hazardous projects. There are many combinations.

### HHPS: Household Hazardous Product Symbols

Before October 1, 2001 the old regulations required three different frames (Yield sign, diamond and stop sign) to indicate the degree of hazard. Now, only two frames are used to distinguish between the **contents** of the product and the **container** itself.

	Poison	Flammable	Explosive	Corrosive
Danger				
Warning				
Caution				

*The above indicates symbols prior to October 1, 2001.*

### HHPS: Household Hazardous Product Symbols

- These symbols are made up of a **picture** and a **frame**:
  - The picture tells you the type of danger.
  - The frame tells you
    - if it is the chemical inside the container that is hazardous
    - if it is the container that is hazardous.

**Dangerous contents in container**



**Dangerous container**



*These symbols have been used since October, 2001.*

*Image Credits: WHMIS Training Slide Deck*

## Chemical Forms

Chemicals come in three different forms:

1. Dry (powder)
2. Liquid
3. Spray

Three forms of chemicals (or pesticides) mean three places where they can come into contact with the body.

1. Skin (touch)
2. Stomach (ingestion)
3. Lungs (inhalation)

## Personal Protective Equipment (PPE)

When working with chemicals, personal protective equipment is worn by workers to reduce or eliminate the exposure. The MSDS's (see WHMIS in Meeting 2) for chemicals in the classroom or in the workplace will list the right PPE to wear. Not all types of PPE will protect against all hazards so it is important to always check the MSDS first before using both the chemical and the PPE.

PPE commonly used when working with chemicals includes:

PPE	Protects	Hazards
Safety Glasses	eyes	chemical liquid splashes, dust
Hard Hat	head	falling material
Ear Protection	hearing	excessive noise
Gloves	hands	corrosives, toxic materials
Respirator	lungs	toxic gases, vapours, fumes or dust
Clothing	skin	toxic or corrosive materials
Footwear	feet	corrosive, toxic materials

Chart Credit: Canadian Centre for Occupational Health & Safety [http://www.ccohs.ca/teach\\_tools/phys\\_hazards/ppe.html](http://www.ccohs.ca/teach_tools/phys_hazards/ppe.html)

## BEFORE THE NEXT MEETING

Try these activities at home.

1. Take a picture of a container that has at least one hazardous symbol on it. Put the picture in your Record Book and list what each of the hazardous symbols mean and what precautions should be taken when working with the substance in the container.
2. Find out what steps should be taken if there was a gasoline spill on or near your property. Call your local petrochemical dealer and ask for the list. Bring the list to the next meeting.
3. Choose a situation working with pesticides that could be potentially dangerous. Go through the steps of Stop, Think, Act (found in the introduction of this reference manual) to outline what the activity is and why a person should:

*Stop briefly:* What could go wrong? How bad could it be?

*Think:* Do I understand the activity? Do I have the right tools? What potential risks are there?

*Act:* What action should I take to avoid the dangers? Make it safe!

AND, stop if it cannot be done safely!

## DIGGING DEEPER

For Senior Members

### Reading Pesticide Labels

Important information is found on the labels of pest control products, and includes:

Pesticide Label Information	
Label element	Description
Trade or Product Name	The name may include a distinctive brand or trademark which will usually be prominently displayed.
Classification	All pest control products are classified for intended use and by toxicity into one of four pesticide classes (domestic, commercial, manufacturing or restricted). The class is based on where the product will most often be used and how hazardous the product is to the user and the environment. It is also an indication of the care that should be taken when using, storing and transporting the pesticide.
Pesticide Type	This is a description of the intended purpose of the product. Some of the most commonly used pesticides include herbicides, insecticides and fungicides.
Active Ingredient(s) and Guarantee of Concentration	Each active ingredient is identified by its established common name and the concentration in the formulation (% by weight or by volume).
Type of Formulation	Is a description of the physical form of the product such as dust, liquid, wettable powder, etc.
Pest Control Product Registration Number	For example REGISTRATION NO. 00000 PEST CONTROL PRODUCTS ACT.
Registrant's Name and Address	Name and address, and sometimes a telephone number. Under some circumstances, the name and address of the Canadian Agent may be required instead. The registrant or agent can always be contacted for additional information.
Net Contents of Package	The amount of pesticide product in the container expressed in metric units. This information will help you decide how many packages will be needed.
Directions for Use	Includes species that are intended targets of the product, dosage rates, timing of application and limitations for use of the product. May list the re-entry time.
Degree and Nature of Hazards	Indicated by precautionary signs, symbols and signal words as standardized and outlined in the Pest Control Products Regulations.
Precautionary Statements and Handling Precautions	Presents information on hazards relating to handling, storage, display, distribution and disposal. Instructions on how to eliminate the hazards should also be outlined here. May list the re-entry time.
First Aid Instructions	Gives practical information on what to do in the event of poisoning or injury by the product.
Toxicological Information	Gives information essential to treatment if a person is injured, or poisoned by the product. Includes the symptoms of poisoning, antidote or remedial measures and identity of other ingredients (such as petroleum distillates) in the product that may affect treatment. May list the re-entry time.

*Adapted from: Grower Pesticide Safety Course Manual, Chapter 5 – Pesticide Formulations, Ontario Pesticide Education Program, University of Guelph Ridgetown Campus*

## MEETING 3

To look up individual pesticide labels, Health Canada's Pest Management Regulatory Agency (PMRA) has an electronic pesticide and label database. The labels of all pesticides registered for use in Canada, their complete text, including the pamphlets attached to the labels, can be found on the Health Canada web site at: <http://www.hc-sc.gc.ca/cps-spc/pest/registrant-titulaire/tools-outils/label-etiq-eng.php>

Choose a pesticide and research what the label looks like. Include the label in your Record Book. By reading the label, determine if it is a herbicide, insecticide or fungicide, which type of crop the product is to be used for, the size of the container and any restrictions for application of the product (such as wind speed, temperature, etc.). If this information cannot be found on the label, try to find the pamphlet/booklet that would also accompany the pesticide container.

## ACTIVITIES

### Activity #12 – Judging PPE Equipment - Hazardous Products

#### ***Items Needed:***

- Four sets of any type of PPE (e.g. safety glasses, hard hat, ear protection, gloves, respirator, clothing, footwear)
- Judging Worksheet (found at the end of this meeting)
- Pen/pencil

Which set of PPE would be the safest when using hazardous products? Why do you think your choice is the best?

### Activity #13 – Hazardous Products Symbols Scavenger Hunt

#### ***Items Needed:***

- Have members do a scavenger hunt in either a shop, kitchen, bathroom or any other area that you are comfortable have members look through
- Blank Paper and Pen/Pencil

#### ***Instructions:***

1. Divide members into teams of two to three members.
2. Explain that the object of the scavenger hunt is for members to find as many different hazardous products symbols on items as possible in a specified time frame (e.g. 5 minutes).
3. Have members do a scavenger hunt in either a shop, kitchen, bathroom or any other area that you are comfortable having members look through. A barn with livestock is not advisable as members rushing to find items will scare livestock.
4. The team that finds the highest number of different hazardous symbols in the specified time frame wins.
5. Have members show the rest of the group what symbols they found and what the symbols mean.

## Activity #14 – Safety Equipment

### *Items Needed:*

- Rubber boots
- Goggles
- Rubber gloves
- Rubber apron
- Face shield
- Dust mask
- SCBA
- Work boots with steel toes and reinforced heel and sole
- Any other piece of PPE necessary for farm practices

### *Instructions:*

1. Discuss the features of each piece of PPE that is available..
2. Ask for a volunteer to demonstrate the way each piece of equipment would be used.

### *Discussion questions:*

- Where would each piece of equipment be used?
- How often do you or your parents use PPE?
- Why do you use it?
- How is it used or worn?

## Activity #15 – Now We're In The Soup

### *Items Needed:*

- Empty soup cans
- PPE for use in spraying pesticides

### *Instructions:*

1. Have a volunteer in the group put on the proper PPE for use when working with and filling a sprayer with pesticides.
2. Fill one of the soup cans with water. Pretend that in front of you is a sprayer (larger soup



can). In your hand you hold a can of pesticide liquid (the can filled with water).

3. Dump the liquid into the sprayer, being careful not to spill.
4. Decide as a group what the correct next steps should be. The can should be triple rinsed. Pour more water into the can and slosh it about, being careful not to spill.

***Discussion questions:***

- What should happen to the can after it has been triple rinsed? Is there a depot in your area to take the can?
- Why is rinsing important?
- Why is it important to not leave the container laying around your farm?

## **Activity #16 – Proper Labelling**

***Items Needed:***

- Identical clear containers with lids, numbered.
- Various liquids (suggestions but not limited to):
  - Mouthwash
  - Draino
  - Round-up
  - Windshield washer
  - Pop
  - Motor oil
  - Vegetable oil
  - Gasoline
  - Diesel fuel
- Labels for the liquids

***Instructions:***

1. Place all of the liquids in a row. Number the containers.
2. Have members look at the liquids and guess as to what they are.
3. Review what the correct answers are.

***Points for Discussion:***

- Did any of the liquids fool you?
- What are the potential dangers of mistaking a liquid for something that it's not?
- What would have helped you to better identify the liquids?
- What could be done to prevent accidental poisoning from happening?

**Activity #17 – Guest Speakers*****Suggestions for guest speakers***

- Local farm supply dealer that sells pesticides
- Grower Pesticide Course instructor
- Graduate of the Grower Pesticide course

## JUDGING CARD – PPE Equipment - Hazardous Products

### **Criteria:**

1. Is the item made properly?
2. Does the item serve the purpose for the class it is in?
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

\*\*note: additional requirements can be added to list

### **Giving Reasons:**

I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

I place \_\_\_\_\_ first because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ 4th because.....

For these reasons, I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

Official Placing \_\_\_\_\_.



## MEETING 4 - FIRE LIGHT, FIRE BRIGHT

### Objectives

- Learn what the four elements of fire are.
- Learn about types of fires and fire extinguishers and how to use a fire extinguisher.
- Learn ways to prevent barn, shed, shop and machinery fires.
- Learn what to do in the event of a fire.

### Roll Calls

- Name one thing that can be done in a barn to help prevent a fire.
- If a fire starts and you call for emergency help, what is one piece of information that is critical for you to give?
- Name a piece of farm equipment that could catch fire.

### Sample Meeting Agenda – 2 hrs. 15 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes & Business	10 min
Topic Information Discussion	Discuss Elements of Fire, Combustibles, Flashpoints & Mixtures, Types of Fire Extinguishers, Using a Fire Extinguisher, Being Prepared – Barn Fires, Machinery Fires	40 min
Activities Relating to Topic	Activity #18 – Flaming What? Activity #19 – Bad Things Come in Threes! Activity #20 – Types of Fire Extinguisher Activity #21 – Judging Fire Extinguishers Activity #22 – Make Your Own Fire Extinguisher Activity #23 – Escape Plan Activity #24 – How Safe Is Your Farm? Activity #25 – Guest Speakers	60 min
Wrap up, Adjournment & Social Time!		10 min
At Home Challenge	Choose one of the At Home activities to complete.	

## Topic Information

### Elements of Fire

Fire occurs whenever combustible fuel in the presence of oxygen at an extremely high temperature becomes gas. Flames are the visual indicator of the heated gas. Fire can also occur from lower-temperature sources. Over time, combustible materials such as smoldering embers can reach their ignition temperature.

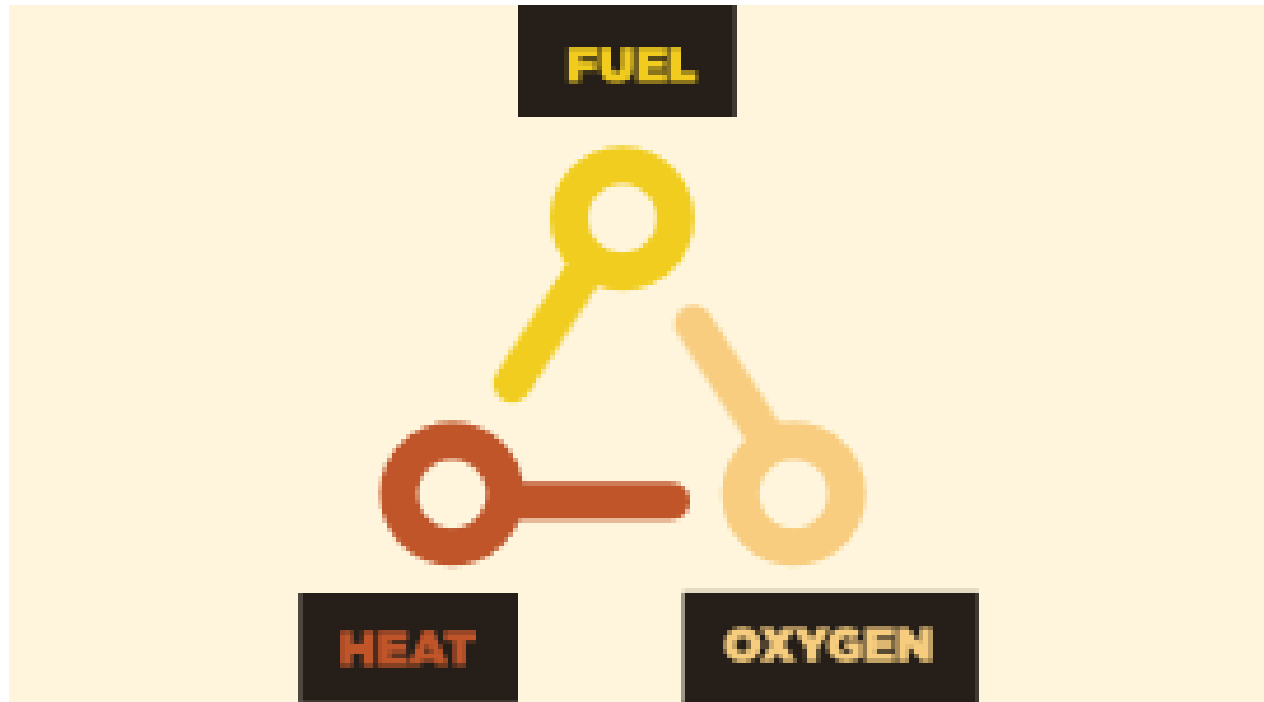


Image Credit: Canadian Centre for Occupational Health and Safety <http://www.ccohs.ca>

### The Fire Tetrahedron

When fire strikes, the potential for damage to people and property is tremendously high. The burning process requires four elements often referred to as a fire tetrahedron:

#### **Heat**

A heat source is responsible for the initial ignition of fire, and is also needed to maintain the fire and enable it to spread. Heat allows fire to spread by drying out and preheating nearby fuel and warming surrounding air.

#### **Fuel**

Fuel is any kind of combustible material. It's characterized by its moisture content, size, shape, quantity and the arrangement in which it is spread over the landscape. The moisture content determines how easily it will burn.

#### **Oxygen**

Air contains about 21 percent oxygen, and most fires require at least 16 percent oxygen content to burn. Oxygen supports the chemical processes that occur during fire. When fuel burns, it

reacts with oxygen from the surrounding air, releasing heat and generating combustion products (gases, smoke, embers, etc.). This process is known as oxidation.

### Chemical Reaction

This is called combustion and involves the transformation of the fuel and oxygen into water and carbon dioxide. By-products include heat and light. The heat sustains the reaction.

If any of the above four items are removed, the fire will stop. For example, if something is burning in a pot, put a lid on the pot, oxygen will be cut off and the burning will stop.

## Combustibles, Flashpoints, Mixtures

**Combustible** substances are substances that burn and can be a liquid or a solid. Some ordinary combustibles are wood, paper and clothing.

- Ordinary combustibles start burning between 450-500 degrees Celsius.
- A candle burns at 1800-1900 degrees Celsius.

A **flash point** is the lowest temperature at which a liquid releases enough vapors to start burning.

- Gasoline's flashpoint is 40 degrees Celsius.
- Diesel fuel's flashpoint is 120 degrees Celsius.






With combustible fuels, it is the fumes which burn, not the liquid itself. It is therefore important to know when fumes are produced.


For natural gas and propane, it is the **mixture** of the gas in the air which is dangerous. From 4 to 14 percent of natural gas mixed with air will cause an explosion if a spark is present. The explosive percentage for propane is between 3 and 8 percent.

## Types of Fires and Fire Extinguishers

Physical Hazards
TEACHING TOOLS

### Fire Fire Classes

				
<b>Ordinary combustibles</b> Wood, paper, cloth, trash and other ordinary materials	<b>Flammable Liquids</b> Gasoline, paints, oils, grease and other flammable liquids	<b>Electrical Equipment</b> Wiring, fuse box	<b>Combustible Metals</b> Combustible metals and metal alloys	<b>Combustible Cooking</b> Cooking media (vegetable or animal oils and fats)



Canadian Centre for Occupational Health and Safety

Image Credit: Canadian Centre for Occupational Health and Safety <http://www.ccohs.ca>

## MEETING 4

There are five main types of fire:

1. Class A – Ordinary Combustibles
  - a. Wood, paper, cloth
  - b. Ordinary trash
2. Class B – Flammable Liquids and Gases
  - a. Gasoline
  - b. Oils
  - c. Paints
  - d. Propane
3. Class C – Electrical Equipment – these could be any of the other type of fires but electrical equipment is involved
4. Class D – Combustible Metals and Metal Alloys (not very common)
5. Class K – Cooking Materials
  - a. Cooking oils
  - b. Animal and vegetable fats
  - c. Grease

A multi-purpose dry chemical fire extinguisher labeled ABC is good for extinguishing class A, B and C fires, and is recommended for home use. Sand is good to stop metal fires.

### Fire Extinguishers

Extinguishers should be located on each floor or level. You should have one in the kitchen (not too close to the stove), another in your workshop, and in the garage, basement, camper, barn, shop and in tractors, combines, harvesters and any other self-propelled farm machinery. Locate the extinguisher just inside the door to the area concerned so you can reach it easily and fight the fire, while remaining close to the escape route.

Check the extinguisher pressure gauge every month to ensure the unit is holding its charge. If you use the extinguisher, no matter how much agent has been used the extinguisher should be considered empty, and you should have it refilled as soon as possible. The extinguisher will not maintain its pressure once it has been operated.

The decision to fight a fire in your home is critical. Regardless of your choice, always get your family out of the house first, and call the fire department.



## Using a Fire Extinguisher

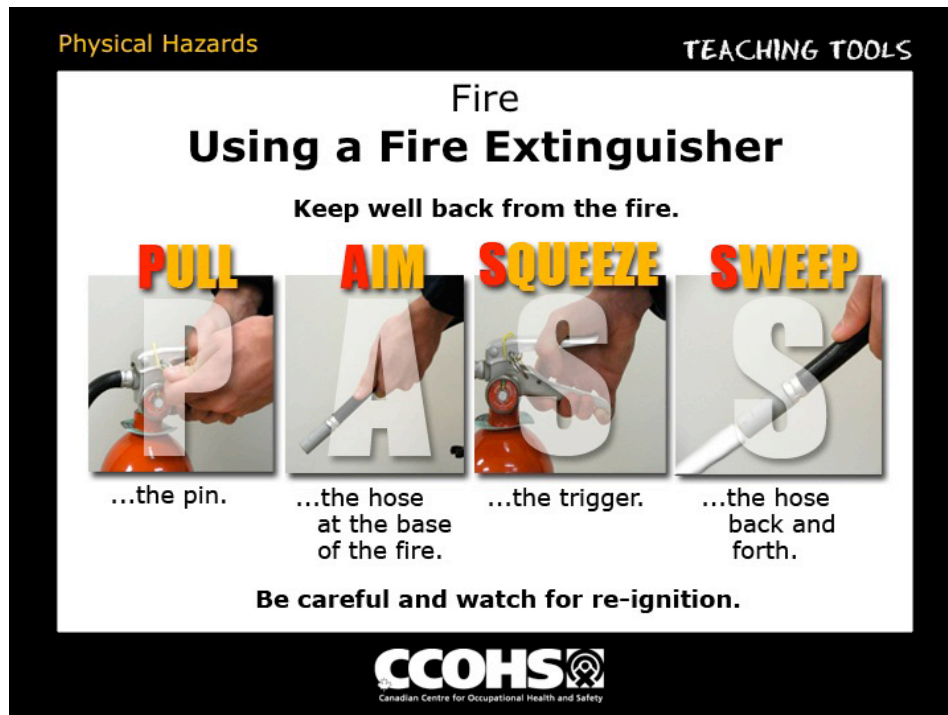


Image Credit: Canadian Centre for Occupational Health and Safety  
<http://www.ccohs.ca>

Keep well back from the fire and remember the acronym PASS.

P = PULL the pin on the fire extinguisher

A = AIM the extinguisher nozzle at the base of the fire

S = SQUEEZE the handle

S = SWEEP from side to side.

Be careful and watch for re-ignition.

## Be Prepared! How Fire Safe is Your Farm?

There is no such thing as a fireproof building, especially in agricultural settings. Building design, management and safety practices are the best way to minimize the risk of fires.

The Office of the Fire Marshal in Ontario manages a database on all fire and explosion occurrences in Ontario. Data reported by fire departments for 2004 – 2007 were analyzed for occurrences involving farm buildings to identify common causes and what can be learned to reduce them.

While the sources of many fires are undetermined due to significant fire damage, there are three leading causes of identifiable farm fires, as reported by fire services.

***Mechanical/electrical failure***

- Short circuit or ground fault in electrical equipment
- Failure of the built-in automatic controls in mechanical equipment or system

***Misuse of ignition source or igniting equipment***

- Improperly discarded smoker's material (e.g. match, cigarette)
- Ignition source left unattended
- Smoking where flammable vapours are present
- Improper use of extension cords (e.g. overloaded circuit, multiple strings in sequence)

***Design, construction or maintenance deficiency***

- Improperly constructed building feature or system
- Improperly installed object such as a heating appliance that is too close to combustible building features
- Improper maintenance such as failure to remove accumulation of combustible dust or debris, which is then ignited by heating appliances, process equipment or electrical equipment
- Faulty product design causes a fire even when the produce is installed and used correctly

There are several operational and maintenance practices that farm operators can use to reduce the risk of fires on farm.

**General Operating Practices – Prevention is Key!**

- An ideal barn design has fire prevention as an important goal. For example, stalls with doors that open to the outside or sliding doors into the aisles that permit rapid evacuation for people and animals
- Do not allow smoking in farm buildings. Restricting access to farm buildings keeps people out who don't know or respect these rules.
- All barns should have smoke detectors. Some farms have water sprinklers and smoke detectors which sound an alarm in the house. Large barns should be outfitted with alarms that not only detect fires, but also ventilation failures and power outages.
- Ensure your barn is outfitted with at least one large fire extinguisher. Two ABC fire extinguishers in good working order, one at each entrance to the barn, are preferred. A rubber hose that extends the length of the barn will help extinguish most early stage fires in a stable. Do not use water to put out an electrical fire!

## MEETING 4

- When repairing fixed or stationary equipment inside a farm building (livestock penning, stabling, shop, etc.) with ignition source equipment (welders, cutting torches or grinders), ensure that:
  - fire extinguishers are located in the work area
  - all combustible materials are removed from the work area
  - the site is well ventilated to reduce the concentration of combustible gases present

Establish a fire watch during the work and for a period of time following completion. Gas detection devices are available if accurate gas concentration levels are required.

- Turn off all non-essential lights. Lights should have protective covers where possible. Do not leave heat lamps or space heaters turned on and unattended around flammable materials. Many fires have been started in calf warmers made of plywood with straw and a heat lamp.
- Store combustibles (hay, shavings, manure, gas, oil, propane, paint, cutting torches, etc.) away from the barn. Only a limited amount of hay should be stored inside the barn and temperature checks should be done periodically. Keep all haystacks away from the barn as the bales can be easily ignited by combustion or a lightening strike. Shavings will also heat up quickly and should not be stored in or near the barn. When cleaning the barn, all dirty straw, shavings and manure must be moved completely clear of the barn.
- Establish good housekeeping practices. Eliminate clutter inside and outside the buildings. Keep grass and weeds mowed around buildings. These measures reduce the risk of fire spread and improve the effectiveness of suppression activities. Clean house - cobwebs and dust are combustibles! Stalls and pens should be cleaned out regularly and the ceiling and beams swept. Perform rodent control.
- Keep burn barrels away from the barn and shop.
- Be careful when pressure washing inside a farm building. The high pressure water can physically damage equipment and allow deep water penetration into unwanted areas such as electrical panels, heater controls, etc.
- Grain handling and feed preparation activities generate dust, which presents an explosion and/or fire hazard. Vent these areas and provide a fresh air supply. Properly protect electrical fixtures and use totally enclosed, fan-cooled motors. Good housekeeping practices are critical to limit combustible materials from this area.
- All wiring should be installed by a professional and protected not only from the elements, but also from the animals and rodents who can chew on them. Situate electrical boxes in a location where they can be shut off quickly and safely. Have wiring inspected regularly. The less wires the better! Keep wiring to a minimum in the barn - this includes extension cords, radios, microwaves, televisions, etc.
- Install all electrical equipment associated with fuel storage (i.e. electric fuel pump) according to the Ontario Electrical Safety Code.
- Ensure all liquid fuel and propane storage areas are located according to applicable Codes (adequate separation distance from fixed ignition sources, etc.). If the storage

## MEETING 4

tanks are exposed to vehicle traffic, install protection (i.e. bollards or equivalent) around the storage tanks to reduce risk of damage from vehicle collisions



*Image Credit: OMAFRA Publication 837 – Reducing the Risk of Fire on Farm*

## What To Do When Fire Strikes:

1. Do not panic.
2. Call 911. Tell the dispatcher what type of building is on fire (barn, shop, shed etc.) and give them the emergency number address. If you don't have an emergency number at the building, know your land location and make sure your local fire hall knows the roads that can reach your farm in all seasons and weather.
3. Tell them the status of the fire (smoke showing or fully involved).
4. Notify them if there are any people injured or trapped.
5. Notify them as to any dangers that might be in the shed or shop such as tractors containing fuel, barrels of oil, paints, etc.
6. Notify them of the status and type of animals – if the animal are loose or contained and how many are still in the barn.
7. If your driveway is difficult to see or find, send someone out to meet the fire department. Many fire departments have delayed response time due to poor directions.
8. Shut off the power source to your barn.
9. If you are the only one at the barn, **DO NOT enter the barn!** If something happens, no one will know you are inside.
10. If the fire starts while people are working in the barn, shed or shop, have a designated spot outside where all family members/employees meet to make sure everyone is out of the building.
11. If the barn roof is on fire, do not enter the barn. The roof may collapse at any time.
12. Grain dust will ignite and explode. Do not try to auger grains during a fire.
13. If any animals get out of the barn, secure them in a containment area away from the burning structure (i.e. corral or trailer).

14. All burned and severely injured animals must be euthanized as soon as possible.

15. If you experience animal death loss, you must follow provincial deadstock laws.

## **Tips & Hints: About Specific Types of Animals**

### ***Cattle***

- Cattle are very difficult to remove from a burning barn. They will run back in if not confined away from the fire.
- It is best to try to move the animals in a group versus one at a time. Isolation greatly stresses the animals and they will not be cooperative if you attempt to move one at a time.
- Many beef animals are housed outside near or around a barn. Move them to a separate field away from the barn.
- Dairy animals will need to be evacuated to a protected area if the fire occurs in winter as they cannot withstand extreme weather.

### ***Poultry***

- In poultry barn fires, the birds are almost impossible to evacuate. Virtually all poultry barn fires result in a 100% loss.
- Along with barn fires, ventilation system failures are a very common poultry farm disaster scenario. Ensure your barn alarm is linked to the main house and the alarm system is maintained and tested.

### ***Swine***

- Pig barn fires are among the most difficult to deal with. Due to the design of the barns, the number of pigs in the barn and the difficulty in moving pigs, these barns are almost impossible to evacuate.
- Keep in mind that pigs are highly flammable.
- If you have a series of connected barns, do not attempt to evacuate the barn on fire. Begin to evacuate the next section in the barn or the next nearest barn if the pigs are in group pens. Experienced equipment operators may be able to break the barns apart to isolate the burning area.
- Just like cattle, pigs must be contained after removal from the barn as they will run back into the burning barn.
- The pigs must be protected from the cold if the fire occurs in the winter as they may quickly succumb to adverse weather.
- You must prepare yourself for the smell and the sounds of the animals involved in pig barn fires. These fires are very devastating.

### ***Horses***

- Horse barn fires are the most common of all fires and horse owners may not always act rationally when responding to a barn fire.
- Horses must always be approached on and led from the left hand side.
- A horse will be easier to move if it is blindfolded. Using a towel under a halter works very well. Horses, like cattle, may run back into the barn.

## **Machinery Fires (Tractor, Baler, Combine)**

### **General Operating Practices – Prevention is Key!**

Any time you expose dry, flammable material to hot mufflers, worn-out bearings and electrical wiring, there's a risk of starting a fire where there shouldn't be one.

Unfortunately, a combination of these elements results in combines and balers catching fire every year.

1. Have working fire extinguishers mounted on equipment and ensure everyone knows how to use them. There should be a fire extinguisher in the cab and one that is accessible from the ground.
2. Ensure bearings and drives are lubricated and tension is set appropriately.
3. Check exposed wiring and fuel/hydraulic lines for damage, wear and deterioration.
4. Remove crop residue, dust, debris, dirt and excess lubricant around all heat sources regularly. Some crops, like canola and sunflowers are "stickier" than others.
5. Allow engine to cool before refueling.
6. Walk around machinery and watch, listen and smell to make sure things are working properly.
7. Carry a shovel along on equipment.
8. Be careful when using vehicles in fields that are low to the ground, as exhaust pipes and catalytic converters can ignite dry grass or stubble. Park on field edges or in places where they won't ignite dry crop residue.
9. Carry a cell phone or radio to report emergencies. Make sure you know the directions to the field.

### **What To Do When Fire Strikes:**

If a fire arises call emergency services first. Once the fire department has been called, attack with the fire extinguisher if it's safe to proceed. In a dry, windy environment, fires can double in no time and expand well beyond your control.

If the fire becomes out of control and beyond the capabilities of a fire extinguisher, get far away from the machinery as the fire could spread quickly along the ground.

## BEFORE THE NEXT MEETING

Try these activities at home:

1. Do you know the 911/Emergency address for where you live? Record it in your Record Book and make a sign with the address for each place there is a phone on your property and in various places in your home, shed, shop and/or barn.
2. Inspect your own farm as well as your home for proper placement of fire extinguishers. Make sure that the fire extinguishers have been checked and dated as they expire over time.
3. Make a poster that displays the acronym PASS. Create drawings and use explanations for each of Pull, Aim, Squeeze and Sweep to demonstrate the proper use of a fire extinguisher.
4. Choose a situation working with gasoline and/or fire that could be potentially dangerous. Go through the steps of Stop, Think, Act (found in the introduction of this reference manual) to outline what the activity is and why a person should:

*Stop briefly:* What could go wrong? How bad could it be?

*Think:* Do I understand the activity? Do I have the right tools? What potential risks are there?

*Act:* What action should I take to avoid the dangers? Make it safe!

AND, stop if it cannot be done safely!



## DIGGING DEEPER

For Senior Members

### Burning Corn as a Source of Heat

Corn is considered a clean burning fuel and environmentally friendly.

When considering shelled corn as a fuel, there are many decisions to make such as which stove, furnace or boiler to buy and how to store the fuel corn. Unlike other home heating systems where the fuel is delivered through a pipe or a wire, corn-fuelled appliances need corn fed into them manually in order to produce heat. The corn storage system can be very simple or more complex, with simple corn storage systems usually involving daily manual labour.

Although similar to wood stoves, corn stoves are specifically designed to burn a dry granular fuel, such as shelled corn. Corn-burning stoves usually have a combustion air fan and a corn delivery system, which is not required in standard wood stove construction.

Quality requirements for corn fuel include:

- Shelled corn must be dry, preferably, 15% moisture content or less. Corn higher in moisture will have a lower heat value per unit weight than dry corn will cause flow problems through the fuel loading system and can spoil in storage.
- Shelled corn must be free of fines. Dirty corn, which has a lot of fines and cob pieces, will cause problems with the fuel delivery system.
- Dirty corn may also cause bridging in fuel hoppers.
- Corn test weight does not affect burn quality. The heat content of shelled corn is based on the weight and moisture content of the corn.

There are claims that burning corn is one of the safest ways of producing heat but is this true? Research to find out if corn really is an environmentally friendly, clean burning fuel.

What other considerations are there when choosing a corn stove? Consider things such as whether the stove is CSA (Canadian Safety Association) approved, the labour needed to keep corn flowing into the stove and the exhaust venting that is required.



## ACTIVITIES

### Activity #18 - Flaming What?

#### **Items Needed:**

- Worksheet and Answer Sheet (found at the end of this meeting)
- Pen/pencil

Using the worksheet at the end of this meeting, have members decode the items on the page. Let members know that the items on the sheet are several commonly used terms and phrases related to fire safety. They are to see how many they can decipher in five minutes. If members are having a hard time understanding what they are to do give them the following example:

Write: A CHANCE N on the whiteboard.

Say: "this translates to - an outside chance"

### Activity #19 – Bad Things Come in Threes!

This activity demonstrates how the three components of fire interact with one another. You can also see many interesting things about fire.

#### **Items Needed:**

- Candle
- Matches
- Large glass

#### **Instructions:**

1. Light the candle. Wait until it gets a steady flame. Ask the following questions:
  - What can you tell about the flame? What do you see and feel?
    - It's bright and hot.
  - What does the flame need to survive?
    - It needs three things: heat, oxygen and fuel.
    - If you take the candle away there is no fuel.
    - If you take the heat away by throwing water on it, the flame will go out. Water on a combustible fire disperses the heat and puts the fire out.
  - How can I see the fire's need for oxygen?
    - Set a glass over the candle and watch what happens.
    - The candle should go out in short order.

## Activity #20 – Types of Fire Extinguishers

If possible, have a firefighter do a demonstration about the various types of fire extinguishers available and what types of fires each extinguisher is used for.

If a firefighter is not available, review the information in this meeting about types of fire extinguishers and use this activity to lead into the Judging Fire Extinguishers (Activity #21) and what attributes a good fire extinguisher should possess.

## Activity #21 – Judging Fire Extinguishers

### *Items Needed:*

- Four fire extinguishers
- Judging Worksheet (found at the end of this meeting)
- Pen/pencil

Which fire extinguisher is in the best working order? Why do you think your choice is the best?

## Activity #22 – Make Your Own Fire Extinguisher

### *Items Needed:*

- White vinegar
- Baking soda
- Candles
- Matches
- Jug

### *Instructions:*

1. Light the candles
2. Add several spoonfuls of baking soda to the jug
3. Pour white vinegar into the jug and mix
4. Tip the jug slightly and move it over the candles. Make sure the liquid doesn't touch the candles
5. Watch to see if the flame on the candles goes out.

***How it Works:***

The vinegar and bicarbonate of soda react to form carbon dioxide. This is heavier than air so it stays in the jug when the jug is upright. When you tip the jug, the carbon dioxide pours out.

Fire needs oxygen to burn. The air has around 20% oxygen. When you tip the jug, the carbon dioxide pours out and pushes oxygen out of the way. Without oxygen the candles go out.

Have a look at a fire extinguisher. It works in the same way as your fire extinguisher by using carbon dioxide to displace the oxygen that the fire needs to burn.

**Activity #23 – Escape Plan*****Items Needed:***

- Blindfold

***Instructions:***

1. Have members design a fire plan for the building you are currently in. Have them consider the following:
  - How many exits are there?
  - Which one is the fastest and the safest? (they may not be the same)
  - What can be done to the room/building before you leave it? (e.g. close the door behind you). This may help to contain the fire.
2. If the fire is bad with dense smoke, practice dropping to the floors and holding hands until the group can get out of the building.
3. Practice a fire drill.

When practicing a fire drill, members should put their mouths and noses as near to the floor as possible. Practice crawling out (like elephants), with a hand on the ankle of the person head of them. Remember, members must close their eyes because the smoke might be too bad to hold them open. Blindfold members to reinforce this.

To prove how deadly smoke is, blindfold a member and then turn him/her around several times. Then ask the member to take a deep breath. They must find their way out before they exhale. One inhale and the imaginary smoke gets them.

***Removal of livestock:***

Attempts to remove livestock should only be made when it is safe to do so. Stay out if the smoke is toxic or is heavy enough to down a person. If livestock can be removed safely, it is important to **remain calm**.

**Activity #24 – How Safe Is Your Farm?**

Have members form small groups and create a checklist for fire safety on a farm. Have groups present and compare their lists.

**Activity #25 – Guest Speakers, Demonstrations*****Suggestions:***

- Firefighter
- Fire Extinguisher demonstration
- Fire Truck visit

## Activity #19 - Flaming What? Exercise Sheet

1. S M U P O K E

2. THERE'S  $\frac{\text{ROOF}}{\text{FIRE}}$ 3.  $\begin{array}{ccccc} & & 10 & & \\ 10 & & & & 10 \\ 10 & \text{HEAT} & 10 & & \\ & 10 & & & 10 \\ & & 10 & & \end{array}$ 

4. T H G U A R D

5. FIRE HYD RANT

6. HEATHEATHEATHEATHEATHEATHEATHEATHEATHEATHEAT

7. PHd  
BA BURNS  
MD8. MT H<sub>2</sub>O TANK

**Activity #19 – Flaming What? Answer Sheet**

1. Up in Smoke
2. There's a Fire Under Roof
3. The Heat is Intense
4. Back draught
5. Broken Fire Hydrant
6. Heat Wave
7. Third Degree Burns
8. Empty Water Tank.

**JUDGING CARD – Fire Extinguishers*****Criteria:***

1. Is the fire extinguisher is good working order?
2. Is it missing any parts?
3. Has it been used? Has it been maintained?
4. \_\_\_\_\_
5. \_\_\_\_\_

**\*\*note:** additional requirements can be added to list

***Giving Reasons:***

I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

I place \_\_\_\_\_ first because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ 4th because.....

For these reasons, I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

Official Placing \_\_\_\_\_.





## MEETING 5 - CAUGHT IN THE FLOW

### Machinery Hazards

#### Objectives

- Learn how to avoid being trapped in a grain bin.
- Learn what to do if someone is caught in a grain flow.
- Learn proper use of farm machinery and ATV/ORVs and what dangers to be aware of.
- Learn how to safely work with batteries.

#### Roll Calls

- Name one safety feature a tractor should have.
- Name a type of grain that could be stored in a grain bin.
- Name a piece of farm machinery that poses a danger to humans. Why does it pose this danger?

#### Sample Meeting Agenda – 2 hrs. 25 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes & Business	10 min
Topic Information Discussion	Discuss Entrapment – Grain Bins, Machinery Hazards, What Makes a Tractor Safe?, ATV/ORV Safety, Safe Handling of Batteries, Proper Clothing, Hearing Safety	30 min
Activities Relating to Topic	Activity #26 - Bushels of Danger Activity #27 - Performing the Great Raisin Rescue! Activity #28 - A Real Rescue Activity #29 - Judging PTO Shafts Activity #30 - Machinery Safety Hazards ID Activity #31 - PTO Demonstration Activity #32 - Judging Tractor Safety Activity #33 - In The Middle Activity #34 - Model Eardrum	80 min
Wrap up, Adjournment & Social Time!		10 min
At Home Challenge	Choose one of the At Home activities to complete.	

## Topic Information

### Entrapment – Grain Bins

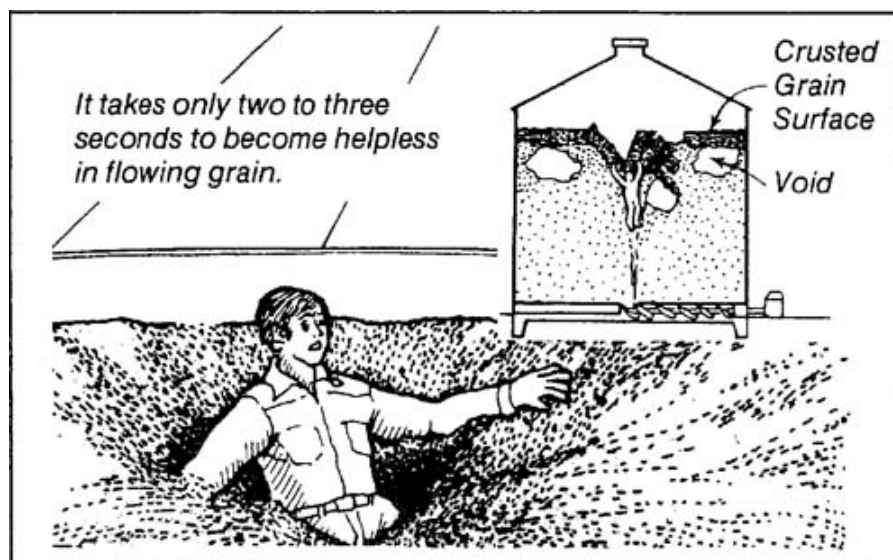


Image Credit: National Ag Safety Database <http://nasdonline.org>

### Why Grain is Dangerous - How Grain Entrapment Incidents Happen

#### *Engulfment in a Flowing Grain Column*

Grain flows in a funnel-shaped path to the unloading auger. This vortex of grain behaves very much like a water whirlpool. Velocity (speed) increases as grain flows from the bin wall at the top of the grain mass into a small vertical column at the centre of the bin.

The vertical column flows down through the grain mass at close to the rate of the unloading auger. Essentially no grain flows in from the surrounding mass. The rate of inflow at the centre top of a grain bin is so great that escape is impossible. Once engulfed in the grain flow, a victim is rapidly drawn down toward the bin floor.

The few survivors of this type of entrapment say they deliberately covered their mouths and noses with their hands and did not panic. They all expressed amazement at the tremendous speed that they were engulfed.

#### *Entrapment in Grain Transport Vehicles*

Many entrapments and suffocation have occurred in high capacity grain transport equipment. Victims are either buried during loading from a combine or storage, or drawn into the flow of grain as a vehicle is being unloaded. Most victims of this type of accident are under 16 years of age. Do not allow children to enter grain transport equipment.

***Collapse of Horizontal Crusted Grain Surfaces***

A thin layer of crusted, spoiled grain can conceal voids (empty spaces) beneath the surface. A victim who breaks through this crust is quickly covered as an avalanche of grain collapses into the cavity.

***Collapse of Vertical Crusted Grain Surfaces***

Spoiled or caked grain can stand almost vertically. As grain is removed from the base of a caked mass, the potential for an avalanche and being engulfed in grain increases dramatically.

***Suction Equipment Hazards***

All bins should be equipped with properly designed doors to permit suction unloading from the exterior only. Attempting to empty a bin from the inside with conventional suction equipment can result in a person being buried in an avalanche of grain.

**In 2015, seven people died in Canada after being entrapped in grain. Four were children.**

**Source: Canadian Agricultural Safety Association <http://casa-acsa.ca>**

**Grain Entrapment Rescue**

Note, not many people survive entrapment in grain. The best rescue is one that never has to happen in the first place! But, if entrapment occurs, it is good to have a plan to attempt to rescue the victim.

***Precautions for Rescuers***

1. Always assume that an entrapped victim is alive.
2. Under no circumstances should you start an unloading auger or open a gravity flow gate. The victim could be drawn into the auger or become edged in the opening.
3. If bin entry is required, the rescuer who goes into the structure should wear a body harness and be tied with a safety rope to at least two rescuers on the roof of the bin.

**Recue Situations*****Always call 911/emergency response for help before starting a rescue!*****A. Victim Completely Submerged**

1. Turn on bin aeration fans to provide as much air as possible to the victim. The extra air could help to save the life of the trapped person.
2. Remove grain from the bin in the most rapid and orderly manner possible. Attempts to dig a buried victim free and generally fruitless because of the massive amount of grain involved and the tendency for grain to backflow. Large openings should be cut

uniformly around the base of the bin. Cut with an abrasive saw, air chisel or cutting torch. These openings will greatly speed up grain removal. If a torch is used, be alert for a fire and have water readily available. If suitable cutting equipment is not available, use the corner of a tractor bucket to ram holes in the bin wall.

3. Cut emergency openings one to two metres (approximately four to six feet) above the ground to reduce the potential for a grain build-up around the outside of the bin. This would block the flow. Ideally, semi-circular V-shaped cuts should be made 75 to 100 cm (30 to 40 inches) across to form valves, which when bent up, allow grain to flow freely. When bent back into place, they slow or stop the flow. This type of control protects rescue workers inside of the bin who otherwise might be drawn into a rapid, uncontrolled flow of grain.
4. Space openings uniformly around the bin to reduce the risk of structural collapse and to make it easier to remove grain from around the base. Once the victim been uncovered, the bin openings can be closed to allow safe access by rescuers.

#### B. Partially Submerged Victim

- If possible, lower a rescue squad member into the bin to reassure the victim and to attempt to attach a body harness or life line. Don't try to pull the victim free with the line. The tremendous drag of the grain could cause further injuries. The life line is only intended to prevent further sinking.
- Check the victim's airway for grain. If he/she is experiencing breathing difficulties, administration of oxygen will help. Panic and struggle may be the chief reason for respiratory (breathing) problems so try to calm the victim.
- Construct a shield if there is further danger of grain collapse. A steel drum with both ends removed, plywood and pieces of sheet metal formed into a circle have all been used successfully.

A portion of the bin's roof may need to be removed to get materials inside. Once the shield is in place, it may be possible to free the victim by scooping grain from the inside of the shielded area. Use a board or sheet of plywood as a work platform.

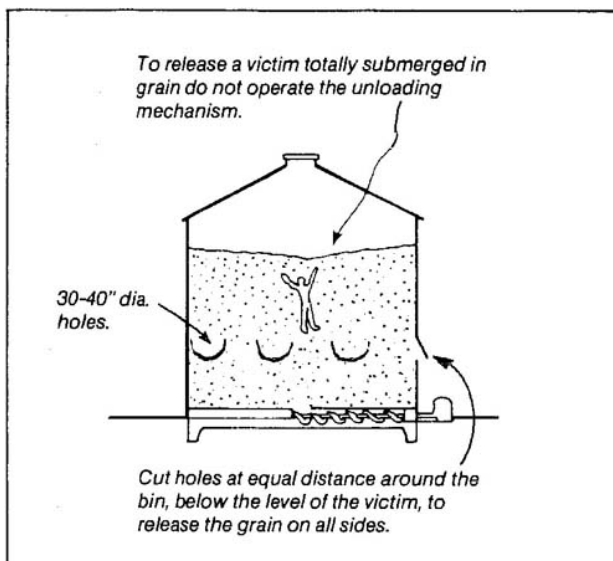


Image Credit: National Ag Safety Database  
<http://nasdonline.org>

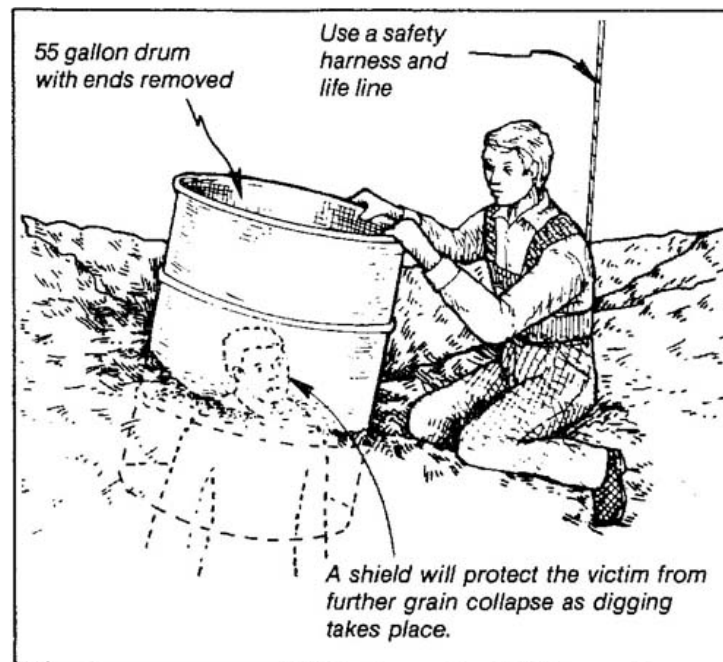
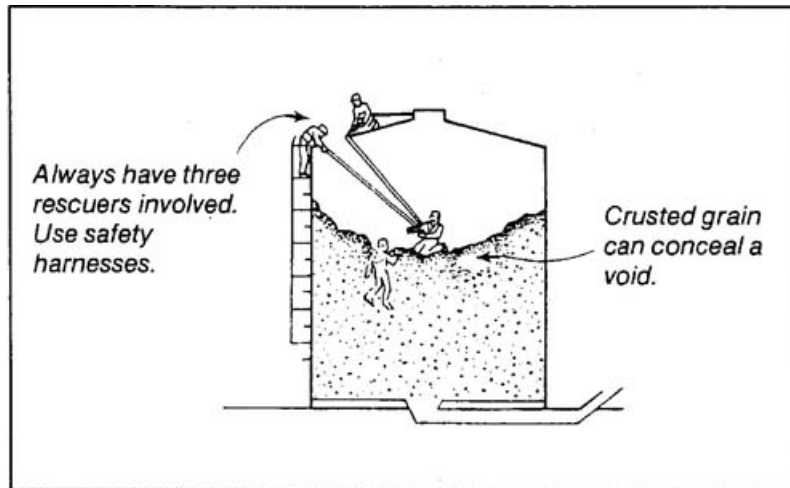


Image Credit: National Ag Safety Database <http://nasdonline.org>

## Machinery Hazards

Farm machinery uses power to do work. This creates a number of possible hazards for both operators and bystanders. Even though manufacturers take many steps to make machinery safe, all hazards cannot be removed.

Most accidents with machinery are the result of human error. The operator either forgot something, took a shortcut or a risk, ignored a warning, wasn't paying close attention or failed to follow safety rules. In many cases, accidents with farm machinery are very serious, even fatal. It is important to recognize and be alert for machine hazards and to take precautions to avoid injury.

There are many different kinds of farm machinery--mowers, tractors, harvesters, grinders, blowers, augers, balers, etc.--but they all have similar characteristics and similar hazards. You can be cut, crushed, pulled in or struck by an object thrown by these machines. They have

cutting edges, gears, chains, revolving shafts, rotating blades, levers and similar hazards. You can also be injured if you fall while working from or near any of these machines.

Another problem with machinery is that some machine parts cannot be completely shielded and still do their job. For instance, a cutting blade cannot be totally enclosed, or it could not cut. In addition, guards which can be removed for maintenance often don't get replaced.

Below is a brief description of areas where machinery injuries can occur. You will likely be touring a farm or machinery dealership to see some of these potential hazards.

### Fact

**From 1990-2008, over half (53%) of all agricultural fatalities in Ontario were due to three machine-related causes: machine rollovers, machine run-overs and machine entanglements.**

- **Of the machine rollover deaths, 65% were sideways.**
- **Of the machine run-over deaths, 34% were caused by unmanned machines (machines had been bypass started, left running or left unblocked on a slope).**
- **Of the entanglements deaths, 30% involved a power take off (PTO).**

*Source: Agricultural Fatalities and Hospitalizations in Ontario 1990-2008, Canadian Agricultural Injury Reporting (CAIR), 2011*

### Shear/Cutting Points

Shear points are created when the edges of two objects move toward or next to each other closely enough to cut soft material. Shear points can be found on harvesters and grain augers.

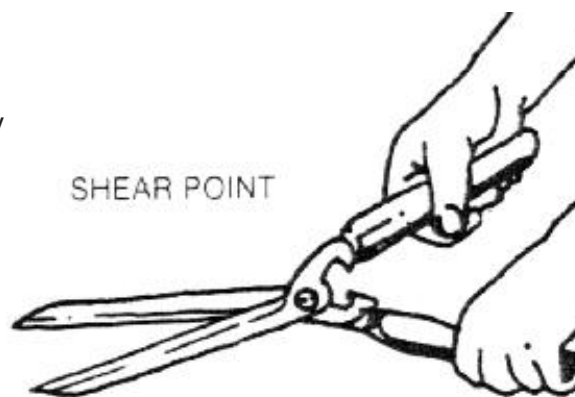


Image Credit: National Ag Safety Database  
<http://nasdonline.org>



### Pinch Points

Pinch points are created when two objects move together with at least one of them moving in a circle. Pinch points can be found on power transmission devices, belt and chain drives (i.e. lawn mowers, motorcycles, snowmobiles, bicycle chains, fan belt on a car, etc.), gear drives and feed rollers.

FIGURE 14-1

### Pinch Points

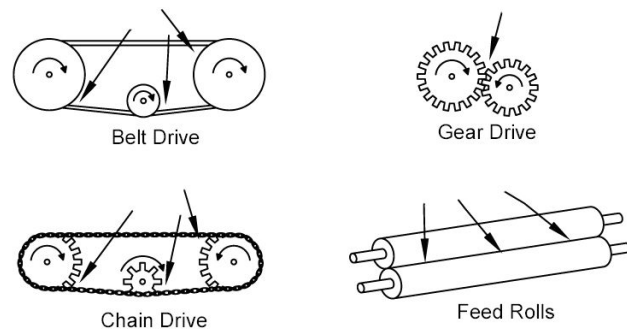


Image Credit: <http://www.namic.org>

### Wrap Points



Image Credit: Living the Country Life  
<http://www.livingthecountrylife.com>

Any exposed rotating machine part is a potential wrap point. A power take off (PTO) shaft is the most common wrap point, although any exposed machine part that rotates can be a wrap point. The ends of shafts that protrude beyond bearings are also dangerous. Universal joints, keys and fastening devices can also snag clothing.

Entanglement with a wrap point can pull you into the machine, or clothing may become so tightly wrapped that you are crushed or suffocated. Workers

operating machinery should be aware of wrap points and wear clothing that will not become entangled in moving components. In addition, where possible, shields or guards should be used to prevent access.

### Crush Points

Crush points are created when two objects move towards one another. Hitches on tractors, wagons and trucks are all examples of crush points.

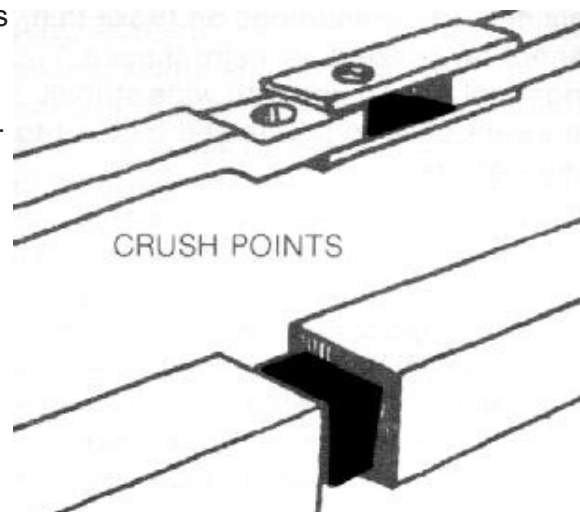


Image Credit: National Ag Safety Database  
<http://nasdonline.org>

### ***Free Wheeling Parts (Thrown objects)***

The heavier a revolving part is, the longer it will take to stop. Many machine parts continue to spin after the power is shut off; for instance, cutter heads of forage harvesters, hammer mills of feed grinders, rotary mower blades, fans and flywheels. Never touch these parts until they have stopped moving completely. This may take as long as 2 to 2 ½ minutes. These machine parts also have the potential of throwing objects.

**FIGURE 14-7**

#### **Thrown Objects**

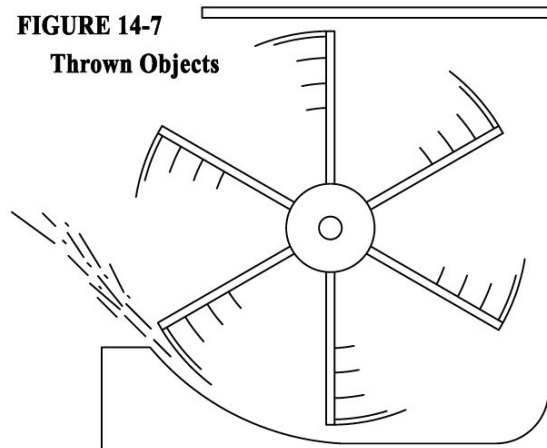


Image Credit: <http://www.namic.org>



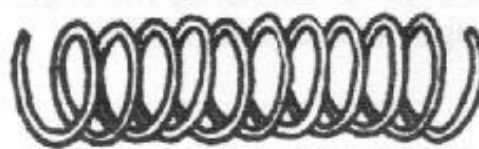
Image Credit: Elizabeth Johnston

### ***Pull-in Points***

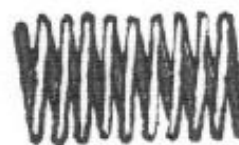
Pull-in injuries usually occur when someone tries to remove plant material from machinery parts. Once the material is freed it can pull you in before you can react and let go. Pull-in points include feed rolls and harvesters.

### ***Springs***

Springs under compression will expand with great force when released, and springs that are stretched will contract rapidly when released. Know what direction a spring will move and how it might affect another machine part when released, and stay out of its path.



NO ENERGY  
SPRING RELAXED



STORED ENERGY  
COMPRESSION

Image Credit: National Ag Safety Database  
<http://nasdonline.org>



### Hydraulic Systems

Hydraulic systems store considerable energy. They are used to:

- Lift and change the position of attachments
- Operate hydraulic motors
- Assist in steering and braking

Leaks from hydraulic systems are a serious hazard because of the high pressure and temperature of the fluid contained in the system. Even fine jets of hydraulic fluid can burn or pierce skin and tissue.

Workers should:

- Never inspect hydraulic hoses with their hands
- Wear long sleeve, heavy gloves and safety glasses when checking for leaks
- Follow the instructions in the operator's manual because the specific procedures for servicing these systems are very important for one's safety

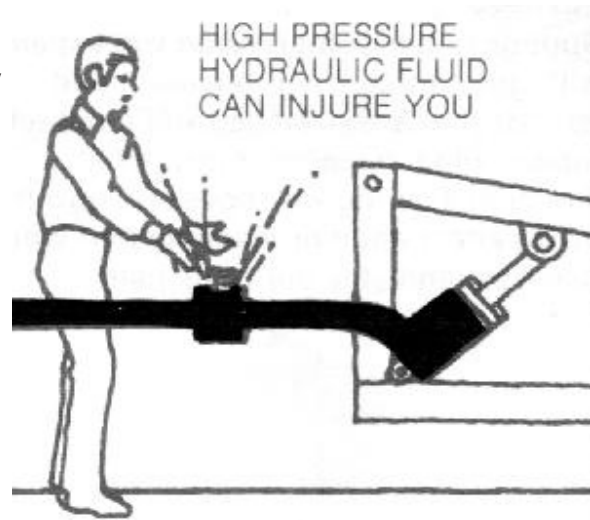


Image Credit: National Ag Safety Database  
<http://nasdonline.org>

When appropriate a properly qualified and certified mechanic should perform repairs and maintenance.

Work should not be performed under raised hydraulic equipment.

### What Makes a Tractor Safe?

- Shields and guards are in place
- Tires are properly inflated
- Brakes and steering systems are in good working order
- The lights all work
- Slow moving vehicle sign is in place for road travel
- There are NO RIDERS other than the operator
- Safety hitch pins and chains are used for towing equipment
- There is a roll-over protective frame or cab and a seatbelt
- When the tractor is stopped:

#### Fact

**From 1990-2008, 44% of all agriculture fatalities in Ontario involved a tractor (run-over, rollover or being pinned by a tractor).**

**Source: *Agricultural Fatalities and Hospitalizations in Ontario 1990-2008, Canadian Agricultural Injury Reporting (CAIR), 2011***

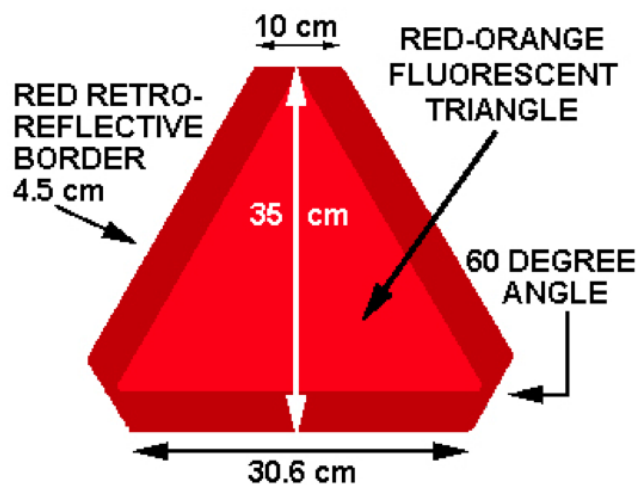
## MEETING 5

- Tractor is in neutral
- Parking brake is set
- Key is removed

## Rules of the Road

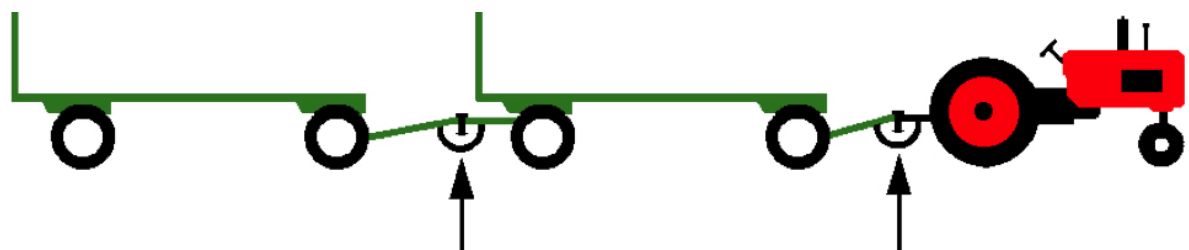
Generally, rules of the road, such as stop signs, right-of-way, traffic lights, turning, etc., that apply to cars and trucks also apply to farm equipment but some rules, such as slow driving and using the shoulder of the road, do not apply to the operation of farm equipment on the road.

- Farm equipment may be driven on the travelled portion of the road, on the shoulder portion of the road, except where prohibited, or on both portions when operating wide equipment.
- Tractors and Self Propelled Implement of Husbandry (SPIH) must display a slow moving vehicle sign on the rear. If one of these machines is towing one or more implements the sign or an additional sign, must be displayed on the rear of the combination. A slow-moving vehicle sign (sign) warns other road users that the vehicle displaying the sign is travelling at 40 km/h or less.



*Image Credit: Ontario Ministry of Transportation*

- Farm equipment must have proper lighting. When in use, lamps must be visible from a distance of 150 m (500 ft.). Lights must be on one half hour before sunset and one half hour after sunrise.
- Farm tractors do not require licence plates. A plate is not required on a SPIH when travelling from farm to farm or to or from such places as are necessary for the repair or maintenance of the vehicle. Farm to farm includes farms not owned by the owner of the SPIH. A SPIH travelling from farm to commercial elevator, processing plant, etc. or transporting general freight must have a plate. A SPIH operating under these circumstances would be deemed a truck and subject to all truck rules.
- A safety chain is required between a farm tractor and towed implement when operated on the road. If more than one implement is being towed, the second and subsequent implements are required to have a chain between the towing implement and the towed implement.
- Turn Signals – Drivers must, before:
  - Turning left or right at any intersection or into a private road or driveway
  - Moving from one lane of traffic to another lane of traffic, or
  - Leaving or entering the travelled portion of the road



*Image Credit: Ontario Ministry of Transportation*

first see that the movement can be made safely and if the operation of any other vehicle may be affected by the movement shall give a signal plainly visible to the driver of the other vehicle of the intention to make the movement.

- Drivers of a tractor or SPIH must be 16 or older to drive on, or along, a road. Drivers under 16 are only allowed to drive a tractor or SPIH directly across a road. A person who has been prohibited from operating a “vehicle” by the courts for impaired driving under the Criminal Code of Canada is prohibited from operating farm equipment on any road or in a public place.

For more in-depth information about the Rules of the Road for farm equipment download the document:

MTO – Ministry of Transportation – FARM GUIDE – Farm Equipment on the Highway <http://www.mto.gov.on.ca/english/trucks/pdfs/farm-guide-farm-equipment-on-the-highway.pdf>

## ATV/ORV (All Terrain Vehicle/Off Road Vehicle) Safety

### Common ATV/ORV hazards include:

- Failure to wear a helmet
- Inadequate training or supervision
- Carrying passengers on the ATV/ORV
- Stability: Large low-pressure tires are more unstable on paved roads
- Rollovers: High centre of gravity makes it easy to tip
- Poorly maintained equipment and older, unsafe ATV/ORV models

### Managing ATV/ORV Hazards

- ATV drivers must be properly trained in basic operation and safety
- On-road riding ATV drivers MUST be at least 16 years of age and hold a valid G2 or M2 licence or greater
- Climb hills in low gear and redistribute weight to prevent potential backflips
- An approved motorcycle helmet is required. Eye protection and protective clothing/footwear are also recommended

## MEETING 5

- Stay in control – never ride beyond your skill level
- Avoid going sideways across a slope due to tipping hazards
- Alcohol and ATV/ORV's do not mix

### Safe Handling of Batteries

Lead-acid batteries are built with a number of individual cells containing layers of lead plates immersed in sulphuric acid. When the sulphuric acid comes into contact with the lead plate, energy is produced. The battery will have a negative and a positive terminal on the top or side of the battery, and will have vent caps on top. The purpose of the vent caps is to allow for the escape of gases formed when the battery is charging. In addition, the vent caps allow water and acid levels of the battery to be checked during maintenance.

Lead-acid batteries can produce explosive mixtures of hydrogen and oxygen gases when they are being charged. If ventilation is poor, the escaping hydrogen creates an explosive atmosphere around the battery. Always keep sparks, flames, burning cigarettes, and other sources of ignition away from the battery recharging area because the gas can be ignited. The result of an explosion could be severe burns and/or fire.

### General Safety

When working with batteries it is very important to know where the deluge showers and eyewash stations are located. In addition, knowing proper first aid treatment for dealing with acid splashes is also essential. Acid neutralizing bottles can be purchased from local first aid companies, which can be used to allow you to reach the deluge shower or eye wash.

#### *Useful practices when working with batteries:*

- Keep metal tools and jewellery away from batteries (to prevent short circuits)
- When handling batteries, make sure that metal objects do not fall across the terminals
- Inspect the battery for any defective cables, corroded cable connectors, corroded/broken battery terminals, cracked cases or covers, etc.
- Always use the proper wrench size when tightening cable clamp nuts
- Do not use excessive force when tightening connections to the battery terminals
- Loosen corrosion from battery terminals and carefully brush it off. Use a tapered brush when cleaning the battery terminals and cable clamps
- Clearly mark the positive and negative terminals when the battery cables are removed to ensure that they are reconnected correctly
- Clean your hands with soap and water immediately after working with batteries

## Handling Batteries

Lead-acid batteries can be very heavy therefore, it is very important to ensure proper lifting and carrying techniques to avoid any injuries.

- Get your body as close as possible to the battery before lifting or lowering it
- Bend your knees slightly before lifting or lowering the battery
- Do not lift a heavy battery – ask for help or use a lifting device
- Use the battery carry straps to lift or carry a battery
- Carry the battery close to your body and at the centre of your body
- Do not twist. First lift the battery and then move your feet to move the battery
- Watch for slippery floors and obstructions as you move
- When carrying the battery, place a clean cloth or rag between the battery and your clothing to absorb any spilled acid

## Working with Battery Acid

- Wear the proper personal protective equipment (PPE), specifically splash-proof goggles, an apron and rubber gloves. A face shield may also be necessary when handling certain batteries
- Store acid away from hot locations and direct sunlight
- Slowly pour concentrated acid into water. Do not add water into acid
- Use non-metallic containers and funnels
- Use extreme care to avoid spilling or splashing the sulphuric acid solution
- Neutralize any spilled or splashed sulphuric acid solution with baking soda and rinse the area with clean water
- Use self-levelling filler that automatically fills the battery to a predetermined level. Never fill the cells above the level indicator
- Clean up spilled acid safely – first with a solution of sodium carbonate or sodium bicarbonate (baking soda) to neutralize it and then with large volumes of water to rinse the area

## First Aid Measures

When administering first aid to someone who has come into contact with sulphuric acid, always avoid direct contact. Wear chemical-resistant protective clothing, if necessary. Follow any first aid treatment and transport the victim to an emergency care facility immediately.

***Contact with skin:***

- Flush the contaminated area as quickly as possible with gently flowing lukewarm water for at least 30 minutes
- If any irritation persists, repeat flushing
- Under running water, remove contaminated clothing; shoes, and other leather goods (e.g. watchbands, belts)
- Discard any contaminated clothing, shoes etc.

***Acid in the eyes:***

- Immediately flush the contaminated eye(s) with gently flowing lukewarm water for at least 30 minutes while holding the eyelid(s) open
- Do not interrupt the flushing
- Be careful not to rinse contaminated water into the unaffected eye or onto the face
- If any irritation persists, repeat flushing and see a doctor immediately

**Proper Clothing**

Wearing the proper clothes to work can help prevent some injuries to the body. Various jobs require different protective clothing.

***Work Clothing***

Protecting the body with the proper clothing can help prevent injuries or lessen any that occur. When selecting clothing to wear to work, wear nothing that dangles, is untucked or tattered. These can get caught and possibly draw you into the machine. Keep jewelry to a minimum. Metal is an excellent conductor of electricity, so do not wear any jewelry (including a wedding band) when working with electricity or heavy machinery. Pull back long hair so that it does not interfere with your work or get caught in any machinery that you may be using.

***Hands and Arms***

Hands are the most frequently injured part of the body on the farm. During a day's work, a farmer's hands might come in contact with chemicals, harsh detergents, paint, solvents, rough materials and sharp tools. Scalded, burned or frostbitten hands can be a problem. Cuts and abrasions on the hands may allow toxic chemicals to enter the body. These cuts, if not cleaned properly, may lead to infections. Use appropriate gloves, barrier creams, hand cleaners and lotions to protect hands.

Wearing gloves that match the job provides good hand protection. Only sound, properly fitting gloves should be worn. Tight gloves limit dexterity and are uncomfortable and overly large gloves can interfere with work. Use caution when wearing gloves near moving machinery parts. Gloved hands can be drawn into machines and the hands severely injured.

After using chemicals and before removing your gloves, rinse and clean them thoroughly. After removing your gloves, wash your hands again.

### ***Feet***

Toes and feet can be injured during farm work. Poorly fitting or improper footwear can cause slips, trips or falls. Safety boots or shoes should be worn every day. Footwear that fits properly and is appropriate for the job is the first step in foot safety.

Different footwear have different features. Steel-reinforced safety shoes protect your feet from common machinery hazards such as falling or rolling objects, cuts and punctures. The entire toe box and insole are steel-reinforced, and steel, aluminum or plastic materials protect the instep. These shoes also insulate against temperature extremes and may be equipped with special soles to guard against slips, chemicals and electrical hazards. Built-in shin protection is also available. Different soles offer protection from things such as slipping and puncture.

Inspect footwear regularly. When they wear out, dispose of them and purchase new ones. Make sure the shoe laces are not fraying and cannot be caught in equipment. Replace laces that are worn out or too long.

### ***Protective Head Gear***

Protective head gear, such as safety hats and bump caps, could prevent most head injuries common in agricultural work. Know when to wear them and what type. Post signs in areas where hard hats must be worn. Make sure everyone entering that area uses them even if it is just for a minute. Jobs requiring protection include building work, operating and repairing machinery, felling or trimming trees, entering or leaving buildings with low doors, working in close quarters or under low ceilings and running off-road vehicles.

## **Hearing Safety**

Farmers use many different types of machinery that produce excessive amounts of noise, including tractors, grain dryers and radios in enclosed cab tractors. Swine barns at feeding time contain extremely high noise levels. In addition, farmers are around these high noise levels for long periods of time which makes the risk of hearing loss even greater.

### **How can you tell if a noise is dangerous?**

If the noise is loud enough that you must raise your voice to be heard above the noise at one metre (three feet) from the person you are trying to talk to, the noise is probably loud enough to damage your hearing.

### **How does the noise hurt your hears?**

The damage caused by noise involves nerve loss, resulting in hearing loss. Once your hearing is damaged by noise, there is no treatment that can correct your hearing to normal. That is why it is so important to use hearing protection.

## Hearing Protection

Depending on the level of noise, a variety of hearing protection devices can be used. These items include disposable earplugs and earmuff-style hearing protectors.

*Note:* disposable earplugs should be thrown in the garbage as soon as they are dirty. Cotton, when stuffed into ear canals, is very poor protection.

Hearing protection can be purchased at pharmacies, implement dealerships and safety supply companies.

Hearing loss can also be prevented by:

- Limiting the amount of time spent near the noise
- Turning off radios in the tractor
- Install or repair mufflers on equipment
- Close all windows and doors on equipment

If you have questions or are worried about your hearing, contact your family doctor.



## BEFORE THE NEXT MEETING

Try these activities at home:

1. Discuss with your family the dangers surrounding a grain bin. Make sure each person knows what to do if a victim gets trapped in the grain bin.
2. Interview someone who works with farm machinery. Ask them questions such as:
  - What types of machinery do they work with? How long have they been working with the machinery?
  - What training have they received in the proper operation of the equipment?
  - Over the years, have they made any changes in the type of farm machinery they use? Was it because of safety reasons?
  - Do they have any employees? What type of training do they give their employees?
  - What types of clothing do they normally wear when working with machinery?
  - Have they ever been hurt when working with machinery, an ATV, batteries or anything else on the farm?
  - Any other questions you can think of.

Record your findings in your Record Book.

3. Choose a situation working with grain storage or farm machinery that could be potentially dangerous. Go through the steps of Stop, Think, Act (found in the introduction of this reference manual) to outline what the activity is and why a person should:

*Stop briefly:* What could go wrong? How bad could it be?

*Think:* Do I understand the activity? Do I have the right tools? What potential risks are there?

*Act:* What action should I take to avoid the dangers? Make it safe!

AND, stop if it cannot be done safely!

## DIGGING DEEPER I

For senior members

### Caught in the Flow

#### ***Farm Accident Rescue***

Basic knowledge of first aid measures and standard rescue procedures is vitally important to rural residents.

Quite simply, medical assistance and emergency rescue personnel usually have to cover a greater distance than would be the case in an urban setting. Life may hang in the balance during those extra few minutes it takes for help to arrive. Your ability to deal with an emergency can most certainly mean the difference between life and death.

There is a strong element in human nature that leads us to ignore the possibility of disaster striking our lives. It always happens to the “other guy.” We have to make a conscious effort to prepare for emergencies, even though such situations seem to be impossibly remote from our day-to-day lives.

#### ***First Aid Training A Must***

Ideally, there should be at least two individuals on every farm with first aid training. What happens if just one person has knowledge of first aid procedures and it is that individual who gets hurt?

Knowledge of what to do in an emergency situation is vital. Develop a file of information on measures for dealing with accidents, health problems and natural disasters.

Prepare a ‘what if’ plan that involves everyone living or working on your farm. Each person should have a good basic grounding in how to deal with emergencies. Knowledge and preparedness are the best antidotes for panic and fear. Calmness also reassures an accident victim.

#### ***Rely On The Experts***

When confronted by an emergency, assess the situation carefully. Calmly decide what steps need to be taken and in what order.

In many cases, speed is vital. Work quickly and do your best with the available resources.

Remember that first aid is temporary, on-the-spot assistance. It is not a substitute for expert medical care. Call for help as soon as possible. Make sure you know the 911/emergency address for the location of your farm and have it listed inside every first aid kit.

When calling for help, provide as much information as possible regarding the emergency. Rescue teams and medical personnel will be able to think out a strategy en route if they are given basic information on the nature of the emergency. Special procedures may be required to free a victim who is entangled in heavy equipment, for example. If an accident has occurred in a muddy field, access may require a four-wheel-drive vehicle. Such information could save valuable minutes from the time required for rescue.

### ***A Victim's Needs Come First***

In an emergency, physical care for the victim(s) is priority one. Establish breathing and heart function. If either has stopped, start CPR immediately. Control bleeding and administer other required first aid. Psychological reassurance and physical warmth can also improve a victim's survival chances.

### ***CPR Can Be A Lifesaver***

If breathing and blood circulation stop, a victim is less than four minutes away from permanent brain damage. Life quickly slips from a body that is deprived of oxygen.

Cardiopulmonary resuscitation (CPR) combines mouth-to-mouth breathing with external cardiac compression to maintain circulation for life support. In a rural emergency CPR may be the only way of keeping a heart attack or accident victim alive until help arrives.

CPR should not be attempted without formal training.

Find out where and when CPR and First Aid training is offered in your area as well as what the cost is. Find out if it is possible to organize a separate training for your 4-H club. If it is possible, working with your club leaders, set up a training day and organize all aspects of the day.

## **DIGGING DEEPER II**

For senior members

### **PTO Entanglement**

The Power Take-Off (PTO) shaft is an efficient means of transferring mechanical power between farm tractors and implements. This power transfer system helped revolutionize North American agriculture during the 1930s. It is also one of the oldest and most persistent hazards associated with farm machinery.

The PTO and drive shaft rotate at 540 rpm (9 times/second) or 1,000 rpm (16.6 times/second) when operating at full recommended speed. At all speeds, they rotate in proportion to the speed of the tractor engine.

Most incidents involving PTO shafts result from clothing caught by an engaged but unguarded PTO stub. The reasons a PTO shaft may be left engaged include:

1. the operator forgetting or not being aware of the PTO clutch is engaged
2. seeing the PTO stub spinning but not considering it dangerous enough to disengage
3. the operator is involved in a work activity requiring PTO operation.

Boot laces, pant legs, overalls and coveralls, and sweatshirts are clothing items that can become caught and wrapped around a spinning PTO shaft. In addition to clothing, additional items that can become caught in the PTO include jewelry and long hair.

### ***PTO Safety Practices***

Though not always convenient or easy, there are several ways to reduce the risk of PTO injury incidents. These safety practices offer protection from the most common types of PTO entanglements.

- Keep all components of PTO systems shielded and guarded.
- Regularly test driveline guards by spinning or rotating them to ensure that they have not become stuck to the shaft.
- Disengage the PTO and shut off the tractor before dismounting to clean, repair, service, or adjust machinery.
- Always walk around tractors and machinery instead of stepping over a rotating shaft.
- Always use the driveline recommended for your machine. Never switch drivelines among different machines.
- Position the tractor's drawbar properly for each machine used to help prevent driveline stress and separation on uneven terrain and during tight turns.
- Reduce PTO shaft abuse by observing the following: avoid tight turns that pinch rotating shafts between the tractor and machine; keep excessive telescoping to a minimum; engage power to the shaft gradually; and avoid over tightening of slip clutches on PTO-driven machines.
- Be sure PTO driveline is securely locked onto the tractor PTO stub shaft.
- Keep universal joints in phase. (If unfamiliar with this term, check the operator manual or talk with a farm implement dealer.)



*Image Credit: Agricultural Safety and Health, Penn State Extension <http://extension.psu.edu>*

Recognize that the PTO shaft turns at speeds that are faster than our reaction time. It is easy to get snagged into a turning PTO shaft. To prevent PTO entanglement with its potential for injury and death, follow these guidelines:

- Stop the tractor engine and disengage the PTO to work on the machine or unclog it.
- Keep guards in place.
- Wear close fitting clothing to prevent entanglement of loose clothing parts.
- Secure long hair under a hat when working around the PTO.
- Instruct all operators about the hazards of the PTO.
- Keep children away from all turning parts of the machine not just the PTO.

*Excerpts taken from Agricultural Safety and Health, Penn State Extension <http://extension.psu.edu>*

Create a mock working PTO demonstration. Be creative! Make it as realistic as possible. Use this demonstration to show how quickly clothing can become entangled in the PTO shaft. Be prepared to show it at the next meeting, at your Achievement program, at a 4-H Awards Night and/or at a community event such as a local fair or Farm Safety Day.

## DIGGING DEEPER III

For senior members

### Tractor Rollovers

Victims of tractor overturns usually suffer crushing injuries to the head, chest and pelvic areas. Movement may aggravate injuries and cause extensive internal bleeding. In many cases, it is best to transport the victim in the position found.

Emergency medical and rescue personnel should be called to deal with tractor accidents. Overturns frequently result in fatalities. At best, entrapment and serious injury are likely to be encountered.

### *How Do You Prevent Backwards Upsets?*

In a backwards tip, the tractor can hit the ground in less than one and a half seconds.

Factors that cause a tractor to tip over backward depend upon the load and the height of the hitch from the ground.

- Hitch only at the manufacturer's recommended height.
- Engage the clutch pedal slowly and smoothly. Be ready to disengage power quickly if the front end begins to come up.
- Start forward motion slowly and change speed gradually.
- Use counterweights to increase tractor stability. Follow manufacturer's instructions.
- Avoid backing downhill.
- Drive around ditches, not across them.
- Back your tractor out when stuck or tow the stuck machine out with another tractor. Tractors are also prone to tipping when the wheels are stuck.
- Turn downhill when working across a slope.
- Drive straight down even the gentlest slope. Do not drive diagonally across it.

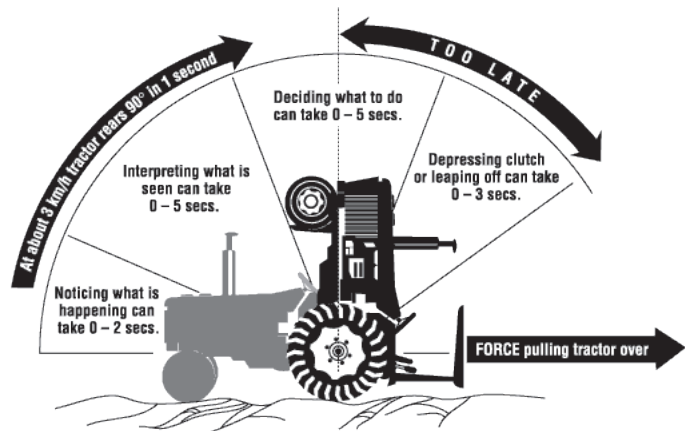


Image Credit: Canadian Centre for Occupational Health and Safety <https://www.ccohs.ca>

## MEETING 5

- Do not hitch a load higher than the tractor draw-bar.
- Do not coast downhill. Before starting down, shift to a lower gear that prevents freewheeling and excessive braking. Try to use the same gear to do down a hill that you would use to pull the load uphill.

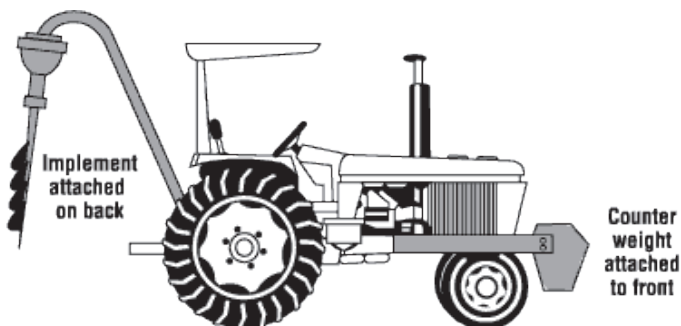


Image Credit: Canadian Centre for Occupational Health and Safety <https://www.ccohs.ca>

### How Do You Prevent Sideways Upsets?

- Set wheels as wide as practical for maximum stability.
- Avoid depressions and obstacles.
- Turn downhill, not uphill, if stability becomes uncertain on slopes or ramps.
- Keep loads, implements or loader buckets close to the ground.
- Keep side-mounted implements on the uphill side.
- Match speed to conditions and loads.
- Back up steep slopes or ramps.
- Lock brake pedals together before high speed travel.
- Slow down before turning.
- Use engine for braking when going downhill.
- Stay away from the edge of ditches and streams.
- Do not try to cross steep slopes.



Image Credit: Canadian Centre for Occupational Health and Safety <https://www.ccohs.ca>

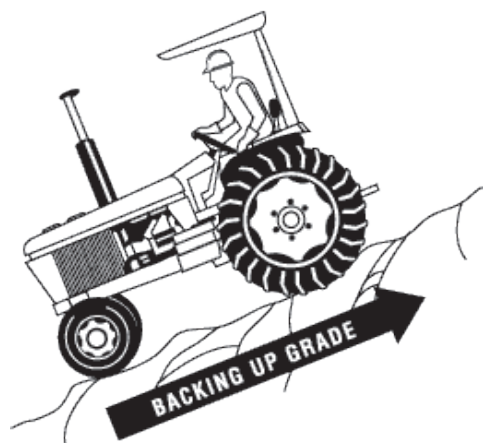


Image Credit: Canadian Centre for Occupational Health and Safety <https://www.ccohs.ca>

Create a poster and/or a presentation to highlight the ways to prevent tractor rollovers. Ask to present this information at school, at a local farm safety event, at a 4-H Judging competition, Achievement Night or Awards Night or any other community event.



## DIGGING DEEPER IV

For senior members

### Internet Safety

The Internet has become a part of our daily lives. The alarm on your cell phone wakes you up in the morning, you can read about what's happening around the world (as it's happening) and you figure out your plans each weekend by chatting with your friends on social media sites during the week.

However, all we seem to hear about are the negative sides of the Internet: people being bullied, ripped off, meeting people who aren't who they say they are etc. It is important that we realize that the Internet, social media sites and all of the other tools we use online aren't the issue – it's the way some people choose to use these tools.

#### Fun Fact

**There are an estimated 2.3 billion people online globally.**

*Source: Royal Canadian Mounted Police [www.rcmp.gc.ca](http://www.rcmp.gc.ca)*

### Interacting Online

Interacting online has become a part of our everyday lives. It allows us to make friends all over the world and makes it easier to keep in touch with friends and family who might not live close by.

Some common activities that allow you to interact with others online are:

- Online chatting
- Photo sharing
- Webcams
- Sexting
- Online gaming
- Social networking sites

### Laws

The use of the Internet to entice or persuade youth (anyone under the age of 18) to meet for sexual acts or to help arrange such a meeting is a crime under the Criminal Code of Canada. There can also be serious consequences if you send photos or videos of someone who is under the age of 18 and the photo/video is of a sexual nature, even if you know the individual. For example, if you pass on a sexual photo/video from your boyfriend or girlfriend who is under 18 years of age, it could be considered distribution of child pornography and may result in criminal charges.

### What You Can Do

Sometimes talking to strangers online can seem harmless, but sometimes it can have negative consequences. Here are some do's and don'ts that should help you stay safe online:

## MEETING 5

- Don't give out too much personal information. Stick to just giving vague information, like your first name or province/territory.
- If you are thinking about meeting up with someone you met online, ask for your parents' permission first, and make sure you have someone with you. This way you can stay safe in case your Internet friend isn't really who they said they were.
- Do remember that once you post something online, you can't control who that information is shared with – and removing it from wherever you posted doesn't mean someone hasn't already reposted it somewhere else.
- Do tell someone, like a trusted parent or adult, if someone on the Internet is making you uncomfortable. Your safety is important, and they will help protect you from those uneasy feelings.

### **Online Scams**

The Internet has made it easier to find information we're looking for, stay in contact with friends, shop for clothes from our couch, play games with people halfway across the world and plan events without leaving home. However, the growing popularity of doing things online also means that you are at a greater risk of being taken advantage of online.

### **Identity Theft**

Identity theft refers to the use of someone else's personal information (name, mother's maiden name, social insurance number, etc.) to commit crimes. On January 8, 2010, it became illegal to possess or use another person's identity information with the purpose of committing a *crime or to use that information in a deceptive or dishonest manner*.

### **Identity Fraud**

Identity fraud is the act of using the identity of another person (living or dead) or inventing a fake identity to commit fraud, (for example: applying for a credit card in the name of someone who is deceased).

The individual committing the fraud looks for personal information such as a full name, date of birth, social insurance number, full address, username and passwords for online services, credit card as well as banking information, and signature with the intention of using it.

### **Debit and Credit Card Fraud**

Debit card fraud happens when a thief "skims" or swipes the information from the strip on the back of your card, or from the chip to create a duplicate of your card. This is done by using a "skimming" machine which scans the back of a debit/credit card and captures the important features of your bank card (bank number, account number, etc.) without actually making contact with your card. In some cases, the machines that read your bank card information can also capture your PIN.

Credit card fraud can happen several ways as well, including being "skimmed". Your card could be lost or stolen and used to purchase goods and services. A criminal could obtain your card data and use this information to manufacture a counterfeit card, or the data could be used to make telephone or Internet purchases (also referred to as "card not present" fraud).



### ***Phishing***

Phishing is a term used for e-mails, text messages and websites that are fabricated by criminals to look like they come from a trusted source. They are used to collect personal, financial and sensitive information. It's also known as brand spoofing.

The content of a phishing e-mail or text message is intended to trigger a quick reaction from you. It can use upsetting or exciting information, demand an urgent response or employ false information or statements. Phishing messages are normally not personalized.

Typically, phishing messages will ask you to “update,” “validate,” or “confirm” your account information. They might even ask you to make a phone call.

### ***What You Can Do:***

- Most online shopping sites will contain a step by step procedure to illustrate safe payment methods. Look for it and be sure to use it. If you do not find it on the website, be sure to check out the website's credibility at [Canadian Anti-Fraud Centre](#).
- Make sure the webpage you are using is official and trusted.
- Always check your bank statements to ensure that all the spending that is being done on your card is being done by you.
- If you have any doubts about an organization, contact the [Better Business Bureau](#).
- Be watchful of contests that offer highly valued items at a significantly low price.
- Be wary of contests that only offer the prize for a “couple of hours.” Contact the [Canadian Anti-fraud Centre](#) to verify the credibility of organizations.

The following are some helpful tips for youth and adults to stay safe and protect their hard earned money:

1. Use strong passwords: Use a combination of capital letters, lower cases, special characters and numbers. This method makes it difficult for people to figure out your password. Change your passwords frequently.
2. Secure your computer: activate your anti-virus and block spyware software to ensure safer connections.
3. Be social media savvy: keep your social media profiles on private and don't provide any information that is not required.
4. Secure your mobile device: your cellphone, laptops and tablets can be vulnerable to viruses and hackers. Only download applications from trusted sources.
5. Install the latest operation system: always download and install the latest version of available software as it is much safer, and less convenient for hackers as it fixes “bugs” that allow hackers access.
6. Protect your data: use encryption (protective security) for your sensitive files and back up all your important documents.
7. Secure your wireless network: lock your home Wi-Fi and avoid conducting financial

transactions on these networks.

8. Protect your E-Identity: don't give out your private information on the Internet.

If you suspect that you or someone else is a victim of identity theft or fraud, or if you unwillingly provided personal information or financial information, make sure to:

- Step 1 - Contact your local police force and file a report.
- Step 2 - Contact your bank/financial institution and credit card company.
- Step 3 - Contact the two national credit bureaus and place a fraud alert on your credit reports.
  - [Equifax Canada](#)  
Toll free: 1 800 465-7166
  - [TransUnion Canada](#)  
Toll free: 1 877 525-3823

### ***Cyberbullying***

Bullying happens when there is an imbalance of power; where someone purposely and repeatedly says or does hurtful things to someone else. Bullying can occur one on one or in a group(s) of people.

Cyberbullying involves the use of communication technologies such as the Internet, social networking sites, websites, email, text messaging and instant messaging to repeatedly intimidate or harass others.

Cyberbullying includes:

- Sending mean or threatening emails or text/instant messages.
- Posting embarrassing photos of someone online.
- Creating a website to make fun of others.
- Pretending to be someone by using their name.
- Tricking someone into revealing personal or embarrassing information and sending it to others.

Cyberbullying affects victims in different ways than traditional bullying. It can follow a victim everywhere 24 hours a day, 7 days a week, from school, to the mall and all the way into the comfort of their home - usually safe from traditional forms of bullying.

If you are a victim of bullying:

- Walk away or leave the online conversation.
- Keep track of the bullying (write it down and/or save a screenshot of the online message).
- Tell a trusted adult. If you don't trust anyone or need to speak with someone urgently, contact the confidential and toll-free [Kids Help Phone](#).

- Report the bullying to school administrators.
- Report criminal offences, such as threats, assaults and sexual exploitation to the local police detachment.
- Report unwanted text messages to your telephone service provider.
- Report online bullying to the social media site and block the person responsible.

***If you know someone who is being bullied...***

Most types of bullying go on as long as someone is watching and laughing. As a bystander, know that you have the power to stop the bullying. 60% of the time, bullying stops in less than ten seconds when someone steps in.

- If you feel it's safe to do so, tell the bully to stop.
- Find friends/students/youth or an adult who can help stop it.
- Befriend the person being bullied and lead them away from the situation.
- Report it to a teacher or school staff.
- Fill out an anonymous letter and drop it off to a teacher or any adult you trust.

Excerpts taken from Royal Canadian Mounted Police [www.rcmp.gc.ca](http://www.rcmp.gc.ca)

Create a video for younger 4-H members to teach them about the do's and don'ts of using the Internet. Show this video at a meeting, at Achievement Night, at a 4-H Awards Night and possibly at school.

## MEETING 5

## ACTIVITIES

**Activity #26 – Bushels of Danger*****Items Needed:***

- Bushel basket (or large bucket)  $\frac{3}{4}$  full of corn or another grain (or even loose sand)
- Item stuck deep in the middle of the basket (e.g. small ping-pong ball)
- Piece of wood  $\frac{1}{2}$  the size of the opening of the bushel basket
- One glass jar
- One ping-pong ball
- Sink or tub (which allows water to whirlpool when it drains)

***Instructions:***

1. Have each member stand in the basket with grain in it and wiggle their feet. Discuss that if an auger was on, they would be engulfed in seconds. Have members feel the quicksand-like nature of the grain by twisting in it.
2. Once everyone has tried this, place the board on the grain and repeat the process. Ask members if they feel any difference. Members should note that they no longer sink or sink as quickly as they did before.
3. Go to a sink and fill it with water. It should whirlpool when draining or this experiment will not work.
4. After the sink is full, pull the drain and let members watch the water swirl. If the whirlpool is big enough, there may even be a strong tug to it.
5. Fill the sink again and put something that floats in the steady water before pulling the plug and watch as it gets sucked down (but not through) the drain. A ping-pong ball will work great but even a small stick will do.
6. Explain that this action is very similar to the motion of the grain in a bin when an auger is on.
7. Take the grain in the basket and scoop some of it into a glass jar.
8. Have members look at how close together the kernels are. Ask them if they think they could breathe if they were under a foot or two of the grain. The answer is definitely no!
9. Before the meeting, stick something deep in the middle of the basket. Have a few members try to dig it out. Remind them that they cannot remove any of the grain. It will be very difficult for them to dig out the object because of the grain's tendency to back flow.

***Why grain entrapment is dangerous:***

1. The flow speed
2. The weight
3. No air
4. The tendency of grain to back flow

## Activity #27 – Performing the Great Raisin Rescue!

The activity should be fairly self-directed.

### ***Items Needed (for each group):***

- 500mL cardboard milk container
- Bowl
- 250mL (one cup) sugar or salt
- Five raisins or dried beans
- One sharp knife
- Scissors
- Piece of paper

### ***Instructions:***

1. Members should be divided into groups of two to four people.
2. Cut off the top of the milk container. If you have a larger milk container, cut it down to the size of a half litre one.
3. Carefully cut a hole in the centre at the bottom of the milk container. It does not need to be very big (about the size of a pea).
4. Set the milk container in the bowl.
5. Fill the container with the salt or sugar until the container is about  $\frac{3}{4}$  full. (some might leak out of the bottom but the salt/sugar should plug itself up).
6. Spread the five raisins in a star pattern across the surface of the salt/sugar. Make sure one raisin is in the centre and that the remaining four are at the four edges of the box. (if you cut the hole in the centre one raisin should be directly above it).
7. To notice the effects of a working auger and how it drains the grain, lift up the container and hold it over the bowl so you don't lose any salt/sugar. Be prepared to make observations.
8. Once this step is complete, retrieve the raisins by pouring the salt into the bowl.
9. With the raisins sifted out, put the salt/sugar back into the container, making sure to plug the hole with a finger.
10. Put the container back in the bowl.
11. This time put only one raisin in the container. The raisin will be the potential victim. You are about to perform the great raisin rescue. Place one raisin in the centre.
12. Lift up the box. Make sure that you set it back down to stop the flow immediately after the raisin is covered. This act is equal to shutting off the auger. (For the purpose of the

## MEETING 5

experiment, if you let the raisin get too deep in the salt/sugar the rescue will be made impossible).

13. With the raisin just covered, begin the rescue procedure. Cut a hole in each side of the box. These holes should be about the same size as the one you made in the bottom. You only have one chance to save this raisin so do not blow it. Give you victim a raisin to live!
  - a) A hole should be cut into each side for two reasons.
    - i. One hole will cause the raisin to flow that way through the salt/sugar and that too is dangerous.
    - ii. This will keep the holes far enough apart to prevent collapse of the structure.
  - b) Secondly watch at what height from the bottom of the bin you cut your holes.
    - i. Too low and the salt/sugar will run out only to plug up the hole again.
    - ii. Too high and not enough salt/sugar will empty out to expose the victim.
14. Now, after the holes are cut hopefully the victim is partially exposed. Entry into the bin is dangerous because of structural damage so work with a life-line and a buddy. Cut a strip of paper about 2.5cm wide. Make a circle out of this strip that would go around an adult's thumb. Tape it at this size and cut away the excess paper. With your new 45 gallon drum (your paper circle), place it around the victim (raisin) embedding it in the remaining salt/sugar. You can now dig out your victim without the shifting salt/sugar covering it back up as fast as you dig. Once the raisin is exposed, put a safety harness on it and lift it out. Your rescue has been successful.

### ***Discussion questions:***

- What did you notice about the five raisins in step 7?
- What did you notice about the salt/sugar?
- How quickly did the raisin in the centre move compared to the other raisins?
- How quickly did the raisin in the centre move compared to the rate of movement of the salt/sugar?
- How did the rescue go? Did you rescue all of your raisins?
- What problems did you experience?
- Can you think of another situation where people could be trapped in a grain bin?

## Activity #28 – A Real Rescue

Not many people survive entrapment in grain. The best rescue is one that never has to happen in the first place! But, if entrapment occurs, it is good to have a plan to attempt to rescue the victim.

Discuss the steps of a real rescue. Small groups could develop lists of steps and then it could be discussed as a club. Remind members to think about the raisin experiment (Activity #27).

What would you do?

1. Remain calm.
2. Turn off the power to the auger and lock or wire shut so it cannot be accidentally turned on. Turn on bin aeration fans.
3. Call for help.
4. Remove grain from bin in the most rapid and orderly manner possible.
5. Attempts to dig a victim free won't work because grain will back flow.
6. If the victim is completely covered, cut holes in the bin 1 to 2 metres above ground. An abrasive air saw, air chisel or cutting torch can be used. Beware of fire if a torch is used. The corner of a tractor loader bucket could also be used to ram holes in the bin wall.
7. If a victim is partially covered, lower a rescue squad member into the bin to attach a body harness or life line. Do not try to pull the victim free with the line. It is just to prevent further sinking.
8. Calm the victim.
9. Construct a shield around the victim using a steel drum with ends removed, a sheet of metal or plywood pieces.
10. Free the victim by scooping grain from the inside of the shielded area.
11. Use a board or sheet of plywood as a work platform so you do not sink into the grain.

### ***Precautions for rescuers:***

1. Always assume that an entrapped victim is alive.
2. Under no circumstances should you start an unloading auger or open a gravity flow gate. The victim could be drawn into the auger or become wedged in the opening.
3. If bin entry is required, the rescuer who goes into the structure should wear a body harness and be tied with a safety rope to at least two rescuers on the roof of the bin.

## Activity #29 – Judging PTO Shafts

### Items Needed:

- Four PTO shafts
- Judging Worksheet (found at the end of this meeting)
- Pen/pencil

Which PTO shaft is in the best working order? Which one has the proper safety features? Why do you think your choice is the best?

## Activity #30 – Machinery Safety Hazards ID

### Items Needed:

- Various pieces of farm machinery
- Plain paper
- Pen/pencil

### Instructions:

1. Before the meeting, look over each piece of farm machinery/implement that is available and make a list of the safety stickers found on the machinery. Tractors and ATV/ORVs could also be included in this activity.
2. Divide the club into small groups. Make sure each group has paper and a writing utensil.
3. Have groups rotate through the machinery. Give groups five minutes at each piece of machinery to see how many safety stickers they can find and write down.
4. When each group has had a chance to view the machinery and make their lists, review each piece of machinery and have teams keep track of how many correct answers they have. If desired, have a prize for the team that found the most safety stickers.
5. Discuss why safety stickers are important.

## Activity #31 – PTO Demonstration

Go to a local machinery dealership, a local farm or have someone from the local Farm Safety Association do a demonstration on how a PTO shaft works and why it is dangerous.

Review the following safety precautions when working near a PTO shaft:

- Wear close fitting clothing
- Tie back long hair



- Be sure PTO shields are in place and in good condition
- Start and stop the PTO from the tractor seat
- Walk around. NEVER step over a PTO shaft

Discuss what could happen if the above safety precautions are not followed.

## Activity #32 – Judging Tractor Safety

### *Items Needed:*

- Four tractors
- Judging Worksheet (found at the end of this meeting)
- Pen/pencil

Which has been maintained the best? Which one has the proper safety features? Why do you think your choice is the best?

## Activity #33 – In The Middle - Hearing Safety

### *Hearing Test*

### *Items Needed:*

- Blindfold

### *Instructions:*

1. Blindfold one person and have this person sit in the middle of the group. Have the rest of the group form a large circle around the blindfolded person.
2. Point to one of the people in the circle and have him/her say the seated person's name. The seated person must then try and point in the direction of the voice and identify the name of the person who said their name.
3. Try this experiment with the seated person using both ears and then again with one ear covered.

### *Discussion questions:*

- How accurate can the centre person identify the caller and where the call came from?
- Are two ears better than one?
- Why is it important to protect your hearing?

## Activity #34 – Model Eardrum

### *Items Needed:*

- Plastic wrap
- Container with a wide opening
- Uncooked rice (any small grain will work)
- Tin cookie sheet (or other noise maker)

### *Instructions:*

It's easy to make a model of the eardrum, also called the tympanic membrane, and see how sound travels through the air.

1. Stretch a piece of plastic wrap over a large bowl or pot (any container with a wide opening will work). Make sure the plastic is stretched tightly over the container. The plastic represents the eardrum.
2. Place about 20 to 30 grains of uncooked rice on the top of the plastic wrap.
3. Hold the cookie sheet close to the plastic wrap. Hit the cookie sheet to create a "big bang" noise and watch the grains jump.

The big bang produces sound waves (changes in air pressure) that cause the plastic sheet to vibrate which causes the rice grains to move. Sound waves vibrate the eardrum in much the same way.

### *Discussion questions:*

- What happens when the eardrum is damaged?
- What happens to the grains if the sound is much quieter? Even louder?
- How can you protect your hearing?

## JUDGING CARD – PTO Shafts

### ***Criteria:***

1. Is the PTO shaft in good working order?
2. Is it missing any parts?
3. Has it been maintained?
4. Is it safe to use?
5. \_\_\_\_\_

\*\*note: additional requirements can be added to list

### ***Giving Reasons:***

I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

I place \_\_\_\_\_ first because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ 4th because.....

For these reasons, I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

Official Placing \_\_\_\_\_.

## JUDGING CARD – Tractor Safety

### ***Criteria:***

1. Is the tractor in good working order?
2. Is it missing any safety shields?
3. Has the tractor been maintained?
4. Are there safety stickers to point out danger areas?
5. \_\_\_\_\_

\*\*note: additional requirements can be added to list

### ***Giving Reasons:***

I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

I place \_\_\_\_\_ first because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ over \_\_\_\_\_ because.....

I place \_\_\_\_\_ 4th because.....

For these reasons, I place this class of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

Official Placing \_\_\_\_\_.

## MEETING 6 - SOLAR AND WIND ELECTRICAL SAFETY

### Objectives

- Learn about different ways to generate electricity.
- Discover what advantages, disadvantages and considerations each form of electricity presents.
- Discover what stray voltage is and how it can be detected on the farm.

### Roll Calls

- Name one way to create hydro.
- Name one thing you learned by participating in this club.
- Name one benefit to

### Sample Meeting Agenda – 2 hrs. 35 minutes

Welcome, Call to Order & Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes & Business	10 min
Topic Information Discussion	Discuss Creating Your Own Hydro – Harvesting Wind, Solar Energy & Biogas Energy, Stray Voltage	20 min
Activities Related to Topic	Activity #35 - Make Your Own Solar Panel Activity #36 - Make A Pinwheel Activity #37 - Guest Speaker Activity #38 - Reflection	60 min
Achievement Day Preparation	Prepare for Achievement Day	40 min
Wrap up, Adjournment & Social Time!		10 min
At Home Challenge	Get ready for the Achievement Program!	

## MEETING 6

## Topic Information

## Creating Your Own Hydro

There are a number of forms of alternative, renewable energy available to farms. Renewable energy, and the most common in Ontario, comes from the wind and sun. While not as common, biogas energy is an emerging industry in Ontario. Any system that produces electricity can be potentially dangerous.

## Harvesting the Wind

Wind turbines require large areas of open space with consistent wind. The prime landscapes for wind energy production in Ontario are almost always in farming regions. Wind turbine developments are being developed by both private investors and by co-operatives that include farmers. Large wind turbines, which are usually installed in clusters called windfarms, can generate large amounts of electricity. Large wind turbines may even produce hundreds of megawatts (MW) of electricity - enough to power hundreds of homes.

## Fact

**Renewable energy sources currently provide about 18.9 per cent of Canada's total primary energy supply.**

Source: Natural Resources Canada <http://www.nrcan.gc.ca/energy/renewable-electricity/7295>



Image Credit: Paul Giamou, Getty Images

Small wind turbines, which are generally defined as producing no more than 100 kW of electricity, are designed to be installed at homes, farms and small businesses either as a source of backup electricity, or to offset use of utility power and reduce electricity bills.



1kilowatt (kW) Wind Turbine

Image Credit: Life Free Energy <http://lifefreeenergy.com>

## Benefits, Drawbacks & Considerations

There are benefits, drawbacks and other factors to consider when thinking about wind energy for a farm.

### ***Benefits:***

- A proven track record for remote water pumping or pond aeration on the farm
- A potentially cost-effective form of renewable energy
- Potential revenue from replacing your own power use, sale of electricity to the grid or from leasing land to a developer
- Well-suited to rural areas with wide open spaces and consistent wind resources
- Helps contribute to Ontario's clean energy supply and reduces the reliance on non-renewable energy sources

### ***Drawbacks and considerations:***

- If you are developing your own project, you need to carefully consider up-front project costs, maintenance costs and expected electricity output and ensure you are meeting all regulatory requirements. You will likely need to seek professional advice.
- You need to carefully consider all of the details of any land lease agreements with wind project developers and seek professional advice
- For off-grid systems, you will need to consider that there might not always be enough wind to meet your energy needs
- Wind turbines may generate low levels of noise
- Neighbours may object to the presence of a wind turbine or how it looks
- There is the potential for wildlife impacts from wind turbines. These considerations must be addressed through relevant authorities during the planning and approval process

## Safety Risks

All wind turbines have a maximum wind speed, called the survival speed, at which they will not operate above. When winds over this maximum occur, they have an internal brake and lock to prevent them from going faster than this survival speed.

For turbines operating in cold winter conditions, they may need to be de-iced as required and have stored batteries in an insulated place.

Mounting turbines on rooftops is generally not recommended unless a wind turbine is very small (1 kW of rated output or less). Wind turbines tend to vibrate and transmit the vibration to the structure on which they are mounted. As a result, turbines mounted on a rooftop could lead to both noise and structural problems with the building and rooftop.

There is also a concern with noise and vibration generated by wind turbines. If you are thinking of installing a wind turbine, make sure you discuss your plans to build a wind turbine with your neighbours and be prepared to respond to their concerns.

## MEETING 6

## Solar Energy

Despite Ontario's northern latitude, much of the province has good solar exposure and rural areas are particularly well placed to take advantage of it because the relatively low levels of air pollution which makes solar collection more efficient.

Photovoltaic panels, also called solar panels or PV panels, use semiconductors like silicon to convert sunlight directly into electricity. Solar panels can be installed on the ground or on a roof.

Today's PV cells can convert roughly 15 per cent of the solar energy that hits them into electricity. Although they produce much less energy during winter, when less solar energy is available, they can still generate a significant amount on a bright sunny January day.

Panels can be either stand-alone systems or connected to the power grid. Small stand-alone PV panels are a simple way to generate electricity away from the grid: to power electric fences or pump water, for example. To increase the electricity yield, panels can be attached to tracking units that keep them aimed at the sun as it moves through the sky.



Image Credit: Ontario Solar Farms <http://ontariosolarfarms.com/residential.html>

## Benefits, Drawbacks & Considerations

There are benefits, drawbacks and other factors to consider when thinking about solar energy for a farm.

### **Benefits:**

- Safe, clean and quiet
- Highly reliable
- Doesn't create emissions
- Virtually maintenance-free
- Can be added onto as needed
- Can be mounted on roofs, thereby not taking any farmland out of production

### **Drawbacks and considerations:**

- High up-front costs
- Electricity generation drops substantially in the winter



## Safety Risks & Rules

There is a danger of electric shock. Any installation should have normal electrical protection equipment in the high voltage circuit. Any portable systems should be treated with care. While many models in current use may not produce more than 30 volts, they may be used in systems where they are connected in series to produce much higher, and therefore dangerous, voltages.

Firefighters face new challenges caused by solar panels. Solar panels can make it more difficult for firefighters to maneuver on rooftops. Firefighters may also find it hard to turn solar panels off because light can keep them energized. Solar panels also pose a challenge for ventilating a burning building as cutting through the roof takes longer.

Fire hazards can occur with faulty wiring or damage to the electrical components.

## Biogas Energy

Anaerobic digestion (AD) is the process by which organic materials in an enclosed vessel are broken down by micro-organisms, in the absence of oxygen. Anaerobic digestion produces biogas (consisting primarily of methane and carbon dioxide). AD systems are also often referred to as “biogas systems.”

Depending on the system design, biogas can be combusted to run a generator producing electricity and heat (called a co-generation system), burned as a fuel in a boiler or furnace or cleaned and used as a natural gas replacement.

The AD process also produces a liquid effluent (called digestate) that contains all the water, all the minerals and approximately half of the carbon from the incoming materials.

Many agri-food AD systems are located on farms. Farm-based AD systems work well with liquid manure. AD systems provide a valuable manure treatment option, since most other economically effective manure treatment systems (such as composting) require solid materials with dry matter greater than 30%.



*Image Credit: OMAFRA Factsheet 07-057*

<http://www.omafra.gov.on.ca/english/engineer/facts/07-057.htm>

## Stray Voltage

### What is Stray Voltage?

From the normal delivery and use of electricity, a small voltage may exist between two conductive surfaces that can be simultaneously contacted by an animal. Examples of conductive surfaces include concrete floors, metal stabling, milk pipelines and water bowls. This voltage, known as “animal contact voltage”, “stray voltage” or “tingle voltage”, usually presents no harm. However, if the voltage level is high enough, it may affect livestock behaviour and health.

## What Causes Stray Voltage?

Stray voltage can be caused by a wide variety of off-farm and on-farm sources:

### ***Off-farm sources***

In a properly functioning electrical distribution system, some voltage will always exist between the neutral system (ground conductors) and the earth. The level of this neutral-to-earth voltage (NEV) can change on a daily or seasonal basis, depending on changes in electrical loading, environmental conditions and other factors such as improper grounding and neutral connections. For safety reasons, in Ontario, the neutral system is connected to a farm's grounding system. While this bond protects people and animals from shocks caused by faulty electrical equipment and lightning strikes, it can also result in a stray voltage equal to a fraction of the NEV appearing on grounded farm equipment, such as feeders, waterers, metal stabling, metal grates and milk pipelines.

### ***On-the-farm sources***

Poor or faulty wiring, improper grounding and bonding, unbalanced farm loading, overloaded circuits or panels, defective equipment or voltage from telephone lines or gas pipelines are all possible sources of stray voltage. By ensuring your system meets Electrical Safety Authority (ESA) standards, you can eliminate many stray voltage problems.

## What are Common Signs of Stray Voltage and How Does It Affect Livestock?

Reported symptoms for dairy cows include:

- Reluctance to enter the milk parlour
- Reduced water or feed intake
- Nervous or aggressive behaviour
- Uneven and incomplete milkout
- Increased somatic cell count
- Lowered milk production

These symptoms and effects can also be the result of other non-electrical farm factors such as disease, poor nutrition, unsanitary conditions or milking equipment problems. Farmers should consider and investigate all possibilities, including stray voltage, when attempting to resolve these problems.

If you think you have a problem with stray voltage on a farm in Ontario:

- Call the Farm Rapid Response Team at 1-888-405-3778, Monday to Friday from 8:30am to 4:00pm
- Complete the Stray Voltage Investigation Form
- Email, fax or mail the completed form

## DIGGING DEEPER

For senior members

### Basic First Aid and CPR

Farm trauma can be devastating. In many rural communities, it may be well over 20 minutes before emergency help arrives to take over medical care of an injured farmer. With proper training, family members and employees can provide lifesaving care to an injured patient.

Proper care not only helps lessen the seriousness of the injury, but it also provides tools to keep the people first on the scene busy while waiting for emergency services to arrive. This has shown to reduce anxiety and leads to better patient outcomes.

Proper first aid training is even more important than the best first aid kit. A person can help and treat people with knowledge, hands and nearby materials. A first aid kit is useless if a person does not know how to use it.

Find out if first aid, CPR and AED training is offered in your area, when it is being offered, the cost and what topics are covered. Find out if they cover situations that are specific to farming such as accidental injection of medication when treating livestock, limbs caught in machinery, etc. If you cannot find training in your local area, keep searching to find the closest training. Record your findings in your Record Book. If possible, take the training so you are prepared to help when an emergency situation arises.

A good first aid training program for farm family members and farm employees should include the following:

- How to assess an injured person and manage life threatening conditions
- Items found around the home and farm that can be used as bandages or splints
- How to care for fractures or dislocations on an injured person
- The proper care for an amputated part or an impaled object
- How to safely and effectively decontaminate a person exposed to chemicals and where to get treatment information
- How to care for thermal and electrical burns and heat and cold exposure
- How to build a first aid kit for the home and farm

## MEETING 6

**ACTIVITIES****Activity #35 - Make Your Own Solar Panel*****Items Needed:***

- Thin copper sheeting, such as copper flashing
- Gloves
- Metal shears or snips
- Extremely fine grain sandpaper or an emery cloth
- A hotplate or other burner
- Salt
- Water
- A large glass mason jar or plastic bottle
- Alligator clips
- An amp meter or LCD multimeter capable of reading low voltage levels

***Instructions:***

NOTE: in order to complete this activity during meeting time, it is advisable to have the copper sheeting cut, cleaned and burnt before the meeting.

**Step 1: Cutting the copper sheeting:**

First you will need to take your metal shears and cut two equal sized pieces of the copper sheeting. The pieces should be no larger than your burner so you can ensure that the entire piece of copper is heated thoroughly and equally.

**Step 2: Cleaning the copper:**

You will need to wash your hands and the piece of copper to ensure that it is free of grease and other contaminants. You should only touch the copper sheet with gloves from this point on. After washing the sheet of copper, you need to take the sandpaper or emery cloth and gently sand down the top layer of the sheet to ensure it is completely free of any debris or contaminants.

**Step 3: Burning the copper:**

Turn the burner on to its highest setting and let it heat up thoroughly. Then place one piece of the copper sheeting on the burner. The copper will start to turn a variety of different colors as it heats up, and then it will start to become covered in a thick black coating known as cupric oxide.

Once the copper is fully covered in the black cupric oxide, let the copper continue to heat on the burner for another thirty minutes. After 30 minutes you can shut the burner off, and then let the piece of copper cool for at least another thirty minutes before touching it. Don't worry if some of the black cupric oxide layer flakes off during the heating or cooling process, as you will be removing this layer later anyways.

**Step 4: Gently washing off the scalded layer:**

Once the copper has sufficiently cooled, tap it gently on its edge on a hard surface to knock off as much of the black cupric oxide as you can. After this you can gently wash it with soap and water to reveal a reddish rust colored layer of cuprous oxide underneath.

Do not scrub or scour the copper sheeting as you don't want to damage the layer of cuprous oxide. It's not necessary to remove all of the black flakes of cupric oxide, just try to get as much of it off as possible without damaging the layer underneath.

**Step 5: Placing the copper in the mason jar:**

Now you will need to take the piece of copper that you heated and gently place it inside your mason jar. Be careful not to bend it too much. Just gently form it to the inside curve of the jar. Make sure that the side of the copper sheet that was directly on the face of the burner is facing the inside of the jar.

Next, repeat the same process and place the unheated piece of copper inside the jar on the opposite side of the heated piece of copper, making sure that the two pieces are not touching.

**Step 6: Connecting the alligator clips:**

Now take the alligator clip leads from your amp meter or LCD multimeter and connect the positive lead to the unheated piece of copper and the negative lead to the heated copper sheet.

**Step 7: Pouring in the salt water:**

Now you'll need to thoroughly mix a solution of around 25% salt and 75% water, ensuring that the salt is fully dissolved in the water. This solution will ensure that the two pieces of copper make a connection so that electricity can be generated.

Slowly and gently pour the solution into your mason jar, being sure to avoid getting the alligator clips wet. The very top of the copper sheets should be above the water to again keep the leads from being wet which will cause your solar cell not to work.

**Step 8: Letting the sun do its magic:**

Once you have filled your jar with the salt and water solution, then your solar cell is ready to start generating electricity. Place the jar in the sunlight, and the copper sheet covered in the layer of cuprous oxide will react photovoltaically and generate a small amount of electricity due the sunlight.

Connect your amp meter to the alligator clips and you should be able to read how much electricity is being produced.

Do not expect this device to produce very much energy, but if you connect multiple of these solar cells together, you might generate enough power to run or charge a small device.

Excerpts take from Solar Energy for Homes <http://www.solar-energy-for-homes.com/homemade-solar-cell.html>

## MEETING 6

**Activity #36 – Make A Pinwheel****Items Needed:**

- Square of paper
- Pencil
- Scissors
- Pin
- Thin dowel

**Instructions:**

1. Follow the instructions on page 145 for making a pinwheel.

**Discussion questions:**

- How is the pinwheel similar to a wind turbine? How is it different?
- Do you think the size of the pinwheel would affect the amount of energy it can produce?
- Do you think this is an efficient way of producing energy?
- Do you think this is a green way of producing energy?

Activity Credit: STEM Works <http://stem-works.com/subjects/2-wind-energy/activities/562>

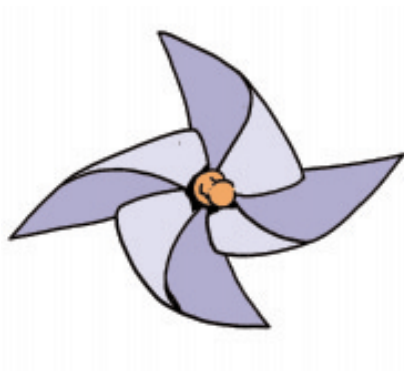
**Activity #37 - Guest Speaker**

Invite someone from Ontario Hydro, your local electrical company or an electrician to speak about electrical safety related to solar and wind energy, the safe use of generators and stray voltage.

**Activity #38 - Reflection**

Use a few minutes to do an informal evaluation. Ask members to complete the following sentences (aloud) and record the answers to help plan for future projects:

- I joined this club because...
- I really enjoyed ...
- I didn't enjoy ...
- I had a hard time ...
- My favourite activity was ...
- If I was to take this project again, I would ...
- I learned ...
- I've changed ...
- I'm glad ...

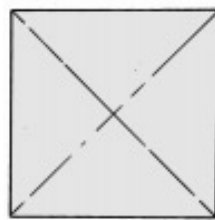


## Pinwheel Instructions

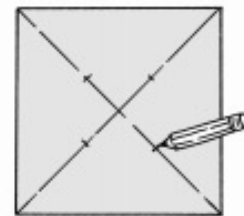
March is a great time to make pinwheels. Pinwheels are easy to make. As long as you begin with a square, the size of your pinwheel is up to you. If you decide to make a big pinwheel, be sure your dowel is longer.



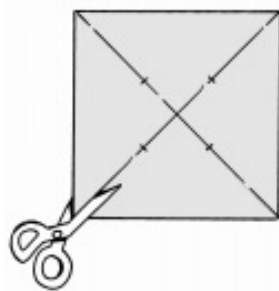
1. Begin with a square of paper.



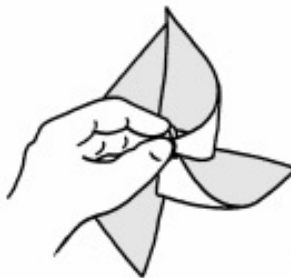
2. Fold your square, corner to corner, then unfold.



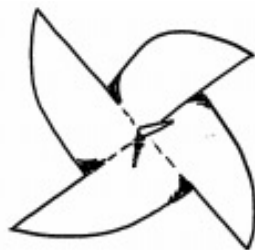
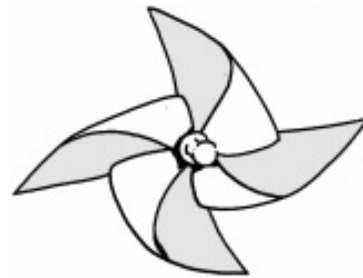
3. Make a pencil mark about 1/3 of the way from center.



4. Cut along fold lines. Stop at your pencil mark.



5. Bring every other point into the center and stick a pin through all four points.



6. Turn your pinwheel over - make sure the pin pokes through in the exact center.

7. Roll the pin around in little circles to enlarge the hole a little. This guarantees your pinwheel will spin freely

8. Stick the pin into a thin dowel.

Hint:  
Separate your pinwheel from the dowel with two or three beads. Stick the pin through the beads first then - into the dowel.

