VETERINARY

Leaders Guide
The mission of 4-H Ontario:
“4-H Ontario is dedicated to the personal development of youth while providing a positive impact on volunteers and communities in Ontario.”

The 4-H Motto:
“Learn to do by Doing”

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.”

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Or contact you local 4-H Association!
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INTRODUCTION

PURPOSE OF THE 4-H PROGRAM

The mission of the 4-H program is the personal development of youth while providing a positive impact on volunteers and communities in Ontario.

In 4-H, members will be:

- encouraged to develop self-confidence, a sense of responsibility, and a positive self-image;
- helped to develop their skills in communications, leadership, problem solving, and goal setting; and
- offered the opportunity to learn about the food production, processing, and marketing systems and the heritage and culture of Ontario through projects such as livestock and crop production, financial management, food preparation, nutrition, recreational activities, and career development.

WELCOME TO 4-H

The 4-H Club Leaders' Handbook says that, "Volunteer 4-H leaders are a blend of friend, teacher and parent." What a big order to fill! But you will discover that you have many talents as a 4-H leader. Having an interest in young people and their development and being willing to take up the challenge of 4-H leadership is the first step to success.

This material covered in this manual is geared towards senior and intermediate members. However, the development of members as individuals is your real goal. You may wish to keep senior members interested by encouraging them to become youth leaders. You will get to know the club members and where their interests lie very well. Use this knowledge, your own expertise and imagination to plan a fun, interesting and challenging club program for your members. And enjoy being a 4-H leader!

WHAT ARE MY RESPONSIBILITIES AS A 4-H LEADER?

Before your club begins:

1. Attend a leader training session;
2. Advertise the project and organize a club which will have a minimum of six members; and
3. Review available resources and begin planning the club program.
During the club:

1. Attend each meeting and the Achievement Program;
2. Assist members in planning and presenting the club program;
3. Provide a FUN, learning atmosphere;
4. Have members complete the club membership list and forward to the Ontario 4-H office by the end of the second meeting;
5. Help each member to set and reach goals for personal development;
6. Encourage members to work together as a group;
7. Provide guidance in choosing and completing an Achievement Program; and
8. Evaluate the club program.
4-H CLUB PROGRAM PLANNING

WHY DO I NEED TO PLAN THE CLUB PROGRAM?

A successful 4-H club doesn't just happen! Careful planning is necessary and very important. As a 4-H leader, you have a responsibility to do the best job you can in providing a fun, learning experience for the 4-H members. Planning will make this a reality. Some other benefits of planning include:

- setting goals to strive for;
- sharing the workload;
- ensuring that club time will be productive;
- providing better communications;
- avoiding calendar conflicts;
- providing a role for each person;
- knowing who will be responsible for what part of the program;
- making the best use of available resources; and
- learning planning skills.

O.K. ... HOW SHOULD I PLAN?

You will want to make some initial plans before the club starts. Remember to involve members early in the planning process. Achieve this by one or more of the following:

- hold a general meeting and have the entire membership suggest ideas
- meet with the elected club officers
- form a planning committee of members and leaders (parents and sponsors could also be included)

It doesn't matter which approach you take but there are some basic steps to follow.

1. Look at the club's situation.
   - ages, interests and locations of members
   - successes and failures of past clubs
   - county/regional/district activities
   - available time

2. Identify the club's goals.
   - base these on the club's situation

3. List possible activities.
   - how goals can be met
   - brainstorming is a good technique at this stage

4. Determine activities.
   - keep goals and the club's situation in mind
   - balance business, learning and social recreation

5. Prepare the Club Program Plan.
   - when will activities take place, where will they be held, what will they be, who will do them
   - share and discuss the plan with the entire membership
HOW CAN I MAKE THE BEST USE OF RESOURCES?

There are many resources available to 4-H leaders. Awareness of these resources and how to use them will help in planning the club program.

1. **4-H MEMBERS' Materials and Leaders Guide**

   The Members' Material, which is on white paper, has been developed as a reference for information that can be covered during the 4-H meetings. **IT IS NOT NECESSARY TO COVER ALL OF THE INFORMATION THAT IS IN THE MANUAL.** Remember your club's situation and select topics that will be of greatest interest. This project is designed to allow flexibility; that is, choose the meeting topics that appeal most to you and the members. Only use the information that is at the right level for your members and suits your geographic location. The key here is to BE FLEXIBLE and meet the needs of your members.

   The Leaders’ Section, which is on yellow paper, suggests possible activities, presentation ideas, and discussion questions for meetings. Use this as an aid in planning the club program. Again, **USE ONLY THE ACTIVITIES YOU HAVE TIME FOR AND THOSE THAT FIT YOUR PROGRAM PLANS.** You will have ideas from the members and ideas of your own to use too.

   USE READING ALOUD (by you or a member) SPARINGLY as a method of sharing information. Daydreaming, fidgeting, whispering, and perhaps even snoring are sure to follow this type of presentation.

   When selecting activities and methods keep this chart in mind.

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<tr>
<th>Method</th>
<th>Retention</th>
<th>Examples</th>
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<tr>
<td>Reading</td>
<td>Members will retain 10% of what they read.</td>
<td>Members’ supplement</td>
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<tr>
<td>Hearing</td>
<td>Members will retain 20% of what they hear.</td>
<td>Lectures, speakers, being read to</td>
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<tr>
<td>Seeing</td>
<td>Members will retain 30% of what they see.</td>
<td>Exhibits, posters, illustrations</td>
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<tr>
<td>Hearing and Seeing</td>
<td>Members will retain 50% of what they see and hear.</td>
<td>Observe videos, demonstrations, films, slides, tours</td>
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<tr>
<td>Saying</td>
<td>Members will retain 70% of what they personally explain.</td>
<td>Discussion groups, judging, expression ideas</td>
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<tr>
<td>Saying and Doing</td>
<td>Members will retain 90% of what they are personally involved in saying and doing.</td>
<td>Practice, explore, demonstrate, build</td>
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2. **CLUB MEMBERS**

The ages of the members in your club probably cover a span of several years. This means that your members will have many different needs, strengths and abilities. Although it is important for the club members to learn to work together you must also recognize individual differences.

**Senior Members** - When the younger members need some undivided attention, have the seniors plan and/or carry out an activity on their own. For times when the whole club must be together, encourage senior members to share their skills and experience with juniors by guiding them through an activity.

**Youth Leader** - If there is a senior member in the club who has completed several projects this may be the challenge he/she is looking for. You can help this member put leadership skills into action by having him/her assist with delivery of the club program.

**Club Executive** - Make sure this group is aware of its responsibilities and then LET THE MEMBERS LEARN BY DOING. The executive is responsible for the business portion of the meeting; chairing, taking roll, and recording minutes, etc. The club might consider pairing a junior and senior member together for some of these positions.

**OBJECTIVES**

The 4-H members will:

1. Be encouraged to have fun while learning.
2. Become familiar with the field of veterinary medicine.
3. Be introduced to common diseases of food-producing and companion animals.
4. Develop leadership and cooperation skills through participation in club activities.
5. Develop judging skills through participation in meeting activities.

3. **PARENTS AND SPONSORS**

Members will learn and enjoy more if their parents are interested in what they are doing. Likewise, sponsors will be more willing to continue their support if they can see the value of the 4-H program.

**INFORM** - Many parents and sponsors don't know what the goal of the 4-H program is or how it benefits the members. Talk to them about 4-H at every opportunity.

**INVITE** - Parents and sponsors should be invited to a 4-H meeting to see the club in action.

**INVOLVE** - Once parents and sponsors are more aware of the 4-H program they are more likely to accept your requests for help (hosting a meeting, being a guest speaker, arranging for a tour). Recognize parents and sponsors for their support with thank you notes, newspaper articles, etc.
4. **OTHER LEADERS AND THE 4-H ASSOCIATION**

Don’t feel that you are walking this road alone. Other 4-H leaders and the 4-H Association are willing to lend an ear for your ideas or offer suggestions.

5. **GUEST SPEAKERS**

Be sure to give speakers lots of notice. Be specific about what you would like discuss and how much time he/she will have. As with your club program planning, the guest should be aware of the club situation, ages of members, attention span and interests. Encourage the guest to involve the members in hands-on activity rather than just lecturing to them. If the number of possible speakers is limited, consider holding joint meetings with other clubs to make efficient use of the speaker’s time.

6. **SOCIAL RECREATION**

4-H should be FUN! Using a variety of social recreation activities at each meeting adds enthusiasm and enjoyment. The age, sex and size of the group determine the kinds of activities. Possibilities include games, relays, active sports, picnics, singing, puzzles and refreshments. Involve members in planning and carrying out the activities.

These are just some of the resources available to you. Become familiar with your community and what it has to offer. The possibilities are endless.

**PARLIAMENTARY PROCEDURE WITHOUT THE BORE**

**TIPS & IDEAS**

1. **SQUEEZE TOY**

   This is a great tool for teaching parliamentary procedure. The squeeze toy or ball can be passed to the person who is moving a motion. Only the person with the squeeze toy can speak. It can also be used to control meetings and ensure everyone gets a chance to speak. It helps keep the discussion on track and on schedule. Stuffed toy club mascots also work well.

2. **ALARM CLOCK**

   An effective time management tool. Set the alarm at the beginning of the meeting, advising the club members that there is “X” amount of time to get through the business material. This can be used for any session or activity.
3. SNOWBALL FIGHT - CAN BE USED AS A BREAK DURING THE BUSINESS PORTION OF MEETINGS

Divide the group into two sides. Each person is given a full sheet of newspaper. At a signal, each uses just one hand to try to crumple the paper into the smallest possible wad. These are the “snowballs”. At another signal, both sides start throwing the “snowballs” at each other. When the signal is given to quit, each side counts the “snowballs” on its side. The side with the fewest “snowballs” wins. To save time the “snowballs” could be made ahead of time and distributed evenly between the two sides.

4. Since the business portion of the meeting can seem boring to members, try incorporating some of the material into social time or a social recreation activity.

5. Keep the business portion of your meeting to 15-20 minutes. Keep it to the point.

6. Let the officers fulfill their responsibilities.

7. Let officers and committee chairs do their assigned duties.

8. A volunteer leader is there for guidance only.

MOTIONS

1. ADDRESS THE CHAIRPERSON (I.E. RAISE YOUR HAND)

Chairperson should have a “fun gavel”
Instead of raising their hands, perhaps the club could come up with a move that appeals to them or is based on the current project.

2. WAIT FOR THE CHAIRPERSON TO ACKNOWLEDGE YOU

The chairperson could pass/toss/hand a stuffed toy, ball etc. to the person wishing to speak.

3. MAKE THE MOTION: “I MOVE THAT….”

Straightforward. However the motion should be stated clearly so that the recorder/secretary can get it down.


The ball, squeeze toy, etc. should be passed to this person before they second. This will ensure that people are getting a chance to speak and are heard.

5. MOTIONS SHOULD BE MADE STANDING UP!
6. **CHAIRPERSON STATES THE MOTION**

   If using a speaker –indicating tool (ball or squeeze toy etc.) make sure the chairperson has it at this time.

7. **CHAIRPERSON CALL FOR DISCUSSION OF THE MOTION**

   Remember to pass the indicator around to those who want to speak.

8. **CHAIRPERSON CALLS THE VOTE: “ALL IN FAVOUR? OPPOSED”**

   At the first meeting of the club, an idea could be to create a method of voting either Favour or Opposed for the remainder of the club meetings.

9. **CHAIRPERSON ANNOUNCES THE RESULT OF THE VOTE**

   Motion “carried” or “defeated”

10. **THE CHAIRPERSON SHOULD REFRAIN FROM PARTICIPATING IN A DEBATE WHILE PRESIDING**

    If the chairperson/president wishes to participate, they should ask another member of the executive to assume the “chairperson” role while they take part in the discussion.

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**ELECTING THE CLUB EXECUTIVE**

Use the information in this section to help your club set up an executive. The following are the positions and roles for an executive.

**THE PRESIDENT**

Traditionally the president acts as the meeting’s chairperson, works with the club volunteers to complete any club business and keeps the meeting running smoothly. The president also works with the volunteer leader to develop an agenda for each meeting.

**THE VICE-PRESIDENT**

Basically, the vice-president is the assistant to the President and also helps to keep meetings running smoothly. They will introduce any guests or lead the meeting if the President is absent.

**SECRETARY**

The secretary’s job is to keep written notes on all club activities, write summaries of each meeting (called ‘Minutes of Meeting’) and read them aloud at the next meeting. The secretary may also be asked to write letters of thanks or requests.
CLUB PRESS REPORTER
This position involves letting the public know what activities and events are going on within the club. They do this by writing small reports and sending them to the local media. This is a very important public relations position.

TREASURER
If the club has a bank account the treasurer will keep accurate accounts of all of the money that is collected and spent by the club. They will report the balance of the bank account at each meeting.

TIPS
1. Have members “campaign” for their position, they can practice creativity and public speaking!

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

3. All positions are declared vacant by the chairperson, who indicates this by saying "I'd like to declare all positions vacant."

4. If possible ask a person who previously held each person to give a short explanation of the responsibilities involved. Ask them in advance to find a “fun” way of promoting the position. Examples are costumes, poems and props.

5. Your group needs to decide on the way you want to vote (i.e. show of hands, ballot, standing or anything you can think of, the possibilities are endless!)

6. Beginning with the position of President, the chairperson accepts nominations from members for the position.

7. Nominations do not require a seconder when taken from the floor. Written nominations do require a seconder.

8. Nominations are closed by a motion or declaration by the chairperson.

9. Give the acting chairperson a ball or toy or speaking stick they can use to pass and indicate who wants to nominate someone.

10. Have a recorder to list the nominations on chart paper at the front of the room so it is easier to keep track

11. Each member nominated is asked if she/he will stand for the position. Ask each nominee to give a short explanation of his/her interest in the position.

12. Members who decline are crossed off by the recorder.
13. If only one name is left then that member is acclaimed to the position. No vote is needed.

WHAT IS AN ACHIEVEMENT PROGRAM?

- An opportunity for members to share the knowledge and skills they have gained during this 4-H project
- Each member should be involved in some way
- Informs the public about the purpose and goals of the 4-H program

Be as creative as you can when planning your Achievement Program. Involve club members in selecting a suitable idea and making the necessary preparations. To help you get started here are some ideas.

1. At a public place, have the members talk about what they have learned during the club meetings. They could put emphasis on their own before the next meeting or special activities. This could be done with other 4-H clubs making the evening a 4-H public education night.

2. Develop a number of displays on topics relating to the field of veterinary medicine for showing at a local fair. This is a great way to raise money for your club!

3. Organize a poster session in a public place (fair, shopping centre, plowing match, Agri-Food Week program) demonstrating the typical 4-H Veterinary Club with a poster describing each meeting. Alternately, a poster session could focus on one topic of interest to the members that would be informative to the public.

4. Enter a float in a local parade. Decorate your float to illustrate the goals of 4-H and recent 4-H achievements in your community. Members could hand out flyers about 4-H to the people watching the parade.

5. Organize an information evening for parents of veterinary club members. Emphasize the communication of topics relating to veterinary medicine. For a more relaxed evening, prepare a quiz, pitting members against parents, and let the members shine!

HAS THE 4-H CLUB PROGRAM BEEN A SUCCESS?

Taking time to evaluate your 4-H club program is just as important as the initial planning. Ask everyone who was involved (members, other leaders, parents, sponsors and guests) for comments and suggestions. Their ideas will be very helpful in planning the program for your next club.
Here is a check list that may stimulate your thinking as you try to measure the success of the club program.

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1. Did members and leaders enjoy coming to meetings?
2. Did each member have a chance to actively participate?
3. Did each member receive praise or encouragement in some way?
4. Did I plan for the differences in age level, abilities and interests of the members?
5. Did I give each member a chance to assume responsibility when it was appropriate?
6. Did members learn at least one new thing at each meeting?
7. Did all members feel they were "a part of" or "belonged to" the group?
8. Did I involve the parents and sponsors in some way?
9. Did all members and leaders have fun?

Some of the material in this section on "4-H Club Program Planning" was adapted from, "Managing a 4-H Club" and "Managing a 4-H Project" from the Manitoba 4-H program, and "Home Study 4-H Advisor Course" from Ohio Cooperative Extension Service.
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<th>MEETING OR EVENT</th>
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<th>TOPIC ACTIVITY OR TASK</th>
<th>PEOPLE WHO COULD HELP</th>
<th>PRESENTATION IDEAS TO CONSIDER</th>
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**4-H CLUB PROGRAM PLANNING CHART**

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SPECIAL NOTES FOR THIS PROJECT

1. Because of the complicated physiological information, the Veterinary project is recommended for intermediate and senior members.

2. Any white pages are for both the leader and member. All yellow pages designed specifically for the leader. Lastly all green pages are glossary pages.

3. The Members' Manual has been designed as a reference source. Hopefully, the members can leave their manuals closed for most of the meeting, allowing them to observe, learn and take part in the discussion and other activities. It is not necessary — and usually not possible — to cover all the information given in the Members' Manual during the meeting.

4. The Members' Manual is designed to allow flexibility. Feel free to choose from sections that are of particular interest to you and your club.

5. If you plan to invite a veterinarian as a guest speaker, or there will be a large number of members wishing to spend a day with the veterinarian, you should approach more than one veterinarian for assistance.

6. You may wish to appoint one or two members to act as liaisons with the veterinarians in your area. They can help co-ordinate guest speaker appearances, and can approach the vets for help in answering difficult questions that may arise during this project.

7. As with all veterinary projects, it has been found that members learn and remember best if they are provided with actual specimens. A local veterinary clinic, agricultural college, abattoir or animal research station should be able to help you locate such visual demonstrations. A field trip to any of these establishments is also strongly recommended.

8. A whiteboard or flipchart is often useful for activities and discussion.

9. Throughout the manual you will see Roll Calls. The roll call is used as a way of introducing members and encouraging them to participate in the discussions at each meeting. Timid members in particular should be given the opportunity to speak during roll call. Not all the roll calls have to be completed and you may wish to use different ones. The roll calls in this manual are just a few examples which you may use but do not feel that you have to. As a volunteer you can choose one for them to do, or have them choose what they are comfortable with.

10. In the leaders section in each unit, you should come across a portion called “Learn to Do by Doing.” These activities are designed to reinforce
material covered in the Veterinary project, while allowing members to be creative, have fun, develop personal skill, and make new friends. Senior members can run the activities as well as the leader. Each activity may vary in time depending upon the size of the club. The more hands on activities there are, the better the member will learn.

11. Case studies are present in most units. This allows members to try to be a vet and diagnose some of the cases provided. The leader section contains the correct answers. This allows the members to know whether or not they made a mistake or if they were correct.

12. In the member’s section there is a part called “The Disease Guide.” This is designed to lay out all the diseases present in each unit so that the members know what affects what part of the body. This is strictly information about diseases.

13. Please feel free to go over and beyond this manual. This manual is designed as a guideline to help you lead your club. Be creative and have fun.

GOOD LUCK!
THE NERVOUS SYSTEM

ROLL CALL

- Like humans, animals use their five senses to know the world around them. Pick one sense (sight, hearing, taste, touch and smell), and name an animal that you think uses that sense particularly well.
- Name one part of the nervous system. What is one of the functions?
- Name a disease associated with the nervous system

"Learn to do by Doing"

ACTIVITIES

A) Transmitting messages

**Purpose:** Members will gain a better understanding of nerve transmission.

**Required Materials:** Small items such as a button or marble to represent neurotransmitters; you will need as many neurotransmitters as you have members in your club; stopwatch.

**Leader:**

1) Ask each member to stand up and form a line and explain that each person in line is a neuron. Tell them that their: left hands are the dendrites of a neuron; their bodies are cell bodies; their right arms are axons and their right hands are synaptic terminals.

2) Give each person in line the small item that represents a neurotransmitter; they should hold it in their right hands.

3) When you say “go,” have the first person in line start the signal transmission by placing his or her “nerve signal” into the dendrite of the next neuron. Then the second person passes his or her neurotransmitter into the dendrite of the next neuron and the “signal” travels to the end of the line. At this time, the transmission is complete.

♦ Remember that each “neuron will pass its own transmitter to the next neuron in line. Each neuron HAS ITS OWN neurotransmitter.”

Measure how long it takes the message to get from the first neuron to the last. Also, measure the distance from the first to the last neuron. Now calculate the speed (divide the distance by the time). How fast did the message travel from first to last neuron?
B) The Cerebrospinal Fluid

**Purpose:** Members will gain a better understanding of the role cerebrospinal fluid plays in protecting the brain from sudden impacts. The inside of a raw egg represents the brain and the shell represents the pia mater, a protective layer that covers the brain.

**Required Materials:** raw eggs, small containers with lids, water (to fill a small container)

**Leader:**
1) put the raw egg into a small plastic container that is slightly larger than the egg (the container represents the skull).
2) Cover the container with a tightly-fitting lid and shake it.
3) Members should notice that shaking the “brain” results in “damage” (a broke egg).
4) Repeat this experiment with a new egg. Fill the container with water, which represents the cerebrospinal fluid.
5) Members should notice that shaking the container does not cause the “brain damage” as before – the fluid has cushioned the brain from injury.

**Extension:** Drop a raw egg (in the plastic container) from a standard height (or heights) in different conditions and compare results:
- With fluid in the container
- Without fluid in the container
- With different fluids or materials (sand, Jello)
- Different shaped materials

**NOTE:** This could also be a homework assignment for the members. You can tell the members to bring their project to the next meeting so that everyone has had time to work on them and then the group can do an analysis on each project. This may some members the opportunity to work with other members to come up with a “brilliant” design. An assignment like this may also stimulate more members to participate.
NERVOUS SYSTEM: DISEASE GUIDE – Case Studies

**Problem #1:**
Your dog has just brought home a fox carcass. You aren’t sure if Fido’s vaccinations are up to date.

Name two things that you should do.

**Solution:**
Call your veterinarian; tie the dog up; have the fox’s brain checked for rabies. Look up the rabies vaccination certificate and tag.

**Problem #2**
It’s November. You are out with your parents checking the calves you weaned last week and you notice one calf off by itself. As you get closer, the calf turns and bumps into the feeder. Its mouth is open and it is making a choking, bawling sound. Your brother thinks it has something caught in its throat.

What do you think? What do you do?

**Solution:**
It shouldn’t bump into the feeder; stay away from the animal and call the vet.

**Problem #3:**
Your 15 lb, 8 year old Dachshund seems in pain when she walks up the stairs. Her right hind leg is dragging on the ground and her hind end seems uncoordinated.

What is the most likely cause of Tiny’s problems?

**Solution:**
Intervertebral disc disease, the breed of dog, overfeeding, and lack of exercise could all be contributors to the problem.

**Problem #4:**
You come into the barn to begin the evening milking and you notice that Milly hasn’t cleaned up her feed. She calved two months ago and she hasn’t been bred back yet. She is having trouble swallowing, is bellowing, and appears to be straining.

What do you do now?

**Solution:**
Keep her inside, stay away from her head, and call the vet. This kind of unusual behavior may lead you to suspect a nervous disorder.
THE MUSCLES

ROLL CALL

- Name a muscle disease or disorder and describe its effect on the animal.
- Name your favourite meat and identify which animal it comes from.
- Name a fact you know about muscles.

"Learn to do by Doing"

ACTIVITIES

DISEASE GUIDE-Case Studies

**PROBLEM #1:**
Hi, my name is Jack. I am a five-year-old St. Bernard. Recently I woke up stiff and walking gives me pain in my hind legs. Can you tell me what my problem could be and if I need an x-ray?

**Solution:**
Jack could have hip dysplasia. This happens because of abnormal bone development in the hips. Jack needs x-rays to confirm diagnosis. Sometimes surgery can correct the abnormality.

**PROBLEM #2:**
My name is Sparkles. I am a two-year-old Bulldog. I just had my first litter of pups. I had a very hard time delivering my babies and my veterinarian had to give me a caesarean. The first pup had a large head. Can you tell me what might have been the problem?

**Solution:**
Sparkles had dystocia, which often occurs in breeds having a large head.

**PROBLEM #3:**
My name is Lucille. I am a four-year-old riding horse. It's been very hot lately, but it got cooler on the weekend and my owner took me for a long on ride on Sunday. As a reward, she gave me extra grain and two days off. Now, it's Wednesday morning and we are going for another ride. My owner has noticed that I am very stiff and that my urine is dark red. What might be wrong with me?

**Solution:**
Lucille has "Classical" Azoturia or "Tying Up Disease". Overworking, excessive grain and rest causes this. Lucille needs immediate medical attention!
THE BONES

ROLL CALL

- Name a bone and describe its location.
  - Long - legs
  - Flat – ribs, sternum, scapula
  - Short – knee, stifle
  - Irregular vertebrae, clavicle, skull
- Have you ever seen an animal with a broken bone? What was the treatment?
- Name a bone disease or disorder and describe its effect on the animals.
  - See disease guide

"Learn to do by Doing"

ACTIVITIES

A) Hollow Strength

Required Materials: Paper, tape, scissors, paper plates, measuring cups, weights (blocks – small)

Leader:
Provide members with a sheet of paper (8 ½” x 11”) and ask them to cut it horizontally into three equal pieces.

Member:
1) roll each sheet into a cylindered (1 inch or 2.5 centimeters in diameter) and fasten it with tape
2) Stand the rolls on their ends, placing a paper plate on top of the bones.
3) Begin to add weights (wooden blocks) to the plate.
4) Count how many blocks the plate can hold before it collapses.
5) Roll 3 more sheets of paper as tightly as they can (no hollow space in center)
6) Stand these “bones” on their ends as before placing the same plate on top of them.
7) Load bricks onto the place until the bones collapse.

Leader
Members should notice that the hollow bones were able to support more weight before collapsing. Explain that the large bones in animals” bodies (including humans) are hollow bones that are strong and designed to carry a lot of weight. As well, hollow bones are lighter than solid bones, requiring less energy to move them.
**Get a Backbone**

**Required Materials:** Empty spools of thread (assorted sizes), pencils, strings, scissors, tape, balloons, ruler, and a hole punch

**Leader:** Provide members with a large, a medium, and a small empty thread spool, one pencil, scissors, ruler, hole punch, string, and tape. Members may work individually or in groups.

**Members:**
1) Trace the base of the medium and large spool twice and the small spool once onto the cardboard.
2) Cut out the cardboard circles and punch holes through the centers.
3) Using a piece of string (45 cm or 18 in), thread the spools together beginning with the largest spool, taping the string to the bottom of the largest spool.
4) Blow up a balloon and place it on top of the model—this represents the animal’s head.
5) Stand the column of spools on the table (largest on the bottom) and push the top spools about 2 inches (5cm) to each side.

**Leaders:**
Explain that the small spools at the top represent the cervical vertebrae, the medium spool represents the thoracic vertebrae and the larger bottom spools represent the lumbar vertebrae. Explain that the vertebra, like the spool, are not permanently attached together, allowing the body to bend and lean in different directions. Between each pair of vertebrae is a disk of cartilage that acts as a shock absorber, just as the cardboard circle between the spools keeps them from knocking together. Without this flexible disc the vertebrae would grind together and the body would not be able to twist, turn, or bend without pain and damage.

**Make the Bones**

**Required Materials:** foam, fasteners, skeleton picture of animal

**Leader:** Provide members with foam and fasteners and a picture of a skeleton (horse). Allow them to work in groups or as a club. They should put together all the foam bones together, creating a fastener where the bones should bend.

**Sampling**

Have samples of bones. You can get these from butchers, and vet centers. Be sure to sterilize them first. This will give the members of the club the opportunity to see what actual animal bones look like.
**BONES: DISEASE GUIDE - Case Studies**

**Problem# 1**
My name is Princess Patsy. I am a two-month-old gilt from champion stock. I sneeze and cough sometimes and my herd mates are starting to chuckle behind my back. My nose is sore and twisted.

Do I have a cold, or something more serious?

**Solution:**
Patsy has atrophic rhinitis. There is no cure, but her farmer could have used a vaccine to prevent this disease. The farmer could also improve sanitation and keep the pigs warm and dry.

**Problem# 2**
My name is Crazy Cow. I was in the field with other cattle that had swollen jaw bones, and I appeared to get the same thing. My jaw oozes yellow discharge.

Am I sick or have I just hurt my jaw while eating something?

**Solution:**
Crazy Cow has Lumpy jaw. Separate all the healthy cattle from the sick cattle. There is an antibiotic treatment that can be used on the sick animals. This is an infectious problem. If the treatment is not successful the animals may have to be sent to market.

**Problem# 3**
My name is Heavy Horse. I have been working the fields since I was big enough to participate in the team. I work many hours and days in a row. My legs are very painful.

Am I just old, or is there something wrong with me?

**Solution:**
Heavy Horse has Ringbone. The extensive wear and tear increased the number of calcium deposits in the leg making it very painful. There is no treatment although corrective shoes could help.
ANTLER, HORDNS, AND HOOVES

ROLL CALL

- Name an animal that grow antlers or horns.
- Have you ever seen an animal being dehorned? How was it done?

"Learn to do by Doing"

ACTIVITIES

1) Find samples of hooves and identify them. Collect samples from local farmers, meat packing plants, or pet stores have them for dog treats.

2) Go to a farm where examining animals’ hooves are accessible to look at.

3) View different sets of antlers, and discuss what they could be from.

4) Demo of hoof trimming, nail cutting or dehorning would be a great way of presenting material.

5) Ferrier could be asked to speak for hoof section.
ANTLERS, HORNs, HOOVES: DISEASE GUIDE – Case Studies

Problem# 1:
Hi my name is Martin. I am a four year old Aberdeen Black Angus bull. Lately my feet have been very sore. The skin between my claws has become inflamed and it hurts to walk. There are also little sores above my coronary band. Do you know what is wrong with me? Is it curable?

Solution:
Martin suffers from Foot Rot or Strawberry Foot. It is caused by the bacteria *Fusiformis Necrophorus*. Lameness may set in if not treated right away. This disorder is treatable. It can be treated with injectable antibiotics and by covering open lesions with creams from the vet. To prevent this from spreading, the farmer could put foot baths of copper sulfate at the doors where the cattle walk into the barn. Also the farmer could keep barnyard and barn clean and dry.

Problem# 2:
Hi my name is Dakota. I am a fifteen year old gelding quarter horse. All my life I have been a trail horse. I am never normally tired or sore after the trails I travel, but the other day I was forced into riding down a gravel road. After I was done my feet were really sore and it hurts to walk on them. Is my condition reversible?

Solution:
Dakota may suffer from a spongy hoof. This means that the horn is soft and non-resistant and after traveling a far distance on a hard gravel road his horn would have become hot and tender. If Dakota is not careful lameness may set in. If he takes it easy for a week or so his condition should improve. He should make sure that his hooves are clean from debris and that he is staying on soft surfaces.

Problem# 3:
Hi my name is Betsy-Lou. I am a thirteen year old Welsh pony. My owner recently removed me from my muddy paddock to my dry stable. I have noticed that my hooves are starting to crack and I do not know what to do. Am I in trouble?

Solution:
Betsy-Lou suffers from Brittle or Cracked Hoof. In her case, her condition is caused by her relocation. The hoof suffers from an abnormally dry state. This condition is not too severe because she caught it right away. A Ferrier should be contacted because her hooves should be trimmed regularly. Also Betsy-Lou should with her owners help try to find an area where there is a balance of moisture so that her hooves do not crack anymore.
REPRODUCTIVE SYSTEM

ROLL CALL

- What was the largest litter of animals you have seen? What type of animal was it?
- Name one structure of the female reproductive system. What is its function?
- Name one hormone involved in the reproductive system. Where does it come from and what is its function?
- What happens during the process of an embryo transfer? How is sperm collected to be used for artificial insemination?
- Name one method of measuring the reproductive health of a herd. How do you use it?

"Learn to do by Doing"

ACTIVITIES

This section is very technical and would be best for the members to have some hands on experience.

Some possible ideas for this section are:

1) Call a large animal vet. Ask him to talk to your club about the reproductive system. The vet may bring a slide presentation or even props like a cows reproductive organs.

2) Call an Artificial Inseminator. See if they would do a demonstration at a farm or even some of their equipment for the members to see and try.

3) Visit a place like Gencor in Guelph. You would have to call and see if it was alright first but if you went to a place like this you could see how the semen is collected and the rest of the process that it goes through before it arrives at your farm with the AI Technician.

4) Visiting a cow-calf operation may be very informative. The members can learn about different setups and their pros and con’s. They can then establish a mental picture of how they want their operation setup when they have their farm.

5) Depending on the group size, smaller group is recommended; you may be able to see an ultrasound of a pregnant animal.
THE DIGESTIVE SYSTEM

<table>
<thead>
<tr>
<th>ROLL CALL - ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Name one type of food eater and describe what they eat.</td>
</tr>
<tr>
<td>▪ Carnivores - protein (meat)</td>
</tr>
<tr>
<td>▪ Herbivores - plants (complex system)</td>
</tr>
<tr>
<td>▪ Omnivores - both meat and plants</td>
</tr>
<tr>
<td>▪ Domesticated Birds - seeds</td>
</tr>
<tr>
<td>➢ Name one disease or disorder involving the digestive tract and state one symptom or method of treatment</td>
</tr>
<tr>
<td>▪ Look at the disease guide for all the answers</td>
</tr>
<tr>
<td>➢ Name one of the four compartments of the ruminant stomach and one fact that you know about it. (For more information read in the members guide – RUMINANT STOMACH)</td>
</tr>
<tr>
<td>▪ Rumen – first stomach – largest – fore stomach</td>
</tr>
<tr>
<td>▪ Reticulum – second stomach – water bag – honey comb</td>
</tr>
<tr>
<td>▪ Omasum – third stomach – many plies</td>
</tr>
<tr>
<td>▪ Abomasum – forth stomach – true stomach – secretory stomach</td>
</tr>
</tbody>
</table>

"Learn to do by Doing"
ACTIVITIES

A) Enzyme Action

Required Materials: Starchy food samples, such as soda crackers or bread.

Leader:
1) Provide members with small pieces of bread or soda crackers.
2) Instruct them to chew the food, without swallowing, until they notice a change in taste.
3) Ask for their explanation of what is happening in their mouth.
4) Explain that the starch is beginning to be digested by enzymes in their saliva.

B) Belching

Purpose: This activity demonstrates that proper belching is a matter of life or death for ruminants.

Required Materials: Balloon, carbonated soda (cola)
Leader:
1) Pour pop into a balloon.
2) Close the balloon carefully and shake it up.
3) Ask the members to explain what happened.
4) Emphasize that this is what would happen to the animal’s rumen if the gas was not released.

C) How Good are Villi?

Required Materials: Flour, water, paper towels

Leader:
1) Mixing flour and water create a very fluid flour and water paste.
2) Divide members into groups of three. Ask them to make three puddles of the flour and water paste on a flat work surface.
3) Supply each group with seven sheets of paper towel.

Member:
1) Designate each group member as 1, 2 or 3
2) The first member will receive one sheet of towel. Don NOT fold it!
3) The second and third members will receive three sheets each and fold them accordion style.
4) Each member will now try to absorb his or her puddle. The first two members may only place their sheets over the puddles. The third may move the paper back and forth, as if they were moving villi.
5) Which puddle is absorbed first? Last? Which most closely resembles villi?

D) PH IN THE GUT

Required Materials: Flour, Vinegar, unsweetened red grape juice, baking soda, water, drinking glass

Leader:
1) Allow members to make a liquid past of flour and vinegar. Discuss: Is vinegar acidic or alkaline? Where in the gut is there an acidic environment? This past is chyme.

Member:
1) Add a few drops of unsweetened red grape juice (the juice acts like litmus paper. It is red in an acid mixture, but turns green in an alkaline mixture.)
2) Add a few drops of baking soda that have been mixed with water (baking soda is sodium bicarbonate). Where in the digestive system is this found? What reaction do you get? Are the contents of the glass now acidic or alkaline?
E) **Make an Emulsion**

**Required Materials:** eggs, oil, vinegar

**Leader:**
1) Ask members to explain what would happen if they tried to mix oil and vinegar together (No matter how hard you shake the two, the oil eventually separates into globules and rises to the top.)
2) Explain that this can be prevented by adding a third substance that stops the oil from separating. This substance helps make an emulsion, and is called an emulsifier.

**Member:**
1) Add ½ cup if vinegar to ½ cup of oil. Shake. What happens?
2) Let the mixture sit for several minutes. What happens?
3) Add an egg to the oil and vinegar. Shake. What happens?
4) Let the mixture sit for several minutes. What happens? (You have just made mayonnaise).

**Leader:**
1) Explain that bile acts as an emulsifier like the egg did in this recipe. Bile also helps retain the contents of the intestine fluid, and prevents the food from fermenting or going bad. Bile also gives feces its colour.

**F) Jeopardy:**

Post the paper of questions, and give each question a different pointing system depending upon how much time you spent on each section. Put the points awarded to each question on the back of the paper and stick the question side towards the wall so the points face outwards. (This also could be used as a quiz and completed in groups or individually.)

1. Digestion is
   (a) The process whereby food is broken down into simpler compounds that can be absorbed into the body
   (b) The process whereby food is chewed and mixed with saliva
   (c) The process whereby nutritious food is separated from harmful or non-nutritious food
   (d) None of the above
   (e) All of the above

2. Another name for the gut is the
   (a) Digestive pathway  (c) Stomach
   (b) Abdomen           (d) Alimentary canal

3. Which animals have the simplest digestive systems?
4. Carnivores have the simplest digestive system because
   (a) They are usually smaller animals
   (b) They are aggressive animals, and need simple stomachs so that they can eat a large amount of food in a short time
   (c) They eat mainly protein, and protein is easy to digest

5. Herbivores have specialized guts to allow them to digest
   (a) Carbohydrates       (c) Cellulose
   (b) Lipids                      (d) Minerals

6. Which organ of the bird acts as its "back teeth"
   (a) Gizzard       (b) Crop       (c) Ceca

7. Enzymes are catalysts, and catalysts help
   (a) Determine which type of nutrient is in the gut
   (b) Move food smoothly through the system
   (c) Speed up chemical reactions

8. Which of these enzymes is NOT produced by the animal?
   (a) Cellulase       (c) Lipase
   (b) Protease       (d) Carbohydrase

9. The valve separating the esophagus from the stomach is called:
   (a) The cardiac sphincter
   (b) The pyloric sphincter
   (c) The gastric sphincter
   (d) The esophageal sphincter

10. The valve separating the stomach from the intestine is called:
    (a) The cardiac sphincter
    (b) The pyloric sphincter
    (c) The gastric sphincter
    (d) The intestinal sphincter

11. The inner lining of the stomach is the:
    (a) Mucus membrane
    (b) Muscle layer
    (c) Connective tissue

12. Saliva helps in the chemical breakdown of
    (a) Protein
    (b) Cellulose
    (c) Fats
    (d) Carbohydrates
13. Once food has been chewed, it is formed into a round mass before it is swallowed. This mass is called
   (a) Chyle
   (b) Chyme
   (c) Bolus
   (d) Gland

14. The environment of the stomach is
   (a) Alkaline
   (b) Acidic

15. What are the three ingredients of gastric juice?

16. When partially digested food leaves the stomach it is called
   (a) Bolus
   (b) Gland
   (c) Chyle
   (d) Chyme

17. Stomatitis is an inflammation of the
   (a) Stomach
   (b) Esophagus
   (c) Mouth

18. The specialized rubber tube used to push objects caught in the esophagus down into the stomach is a
   (a) Plunger
   (b) Probang
   (c) Slide
   (d) Burgeon

19. Ruminants are: (a) Herbivores (b) Carnivores (c) Omnivores

20a. How many compartments are there in the ruminant stomach?

20b. Which compartment is the largest?
    ... is the driest?
    ... is a water reservoir?
    ... is also called the true stomach?

21. Rumination is the process whereby
   (a) Cellulose is broken down by microorganisms
   (b) Food in the stomach is brought back up to the mouth and rechewed
   (c) Animals carefully separate cellulose from other foods
22. Rumination takes longer if the food is
    (a) Soft     (b) Coarse     (c) Sweet     (d) Fresh

23. Fermentation occurs in the (a) Rumen     (c) Omasum
    (b) Abomasum   (d) Esophagus

24. Fatty acids are a by-product of fermentation. What happens to them after digestion?
    (a) They are voided as a waste product
    (b) They are used as a source of energy
    (c) Nothing happens to them; they simply stay in the lining of the stomach

25. Microorganisms are a good source of:
    (a) Cellulose   (b) Fats   (c) Proteins   (d) Vitamins

26. A build-up of gas in the rumen is called:
    (a) Gastric impaction
    (b) Indigestion
    (c) Gastritis
    (d) Bloat

27. In severe cases of bloat, the gas must be removed by puncturing the rumen. The instrument used is a
    (a) Debloater
    (b) Trocar
    (c) Probang
    (d) Release valve

28. Hardware Disease occurs when metal objects penetrate the
    (a) Rumen
    (b) Reticulum
    (c) Abomasum
    (d) Omasum

29. Glands outside the gut that help in digestion are called
    (a) Sub-guttural glands
    (b) Accessory glands
    (c) Gastro-cecal glands

30. Which salivary gland is found on each side of the base of the tongue?
    (a) parotid
    (b) mandibular
    (c) sublingual

31. The drier the food, the thicker the saliva.  True   False
32. Which of these functions is NOT performed by saliva?
   (a) Lubricating the mouth and esophagus
   (b) Softening and wetting food
   (c) Partially digesting starches
   (d) Dividing large molecules of lipids

33. The pancreas is located
   (a) Behind the stomach
   (b) In the loop of the duodenum
   (c) At the junction of the small and large intestines
   (d) Behind the angle of the jaw

34. Pancreatic juice contains
   (a) sodium bicarbonate
   (b) salt
   (c) hydrochloric acid
   (d) vitamins

35. Pancreatitis is a disease particular to
   (a) ruminants
   (b) small animals
   (c) domestic fowl

36. Pancreatitis is usually found in animals that are
   (a) young
   (b) old
   (c) overweight
   (d) undernourished

37. Bile is produced by the
   (a) pancreas     (b) gall bladder     (c) stomach     (d) liver

38. All domestic animals have a gall bladder except the
   (a) horse     (b) cat     (c) dog     (d) cow     (e) chicken     (f) pig

39. The function of the gall bladder is to
   (a) Produce extra bile when needed
   (b) Store and concentrate the bile
   (c) Control the release of pancreatic juice and bile
   (d) It does not function in digestion
40. The duodenum is the first part of the small intestine. It is
   (a) Round
   (b) Oval
   (c) S-shaped
   (d) Contracted

41. The largest section of the small intestine is the
   (a) Duodenum
   (b) Jejunum
   (c) Ileum

42. Villi are found
   (a) At the junction between the stomach and intestine
   (b) In the lining of the intestine
   (c) At the ileo-cecal valve
   (d) In the pancreas

43. The role of the villi is to
   (a) Mix and churn food
   (b) Produce intestinal juice
   (c) Absorb nutrients

44. The first part of the large intestine is the
   (a) Colon
   (b) Rectum
   (c) Cecum
   (d) Duodenum

45. The cecum acts as a rumen in some
   (a) Herbivores
   (b) Carnivores
   (c) Ruminants

46. Which of these animals has a specialized, enlarged cecum?
   (a) dog  (b) horse  (c) cow  (d) chicken

47. In general, most digestion is completed in the
   (a) Large intestine
   (b) Cecum
   (c) Small intestine
   (d) Ileo-cecal valve

48. Feces are stored in the
   (a) Cecum
   (b) Ileum
   (c) Anus
   (d) Rectum

49. The environment of the intestines is - acidic alkaline
50. Excess water is removed from waste food in the
   (a) Colon
   (b) Small intestine
   (c) Jejunum
   (d) Anus

51. Once digestion is finished, chyme becomes
   (a) Chiton
   (b) Bolus
   (c) Chymase
   (d) Chyle

52. Colic is most commonly found in
   (a) horses  (b) cows   (c) pigs   (d) cats

53. The process by which nutrients are taken into the bloodstream is:
   (a) absorption  (b) fermentation  (c) digestion  (d) assimilation

54. Where does most absorption occur?
   (a) Stomach
   (b) Small intestine
   (c) Large intestine
   (d) Throughout the gut

55. Water is important to absorption because:
   (a) It keeps the villi moist
   (b) It prevents food from drying out and sticking to the lining of the gut
   (c) It is the medium through which nutrients pass into the bloodstream

56. Assimilation is the process whereby
   (a) Food is broken down
   (b) Nutrients are taken up by the blood
   (c) Nutrients are used by the body
   (d) Digestive juices are mixed with food

57. Assimilation
   (a) Is a slow process
   (b) Occurs at intervals of 6 to 8 hours
   (c) Happens only when the gut is completely empty

58. The products of excretion are
   (a) chyle    (b) gas    (c) feces   (d) fatty acids

59. Diarrhea is dangerous when it continues for more than
   (a) 5 days   (b) 2 days  (c) 1 day    (d) 1 week  (e) 1 month

60. The most serious effect of diarrhea is
   (a) Dehydration  (b) Lack of appetite
   (c) Inflammation of rectum  (d) Vomiting
ANSWERS:

1) A
2) D
3) B
4) C
5) C
6) A
7) C
8) A
9) A
10) B
11) A
12) D
13) C
14) B
15) Hydrochloric acid, the enzyme pepsin, mucus
16) D
17) C
18) B
19) A
20) Four
22B) Largest - rumen
Driest - Omasum
water reservoir - reticulum
called the true stomach - abomasum
21) B
22) B
23) A
24) B
25) C
26) D
27) B
28) B
29) B
30) C
31) False
32) D
33) B
34) A
35) C
36) B
37) D
38) A
39) B
40) C
41) B
42) B
43) C
44) C
45) A
46) B
47) C
48) D
49) Alkaline
50) A
51) D
52) A
53) A
54) B
55) C
56) C
57) A
58) C
59) B
60) A
THE RESPIRATORY SYSTEM

ROLL CALL
➢ Name one part or function of the respiratory system.
➢ Name one problem of the respiratory system that you or a family member has had.
➢ Name one thing in the air that you or your animal(s) should not breathe.

"Learn to do by Doing"
ACTIVITIES

A) **Lung Fun: A Demonstration Activity**

**Purpose:** Members will be required to apply their knowledge of the respiratory system and make conclusions.

**Required Materials:** Two sets of lungs: one from a stillborn fetus, the other from a piglet that died shortly after birth.

**Leader:**
Place each set of lungs in a container of water and observe what happens. Help discover that once an animal has taken its first breath, the lungs will never completely collapse (some air remains in the lungs). For this reason, the lungs belonging to the stillborn fetus will sink and the other will float.

(Your local butcher or dead stock facility maybe able to provide you with the pigs’ lungs.)

B) **Breathing in a Bag**

**Purpose:** Members will gain a better understanding of gas exchange.

**Required Materials:** plastic bags

**Leader:** Instruct members to breathe into a bag. They will notice that their breathing rate increases. Help them to understand that as the bag fills with exhaled carbon dioxide, the amount of oxygen in the air decreases. Their breathing rate increases, as it tries to supply the body with enough oxygen.
RESPIRATORY SYSTEM: DISEASE GUIDE-CASE STUDIES

PROBLEM# 1:
Dear Gaspy,
I've been having a lot of trouble breathing lately, particularly when I try to breathe out. I really don't know how it all started, but I've noticed that the man in the house also seems to suffer from the same complaint.
Signed: Easier in than out

What is wrong?

Solution:
Dear Easier In Than Out,
You may both have pulmonary emphysema. If serious, this can result in the rupture of some of the alveoli in the lungs.

PROBLEM# 2:
Dear Gaspy,
I'm a five year old collie. For the past four days I've been coughing and gagging quite badly. Others in my kennel have had the same problem. Most recovered after a week or so, but some have been coughing for over two weeks.
Signed: Doggone Worried

Should I worry about this?

Solution:
Dear Doggone Worried,
You are sick, but there's no need to worry too much. You have kennel cough, and as long as you are healthy and well cared for, you will recover just fine. Ask your owner or handlers to give you cough depressants to ease your coughing and gagging. You might also like to suggest that you be separated from any healthy dogs, so that you do not infect them.

PROBLEM# 3:
Dear Gaspy,
I feel awful! I have a fever, my eyes and nose are running, my throat hurts and I haven’t been eating well. I’m even having a bit of trouble with coordination. Help!
Signed: Horse Alert

Solution:
Dear Horse Alert,
I am sure you feel horrible, but there is not much I can do to help. You have equine viral rhino-pneumonitis. Unfortunately, since your disease is viral
there is no treatment. Stay quiet, eat and drink as much as you can, and you should start to feel better soon.

**PROBLEM # 4:**  
**Dear Gaspy,**  
I’m a two-year-old Arabian, and I’ve been boarding at a second-rate stable for most of the summer. The past few weeks have been very hot and dry, and I’m beginning to have a lot of trouble breathing: breath comes in quickly, yet I have to force the air back out of my lungs. All of this makes me very tired most of the time.  
Signed: All tuckered out

What’s wrong with me?

**Solution:**  
Dear All Tuckered Out,  
Sounds like a classic case of heaves to me. You’ve probably been breathing in dust from mouldy hay, stable dust and bedding, and this has irritated your lungs. Unfortunately, you’re in for a long bout of heaves before you recover. Be sure that you are kept in a dust-free barn for now on, and ask your owner to discuss possible treatments or medicines with the veterinarian.

**PROBLEM # 5:**  
**Dear Gaspy,**  
I am a young piglet. My brothers and sisters and I are always sneezing and sniffling. When I looked in the mirror this morning I saw that my nose was starting to go crooked.  
Signed: Almost Out Of Kleenex

What is the matter with me? What can I tell my owner to do to help me?

**Solution:**  
Dear Almost Out Of Kleenex,  
You probably have atrophic rhinitis. Ask your owner to provide you with good ventilation and a warm, dry, draft-free environment. As well, ask him or her to keep your pen clean and not crowd you with a lot of fellow piglets.

**PROBLEM # 6:**  
**Dear Gaspy,**  
I am a two-month old calf that lives with my friends in the passageway just behind our mothers. I always feel cold because it is drafty where I live. I often cough a lot and feel as if I have a fever. Some of my friends have also been quite sick.  
Signed: Can’t Stop Shivering
Can you tell me if I have a bad disease? Where can I move so that I'll at least be warm?

**Solution:**
Dear Can't Stop Shivering,
You probably have enzootic pneumonia. Living in the passageway behind your mother will make your disease worse. Ask to move to a calf barn with your friends where it is warm and dry, or outside into a calf hutch.

**PROBLEM# 7:**
Dear Gaspy,
We are beef calves born in Alberta. We arrived in Ontario at a feedlot two weeks ago. We were just weaned from our mothers before getting on the truck, and the weather all the way here was cold, wet and windy. For the last week we haven't felt like eating and we've had trouble breathing. We think we have pneumonia.
Signed: It Hurts To Breathe

What advice can we send to our friends back home who will be leaving for Ontario in three weeks time?

**Solution:**
Dear It Hurts To Breathe,
Suggest to your friends that they ask to be weaned now so that they have some time to adjust to being away from their mothers. Starting to use weaning troughs and feed bunks would be a big help. Have them ask for a quick trip to Ontario so that the weather does not bother them as much. Relax, eat and drink well before leaving to help lesson the stress.

**REVIEW ACTIVITY - CROSSWORD PUZZLE**

**ANSWERS**

<table>
<thead>
<tr>
<th>ACROSS</th>
<th>DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capillaries</td>
<td>2. Pharynx</td>
</tr>
<tr>
<td>4. Twenty</td>
<td>3. Epiglottis</td>
</tr>
<tr>
<td>7. Bronchi</td>
<td>5. Expire</td>
</tr>
<tr>
<td>8. Turbinate</td>
<td>6. Syrinx</td>
</tr>
<tr>
<td>10. Olfaction</td>
<td>13. Inspire</td>
</tr>
<tr>
<td>18. Thoracic</td>
<td>17. Lungs</td>
</tr>
<tr>
<td>20. Larynx</td>
<td>19. Alveoli</td>
</tr>
<tr>
<td>21. Diaphragm</td>
<td>22. Pleura</td>
</tr>
<tr>
<td>23. Brain</td>
<td></td>
</tr>
<tr>
<td>24. Cilia</td>
<td></td>
</tr>
</tbody>
</table>
ACROSS
1. Tiny blood vessels in the lungs.
4. Average respiratory rate in a cow.
7. Trachea divides into these structures.
8. Bones in the nose.
10. Sense of smell.
12. Flexible tube.
16. Two in number.
18. ______ cavity.
20. Cartilages and muscles.
21. Muscular wall between chest and abdomen.
23. Control of breathing.
24. Tiny hairs on cells which wave back and forth.

DOWN
2. Shared between respiratory and digestive systems.
3. Protects entrance to larynx.
5. Opposite of "13 down".
11. Only in birds (2 words).
13. Air in.
14. ______ cavity - contains hairs and special bones.
15. Waste product produced in the body (2 words).
17. Soft and spongy.
19. Thin walled sacs in the lung.
22. Thin membranes covering the lungs.
THE TEETH

ROLL CALL

- Have you ever had a cavity? How was it treated?
- Why is it important to visit the dentist regularly?
- List one thing you do to take care of your teeth or your animal(s)’s teeth.

"Learn to do by Doing"

ACTIVITIES

1) Go to an abattoir and see if they can show you the difference between the ages of different animals. For example a lot of meat packaging plants tell the age of an animal by looking at the teeth and the workers or managers may be able to show the group how the process is done.

2) Call a vet and ask him to brief the group on how important proper dental care is to your animals well being.

3) Find different teeth of varies species (a vet might have some teeth that they could lend you) and compare them. Pay attention to the size, the shape and how they wear.
THE CIRCULATORY SYSTEM

ROLL CALL

- Name a fact you know about the circulatory system.
- Do you know anyone who has suffered from heart disease? How was it treated?
- Suggest a tip for keeping a healthy heart.

"Learn to do by Doing"

ACTIVITIES

1) Visit a vet and get him/her to show you how to take the pulse of different animals, their temperatures, and maybe how to take their blood pressure.

2) Call an Abattoir. See if you can get a heart of either a pig or a cow. Then let the group examine it. Be sure to point out major structures like the aorta.

3) If the vet tests blood for certain diseases, see if he/she would walk the group through the process of drawing blood to the actual testing part. Also the vet could explain the results.
ROLL CALL

- Do you consider phenotypes when breeding your animals?
- What structures or objects do you take into consideration before breeding your animal? I.e., Feet and legs.

WHAT IS GENETICS?

Why does my 4-H calf resemble her parents? Why does my puppy look more like his mother than he does like his father? You can find answers to your questions about the passing and inheritance of genes (or traits) when you learn about genetics...

![Cow and calf]

What is it all about? Genetics is about storing and passing on information. Genetic messages are stored in DNA, which can be found in almost every cell of an animal’s body. In order to keep the body working well, DNA tells cells what they’re supposed to do, when, where and how.

Each living thing has a unique genetic code. Only identical twins have exactly the same DNA.

DNA is also known as deoxyribonucleic acid (de-oxy-ribo-nuclayic).

The nuclei of most body cells contain a specific number of paired chromosomes. Chromosomes are threadlike “packages” of genes and other DNA in the nucleus of a cell. Different kinds of organisms have different numbers of chromosomes. Each parent contributes one chromosome to each pair, so their offspring gets half of their chromosomes from their mothers and half from their fathers. Located on these chromosomes are genes, whose purpose is to carry information (DNA) that tells the cell how to make specific proteins. These genes can tell the cells to make red hair or black, curly or straight.
DNA stores the instructions for making specific proteins, but before it can be “read,” it must be transcribed (think of it as translating a foreign language into English). In the process of transcription, the two strands that make up DNA are pulled apart and a complementary strand of RNA is formed.

What exactly is DNA made of? Each DNA molecule consists of a phosphate molecule, a deoxyribose sugar, and base pairs. The numerous possible combinations of adenine, cytosine, guanine and thymine (the base pairs) allow the DNA in each individual to be unique.

When three base pairs are strung together, they form a codon. As the name suggests, each codon codes for a specific amino acid (keep in mind that amino acids are the “building blocks” for protein). Proteins are synthesized when chains of amino acids are formed.

![DNA (note the double helix structure) and Codon (note the single helix structure of the RNA)](image)

**Passing and Inheriting Genes**

Because complex animals like cows, pigs, sheep, and even you, come from two parents, they have two genes for each trait, one gene from each parent.
Why do some animals have black hair while others have red or white – isn’t there only one gene for hair colour?

Different forms of genes are called alleles. Geneticists have found that some alleles are dominant, while others are recessive. That means that dominant alleles “take over” and are expressed (visible), while others are recessive (they are not expressed). This allows a variety of hair colours and also explains why some individuals tend to resemble one parent more than the other.

My calf’s hair is red and curly, while both of her parents have straight, black hair. How could that happen?

No, your calf was not adopted! As you just learned, the genes for traits like hair colour and type (curly or straight) are passed down from parents to their offspring. For example, if both parents have straight, black hair, then it is likely that their offspring will have straight, black hair. Once in awhile, though, this doesn’t happen and parents with one hair colour and type will have offspring with another.

As you know, the calf inherited two alleles for its hair colour and two alleles that determine whether the hair is curly or straight - one from its mother and the other from its father. Assume that the allele for black and straight hair is dominant and the allele for red and curly hair is recessive in your calf’s particular breed. In order for your calf to express the recessive alleles (red, curly) for hair, it must have inherited recessive alleles from both parents.

Geneticists use something called a Punnett’s square to organize this information and predict the genotypes (the genetic identity of an individual) and phenotypes (the observable traits or characteristics of an organism) of two particular individuals’ offspring. They use an upper case letter to indicate a dominant allele and a lower case letter for recessive alleles.

As you can see, your calf’s parents must have a dominant and recessive allele in their genotype. Both their sex cells (egg, sperm) that resulted in your calf’s conception contained recessive alleles. In this situation, statistically, there is a 1/16 or 6 ¼% chance that your calf’s parents will produce red and curly-haired offspring.
The calf’s genotype: bbcc. It’s phenotype: red and curly hair.

When your calf grows up, you may wish to predict what colour and type of hair its offspring will have. You choose to breed her to a bull with straight, black hair.

There are four different possible genotypes that the bull with black, straight hair may have.

His genotype may be ________, ________, ________, or ________.

You find out that most of the bull’s other offspring have straight hair, while only some have curly hair. They have all had black hair. You guess that his genotype is probably BBCc (you would have to do some more research to know this for sure).

You set up a Punnett’s square:

<table>
<thead>
<tr>
<th>B (black)</th>
<th>Mother</th>
<th>Father</th>
<th>bc</th>
</tr>
</thead>
<tbody>
<tr>
<td>b (red)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C (straight)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c (curly)</td>
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</tbody>
</table>

You are able to predict that all offspring will have black hair. 50% will have curly hair and 50% will have straight hair.

**How is SEX determined?**

There are two kinds of sex chromosomes; X and Y. Females have two X chromosomes. Therefore, all eggs have an X chromosome. Males have an X chromosome and a Y chromosome, so sperm may contain either an X or a Y chromosome.

If the sperm that fertilizes an egg carries a Y sex chromosome, the offspring will be male. If the sperm that fertilizes an egg carries an X sex chromosome, the offspring will be female. A baby’s gender is always determined by the sex chromosome carried by the sperm. Boy or Girl?

<table>
<thead>
<tr>
<th>B (black)</th>
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<th>Father</th>
<th>X</th>
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</tbody>
</table>

A girl’s genotype for sex will always and only be XX.
A boy’s genotype for sex will always and only be XY.

If the Y chromosome is present, the offspring will be a boy, regardless of the presence of an X chromosome. A girl can only be born when the male sperm contains an X chromosome.
Applications of Genetics: Selective Breeding

As you have learned, genes are responsible for the passing and inheritance of traits. Our understanding of this is commonly used in successful breeding programs. Breeders may choose to mate two animals so that when they are combined, they will produce offspring with desirable traits. By choosing two animals based on certain characteristic strengths, it is possible to offset some of the weaker qualities of both parents. Whenever possible, a parent will be chosen because it has strength where the other may have a weakness.

DID YOU KNOW

Goldfish have more than twice the number of chromosomes that humans have! Humans have 46, dogs have 78, and goldfish have a whopping 96!

DID YOU KNOW

“Dolly,” the famous cloned sheep, had three mothers – one who supplied the genetic information, one who supplied a dividing cell, and one who carried “Dolly” until she was born!
Everyone involved with the production of livestock, especially farmers, aim to protect animals’ health and productivity against disease. Everyone should learn about health management practices that they can use on their farm to help:

- Prevent the introduction of diseases into your herd
- Decrease the spread of disease between animals, farms, and countries

BIO-SECURITY IS THE PRACTICE OF PREVENTING OR REDUCING THE SPREAD AND INFECTION OF DISEASE.

Why should I learn about bio-security?

You have probably heard people talking about Bovine Spongiform Encephalopathy (mad cow) and “Foot and Mouth Disease.” Contagious diseases such as these are transmitted from infected animal to uninfected animals. The diseases are transmitted through saliva, bodily fluids or ingestion of an infected animal.

When these diseases infect animals, they can have devastating economical effects. Every year farmers lose money because of:

- decreased meat, milk, and/or offspring production in infected animals
- increased vet bills, use of medicines
- higher rate of abortions
- higher mortality rate

Farmers also lose valuable time caring for sick animals.
Protecting the Herd

As you have already learned, contagious diseases can have devastating effects on the well-being of a herd. Because the threat of spread and infection of disease exists, management practices have been established. By learning about these practices, you will be able to increase your farm’s overall bio-security by identifying the changes that need to be made on your farm.

How can I protect my herd?

1. Be a “Traffic Cop” – Control the Traffic on Your Farm

   - Control the number of visitors to your farm. If you must have visitors, supply them with clean clothes and disinfected footwear.
   - Designate a specific visitor area to minimize contact with livestock or feed sources.
   - Insist herd workers wash their hands after handling sick animals and before milking.
   - Control the movement of cats and dogs between farms.
   - Post “DO NOT ENTER” signs.
   - Know the source of purchased animals. Have they been vaccinated? What is the current health status of the herd of origin?
   - Control populations of flies, birds, rats, and mice that move from farm to farm. They can carry diseases and contaminate feed and water.
     - Eliminate nesting sites
     - Destroy existing populations by poisoning or trapping
     - Seal off openings into silo roofs
   - Wash and disinfect equipment shared between animals and neighbours: halters, pails, machinery, hoof trimmers, and dehorners.
   - Use separate boots, forks, and shovels when handling feed and manure. This is an easy way to reduce the risk of contaminating feed!

2. Isolate! For 21-30 days

   - All animals that have been newly purchased or returning from livestock shows
   - All animals that show symptoms of disease.
     - This allows you to observe these animals for symptoms of disease. If they remain disease-free during their isolation period, they can be (re)introduced to the rest of the herd.
3. Vaccinate!
   • Vaccines, if administered properly, can protect animals and humans against some diseases.
   • Be sure to vaccinate farm dogs and cats.

4. Separate!
   Young animals can become infected with contagious diseases when exposed to older infected or carrier animals before they are given time to develop immunity.
   • Provide adequate pen, stall, or bedded area per animal.
   • Provide adequate feed and water access per animal.
   • Use a designated sick pen for sick animals only.
     ➢ Remove all manure after use and disinfect after use.
   • Use a designated maternity pen for freshening animals only.
     ➢ Remove all manure after use and disinfect after use.

5. Sanitation!
   • Dispose of dead animals immediately, by burial or by dead stock removal. Animals must be buried at least two feet deep. Remember to wear protective clothing while handling.
     ➢ If you must bury, include contaminated bedding, milk, manure, or feed.
     ➢ Clean and disinfect area after carcass removal.
   • Maintain a clean living area for livestock.
     ➢ Control populations of parasites and flies that contaminate feed and water and live in manure piles.
     ➢ Store manure so it is inaccessible to cattle, especially calves.
   • When choosing disinfectants, consider the following:
     ➢ Does it work against bacteria, fungi or viruses?
     ➢ Will it be effective if used in hard water?
     ➢ Will it be effective if used in extreme temperatures (hot and cold)?
     ➢ Is it compatible with soaps?
     ➢ Will it continue to work for a period of time after application?
     ➢ Can it be used on feeding equipment?
     ➢ Does it give off irritating fumes?
What is STRESS?

Stress can decrease an animal’s ability to fight off disease. There are many forms of stress, including:

- **Environmental Stress**
  - Humidity
  - Drafts
  - Dust
  - Manure gases (hydrogen sulphide, carbon dioxide, carbon monoxide, methane gas, and ammonia)
  - Temperature changes
  - Airborne bacteria, viruses, fungi, etc.

- **Behavioral Stress**
  - Overcrowding
  - Mixing animals from different sources (e.g. feeder pigs)

- **Nutrition**
  - Imbalance or deficiency of nutrients

- **Production Stress**
  - Heavy production (i.e. dairy cattle)

Any combination of these stresses can suppress an animal’s immune system. If an animal is exposed to a disease-causing agent (bacteria, virus) at a time when its immune system is not able to function at its best, it is likely to be infected with the disease and become very sick. Its body may take longer fighting the disease, meaning that the animal takes longer to recover. Keep stress to a minimum!!

Good ventilation can eliminate many of the stresses that aggravate an animal’s respiratory system. While some farmers rely on natural ventilation (by opening windows and doors), others use automatic systems consisting of exhaust fans and controlled air inlets. There are methods of ventilation best suited for different types of animals living in various environments. Whatever the system, a good ventilation system should:

- Provide fresh air without causing drafts.
- Remove stale air.
- Control humidity.
- Control odour.
- Control temperature.
Vaccination

It was mentioned earlier that vaccination can protect humans and animals from diseases. Now you will learn how vaccines work and how you can establish an effective vaccination program.

A vaccination is a planned and controlled infection that prevents disease.

Virus is modified or killed. → A small amount of vaccine is injected into the animal. → The animal’s body produces specific antibodies which attack and kill the virus; animal may show signs of minor infection. → The body remembers how to produce antibodies and is able to resist infection if additional contact with virus.

Vaccination Timeline:

Birth: newborn receives antibodies from colostrum, does not need to be vaccinated.
6-8 Months: animal is vaccinated for the first time.
4-6 weeks later: animal is given a booster shot.
1 year later: animal is vaccinated again, repeated annually.

Why use Live (modified) Virus? → relatively inexpensive
→ longest duration of protection from disease

Killed Virus? → easier to store
→ cannot cause disease
→ less risk of contamination
→ can be given to pregnant animals

YOUR VETERINARIAN CAN HELP YOU CHOOSE THE BEST VACCINE FOR YOUR ANIMALS.
FOOT AND MOUTH DISEASE (FMD)
You have learned that contagious diseases can be transmitted from an infected animal to a non-infected animal. One such disease is Foot and Mouth Disease (FMD).

Foot and Mouth Disease:
- Is a highly contagious, viral disease.
- In 2001 an outbreak had resulted in the slaughtering of 4,190,000 sheep, cattle, pigs, goats, and deer.
- It affects cloven-hoofed animals including cattle, sheep, pigs, goats, deer, elk, and buffalo; very rarely does it affect humans.
- Infected animals may develop blisters in the mouth (snout), on the feet, in teats and udder.
- Most commonly spread by direct contact between animals, but can be spread by indirect contact.
  - Direct: blisters, nasal discharge, saliva, milk, semen, manure, and urine.
  - Indirect: contaminated vehicles, people, frozen semen, contaminated feed, and drinking water.

KEEPING FMD OUT!
Vaccines exist, but only to protect animals for a relatively short period of time. They would only be used in an emergency.
Instead we must use what we have learned about bio-security to protect Canadian farms from FMD.

What should I do?
- Control traffic!
  - No visitors who have been in countries affected by FMD in the last 14 days.
  - Do not use semen or embryos from imported from FMD-positive countries.
- Isolate!
  - Animals showing symptoms of FMD from the rest of the herd.
- Separate!
  - Young and old animals to prevent spreading.
- Report any suspected cases of FMD to your veterinarian.

What is Canada doing?
Canada’s strict border policy has kept the country free from FMD since 1952:
- Used farm equipment and all live ruminant animals (cows, sheep, etc) and their products cannot be imported into Canada.
- Travelers are educated about the spread of the disease and are advised not to visit Canadian farms within 14 days of being in a country with FMD.
- Disinfectant is provided for travelers’ shoes.
- Beagles are used to "sniff out" food products carried by travelers.

Who can help me protect the bio-security of my farm?
Using common sense and your increased knowledge of bio-security and disease prevention, you can identify factors that threaten the health and well-being of your herd. Making small changes now can save you a lot of money, time, and stress later on. Veterinarians can also help you implement new strategies on your farm to protect you and your operation from disease and its devastating effects.
POISONING
Poisons are toxic substances that can be eaten, absorbed through the skin, and inhaled. Poisoning is sometimes misdiagnosed because its symptoms exhibit other disease or disorders, making it especially dangerous. Some poisons act immediately, while others take days to appear; this also makes diagnosis difficult.

Common symptoms of poisoning:

- Muscle tremors or seizures
- Vomiting and or diarrhea, sometimes with blood
- Excessive salivation - drooling or foaming
- Redness of skin, ears, eyes
- Bleeding (common when rat poison is ingested)
- Formation of ulcers or blisters of the mouth or skin
- Excessive licking
- Swelling of a limb or face, (common with bites and stings)
- Changes in body temperature (unusually high temperature usually due to increased muscle activity as a result of tremors or seizures)
What should I do if I suspect poisoning?

If you suspect poisoning, call your veterinarian or veterinary emergency clinic immediately. If it is possible, have the following information ready:

- Name of toxin ingested, inhaled, or absorbed.
- Approximately how much of the toxin was ingested.
- How long ago you suspect the poison was ingested.
- Approximate weight of your pet.
- What symptoms are being exhibited -- vomiting, tremors, salivation; and general observations -- such as color of the gums, respiratory rate, heart rate, and if possible, body temperature.

Be aware of the following common household poisons:

- Antifreeze (Ethylene glycol)
- Slug/Snail bait
- Prescription medications
- Mouse and rat poison
- Lawn fertilizers, weed killers
- Household cleaners and chemicals
- Some plants (indoor and outdoor) including azalea, oleander, mistletoe, and Easter lilies; shrubs, and trees. Check with your veterinarian for help in finding information on native plants in your area that are toxic to pets.

Identifying plants as poisonous or non-poisonous is difficult for many reasons:

- what may be poisonous to some species is harmless to others,
- poisonous content varies of plants may vary in different stages (early growth to maturity),
- some plants, such as buttercups, contain poisons when fresh but not when dried,
- only certain parts of the plant may contain poisons (rhubarb – only leaves are poisonous),
- certain species are more susceptible to certain poisons than others,
- young animals are more susceptible than older animals (animals may build up resistance),
- hungry animals are more likely to eat large quantities of toxic plants than well-fed animals.
### Classification of Poisons

<table>
<thead>
<tr>
<th>TYPE OF POISON</th>
<th>PROPERTIES</th>
<th>SYMPTOMS</th>
<th>WATCH OUT FOR THESE PLANTS:</th>
</tr>
</thead>
</table>
| **Alkaloids** (examples include morphine, atropine, nicotine, quinine, and strychnine) | • Basic organic substances with a bitter taste | • Irritates the gastrointestinal tract, causing nausea, colic and diarrhea  
• Affects the nervous system, causing blindness, weakness, convulsions, and death. | • Lupines  
• Buttercups  
• Marsh marigolds  
• Purple nightshade |
| **Glycosides (natural plant products containing the sugar glucose):** | | | |
| 1. **Cyanogenic glycosides** | • In the presence of certain enzymes, hydrocyanic acid, (a toxic substance) is produced  
• Conditions such as climate, soil, and exposure to sunlight cause variations in content of cyanogenic glucosides in plants. | • Interferes with oxygen exchange from the lungs to the body tissues, causing muscle tremors, difficult respiration, and convulsions  
• Often symptoms are not seen because death occurs quickly | • Sorghum  
• Sudan grass  
• Marsh-arrow grass  
• Wild cherries |
| 2. **Saponin glycosides** | • Produces gastroenteritis causing vomiting, diarrhea and colic  
• If absorbed into bloodstream, causes a break down of red blood cells  
• Injury to the central nervous system causes convulsions and paralysis. | | • Purple cockle  
• Cow cockle  
• Pokeweed |
| 3. **Mustard oil glucosides** | • Severe gastroenteritis causes severe colic and purging. | | • Found in plants belonging to the Mustard family |
| **Nitrates** | • Poisoning occurs when nitrate is converted to nitrite in the gastrointestinal tract  
• Nitrite is absorbed into the bloodstream where it reacts with hemoglobin to form methemoglobin  
• Gas exchange is | **Acute poisoning:**  
• Trembling and staggering,  
• Rapid breathing,  
• Death  

**Chronic poisoning:**  
• Poor growth  
• Poor milk production  
• Abortions | **Weeds:** pigweed, thistle, hemlock, wild Morning Glory  
**Crops:** oats, rye, wheat, barley, corn, sorghum, sugar beets, turnip  
(Drought and low |
| **Selenium** | • Element needed for normal metabolism  
• Poisoning occurs when quantities are taken in exceeding what is normally needed | • Stiffness of joints  
• Lameness  
• Loss of hair  
• Hoof deformities | In most plants, the level of selenium is related to levels in the soil. |
| **Mycotoxins** | • Produced by fungi  
• Produced only in the right environmental conditions  
• Mycotoxin production may occur while crop is standing or after it is harvested.  
• Two types of toxins; vomitoxin and zearalenone | Vomitoxin: causes animal which ate the contaminated feed animal to vomit.  
Zearalenone: a female estrogen; females show signs of irregular estrus and reduced litter sizes | • Crops infected by fungi including corn and cereals |
| **Photosensitization** | • Certain plants contain toxic agents which cause animals to become sensitive to strong sunlight when eaten. | • May cause sunburning and swelling of sensitive areas, the formation of ulcers, and gangrene.  
• May cause blindness.  
• In some cases it may cause liver damage. | • St. John’s wort  
• Spring parsley  
• Buckwheat  
• Blue-green algae |
Providing a poison-proof environment:

- When using poisons such as ant, rat and mice baits, place the products in areas that are inaccessible to animals. Most baits contain sweet smelling ingredients which can be attractive to pets.
- Medications made for humans may have sugar coatings on them that are attractive to pets and may be toxic if ingested.
- Do not allow pets to chew on plants or trees that are poisonous. You can buy commercial sprays that can be safely applied to plants and discourage pets from chewing on plants.
- Spray bottles or cans that may contain a toxic substance may be seen by a pet as a toy. The contents may leak out if the container is punctured by the pet’s teeth.
- Thoroughly read all directions for use of chemicals and follow directions carefully.
- When cleaning your house, never allow your pet access to the area where cleaning agents are used or stored.
- Never give your animal any medications unless under the direct of your veterinarian. Many medications that are used safely in humans can be deadly when used inappropriately. One extra strength acetaminophen (Tylenol) tablet (500mg) can kill a seven-pound cat.
- Keep all prescription and over the counter drugs out of your pets' reach, preferably in closed cabinets. Pain killers, cold medicines, anti-cancer drugs, antidepressants, vitamins, and diet pills are common examples of human medication that could be lethal even in small dosages. One regular strength ibuprofen (Motrin) tablet (200mg) could cause stomach ulcers in a ten-pound dog.
- Many common household items may be toxic to certain species. Items that are highly toxic even in small amounts include:
  - pennies (high concentration of zinc),
  - mothballs (contain toxic chemicals)
  - potpourri oils,
  - fabric softener sheets,
  - automatic dish detergents (can cause lesions),
  - batteries (contain acids which can cause lesions),
  - homemade play dough (contains high quantity of salt),
  - cigarettes,
  - coffee grounds,
  - alcoholic drinks.
Body Condition Scoring (BCS) is a tool used by animal care providers to assess an animal's current health status. It is useful in determining if the animal's nutrition is adequate or if it requires modification.

An animal at its ideal weight and body condition will perform at its greatest potential and will be most economical. If it is intended for breeding, it will produce healthier offspring than under or overweight animals. As well, animals not at their ideal body weight and condition may have erratic heats, experience difficulty becoming pregnant, experience difficulty during birth, and may not produce enough colostrum.

Body Condition Scoring can help reduce economic losses: carefully planned nutrition minimizes overfeeding which results in financial loss and contributes to high productivity.

It is important to remember that the body condition of an animal cannot be changed quickly (it may take as long as eight weeks to modify condition by one score, depending on the animal and species). Rapid weight loss or gain can be shocking to an animal's body, and may cause more harm than good.

The best time to modify the condition of a breeding animal is at weaning.

It is acceptable to cull breeding animals that show no sign of change in body condition after four weeks on improved nutrition.

Improved nutrition may not be enough… there are other factors that contribute to an animal’s body condition. Disease, especially tooth decay, may contribute to an animal’s unwillingness to eat and can be alleviated with treatment.

Things to consider:

- Age of animal, breed, frame size (older animals tend to carry less condition than younger animals)
- How the animal feels or looks at observation time: do not base evaluation on gut fill or thickness of hair.

Condition scoring is a useful technique to learn and the information gained is very useful in managing animals. Specific criteria for body condition scores are outlined in the following pages.
<table>
<thead>
<tr>
<th>Body Score</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1          | • Emaciated; all skeletal structures are visible.  
• No muscle tissue is evident.  
• No external fat present.  
• Little chance of survival in stressful conditions.  
• Approximately 120 kilograms (260 pounds) underweight.  
• Starving and weak. |
| 2          | Thin  
• Very thin; skeletal structures are visible.  
• Muscle tissue is evident, but scarce.  
• No external fat present.  
• Approximately 90 kilograms (200 pounds) underweight. |
| 3          | • Thin; upper skeleton is prominent (vertebra, hips, pin bones).  
• Muscle tissue is more abundant.  
• Body fat is not obvious.  
• Approximately 65 kilograms (140 pounds) underweight. |
| 4          | Ideal  
• Hooks and pins becoming less obvious.  
• Muscle tissue is abundant.  
• Fat is beginning to cover ribs.  
• Approximately 35 kilograms (75 pounds) underweight. |
| 5 | • Ideal flesh at weaning.  
  • Ribcage is only slightly visible.  
  • Hooks and pins are visible but not obvious.  
  • Muscle tissue is nearing maximum.  
  • Fat deposit behind shoulder is noticeable.  
  • Ribs are covered slightly. |
|---|---|
| 6 | • Ideal flesh at calving.  
  • Ribcage is only barely visible.  
  • Hooks and pins are becoming less prominent.  
  • Muscle tissue volume is at a maximum.  
  • Fat deposit behind shoulder is obvious.  
  • Ribs are covered completely with fat beginning to cover rump.  
  • Approximately 35 kilograms (80 pounds) overweight. |
| 7 | Fat  
  • Slightly over-conditioned.  
  • Skeletal structures are becoming difficult to identify.  
  • Fat deposits behind shoulder and at tailhead are obvious.  
  • Approximately 80 kilograms (170 pounds) overweight. |
| 8 | • Over-conditioned,  
  • Skeletal structures are invisible.  
  • Fat deposits are flattening rump.  
  • Fat is filling brisket and over shoulder.  
  • Mobility may begin to be restricted.  
  • Approximately 120 kilograms (260 pounds) overweight. |
| 9 | • Obese.  
• Flat appearance dominates.  
• Brisket is heavy.  
• Fat deposited in udder limits effective lactation.  
• Approximately 160 kilograms (350 pounds) overweight. |
## DAIRY CATTLE

<table>
<thead>
<tr>
<th>Body Score</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1          | **Rump Area:** Deep cavity around tailhead. No fatty tissue felt between pins. Pelvic bone easily felt.  
**Loin Area:** Ends of short ribs sharp to touch. Upper surfaces can be felt easily. Deep depression in loin.  
Typical in cows with a severely displaced abomasum. |
| 2          | **Rump Area:** Shallow cavity lined with fatty tissue at tailhead. Some fatty tissue felt under pin bone. Pelvis easily felt.  
**Loin Area:** Ends of short ribs feel rounded. Upper surface felt with slight pressure. Depression visible in loin.  
High-producing, early lactation cows should score 2. |
| 3          | **Rump Area:** No visible cavity around tailhead. Fatty tissue is easily felt over whole rump. Skin appears smooth. Pelvis is felt with slight pressure.  
**Loin Area:** Ends of short ribs can be felt with pressure. There is a thick layer of tissue on top. There is only a slight depression in the loin. |
<p>| 4          |             |</p>
<table>
<thead>
<tr>
<th>5</th>
</tr>
</thead>
</table>
| **Rump Area:** Folds of fatty tissue are visible around tailhead. Patches of fat are present around the pin bones. Pelvis is felt only with firm pressure.  
**Loin Area:** Short ribs cannot be felt even with firm pressure. No depression is visible in loin between backbone and hip bone. |

<table>
<thead>
<tr>
<th>5</th>
</tr>
</thead>
</table>
| **Rump Area:** Tailhead is buried in fatty tissue. No part of pelvis can be felt even with firm pressure.  
**Loin Area:** Folds of fatty tissue over short ribs. Bone structures cannot be felt.  
These cows are good candidates for fat cow syndrome. |
# Horses

<table>
<thead>
<tr>
<th>Body Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Emaciated</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Very Thin</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Thin</td>
</tr>
</tbody>
</table>

**Emaciated**
- Processes (the tops of the vertebrae), ribs, tailhead, point of the hip, and point of buttock, project prominently.
- Bone structure of withers, shoulders, and neck easily noticeable.
- No fatty tissue can be felt.

**Very Thin**
- Slight fat covering over base of spine.
- Transverse processes (part of the bone projecting sideways from the lumbar vertebrae) of lumbar vertebrae feel rounded.
- Spine, ribs, tailhead, hip, and buttocks prominent.
- Withers, shoulders, and neck structure faintly visible.

**Thin**
- Transverse processes cannot be felt.
- Slight fat cover over ribs.
- Spine and ribs visible.
- Tailhead prominent but individual vertebrae cannot be identified visually.
- Point of hips appear rounded but visible.
- Point of buttocks not distinguishable.
- Withers, shoulders, and neck accentuated.
<table>
<thead>
<tr>
<th>4</th>
<th>Moderately Thin</th>
<th><img src="image1.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slight ridge along back.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faint outline of ribs visible.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tailhead prominence depends on conformation, fat can be felt around it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Withers, shoulders, and neck not obviously thin.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Moderate</th>
<th><img src="image2.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Back is flat (no crease or ridge).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ribs not visually distinguishable but easily felt.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat around tailhead beginning to feel spongy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Withers appear rounded over spine.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shoulders and neck blend smoothly into body.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>Moderately Fleshy</th>
<th><img src="image3.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May have slight crease down back.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat over ribs spongy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat around tailhead soft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat beginning to be deposited along the side of withers, behind shoulders, and along sides of neck.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th>Fleshy</th>
<th><img src="image4.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May have crease down back.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Individual ribs can be felt but noticeable filling between ribs with fat.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat around tailhead soft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat deposited along withers, behind shoulders, and along neck.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8</th>
<th>Fat</th>
<th><img src="image5.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crease down back.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difficult to feel ribs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat around tailhead very soft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area along withers filled with fat.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area behind shoulder filled with fat.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Noticeable thickening of neck.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fat deposited along inner thighs.</td>
<td></td>
</tr>
</tbody>
</table>

| | Extremely Fat |   |
- Obvious crease down back.
- Patchy fat appearing over ribs.
- Bulging fat around tailhead, along withers, behind shoulders, and along neck.
- Fat along inner thighs may rub together.
- Flank filled with fat.

## Sheep (Ewes)

<table>
<thead>
<tr>
<th>Body Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0</strong></td>
<td>Extremely Emaciated</td>
</tr>
<tr>
<td></td>
<td>- Applies only in very severe cases (ewes is at the point of death)</td>
</tr>
<tr>
<td></td>
<td>- It is not possible to feel any muscle or fatty tissue between skin and bone.</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Extremely Underweight</td>
</tr>
<tr>
<td></td>
<td>- The vertical and horizontal processes are prominent and sharp.</td>
</tr>
<tr>
<td></td>
<td>- The loin muscle is thin and with no fat cover.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Underweight</td>
</tr>
<tr>
<td></td>
<td>- The vertical processes are prominent but smooth.</td>
</tr>
<tr>
<td></td>
<td>- The horizontal processes are smooth and rounded, but it is still possible to press the fingers under.</td>
</tr>
<tr>
<td></td>
<td>- The loin muscle is of moderate depth but with little fat cover.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Ideal</td>
</tr>
<tr>
<td></td>
<td>- The vertical processes are smooth and rounded; the bone is only felt with pressure.</td>
</tr>
<tr>
<td></td>
<td>- The horizontal processes are also smooth and well covered; hard pressure with the fingers is needed to find the ends.</td>
</tr>
<tr>
<td></td>
<td>- The loin muscle is full, with a moderate fat cover.</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Overweight</td>
</tr>
<tr>
<td></td>
<td>- The vertical processes are only detectable as a line.</td>
</tr>
<tr>
<td></td>
<td>- The ends of the horizontal processes cannot be felt.</td>
</tr>
<tr>
<td></td>
<td>- The loin muscles are full and have a thick covering of fat.</td>
</tr>
</tbody>
</table>
Obese

- The vertical processes cannot be detected even with pressure; there is a dimple in the fat layers where the processes should be.
- The horizontal processes cannot be detected.
- The loin muscles are very full and covered with very thick fat.

Notes:

- To assess body condition accurately, handle ewe over and round the backbone, in the area of the loin behind the last rib.
- Using the fingertips:
  - First feel the degree of sharpness or roundness of the lumbar vertebrae.
  - Secondly, feel and assess the prominence and degree of cover over the horizontal processes.
  - Then assess by feel the amount of muscle and fat under the ends of these bones.
  - Finally, assess the eye muscle and its fat cover, by pressing the fingers into the area between the vertical and horizontal processes.

Condition scoring from the side and top.
<table>
<thead>
<tr>
<th>Body Score 1</th>
<th>Description</th>
<th>Body Score 2</th>
</tr>
</thead>
</table>
| **Emaciated/ Very Thin** | - The sow is visually thin.  
- Hips and backbone very prominent  
- No fat cover over hips and backbone. | **Thin** | - The hip bones and backbone are easily felt without any pressure on the palms. |
| **Body Score 3** | **Ideal** | **Body Score 4** |
| | - It takes firm pressure with the palm to feel the hipbones and backbone. | **Heavy/ Overweight** | - It is impossible to feel the bones at all, even with pressure on the palms of the hands. |
| **Body Score 5** | **Grossly Obese** | | - The sow is carrying so much fat that it is impossible to feel the hipbones and backbone even by pushing down with a single finger. |
# Dogs

<table>
<thead>
<tr>
<th>Body Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Emaciated</strong></td>
</tr>
<tr>
<td></td>
<td>• Ribs, backbone and pelvic bones easily seen, even from a distance</td>
</tr>
<tr>
<td></td>
<td>• No body fat</td>
</tr>
<tr>
<td></td>
<td>• Obvious loss of muscle mass</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>Underweight</strong></td>
</tr>
<tr>
<td></td>
<td>• Ribs can be seen and easily felt</td>
</tr>
<tr>
<td></td>
<td>• Pelvic bones are prominent</td>
</tr>
<tr>
<td></td>
<td>• Obvious waist and abdominal tuck</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td><strong>Ideal</strong></td>
</tr>
<tr>
<td></td>
<td>• Ribs can be felt</td>
</tr>
<tr>
<td></td>
<td>• Waist obvious when viewed from above</td>
</tr>
<tr>
<td></td>
<td>• Abdominal tuck evident</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>Overweight</strong></td>
</tr>
<tr>
<td></td>
<td>• Ribs hard to feel, covered by fat</td>
</tr>
<tr>
<td></td>
<td>• Noticeable fat deposits over back and base of tail</td>
</tr>
<tr>
<td></td>
<td>• Waist and abdominal tuck barely discernible</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td><strong>Obese</strong></td>
</tr>
<tr>
<td></td>
<td>• Ribs can not be felt, under heavy fat covering</td>
</tr>
<tr>
<td></td>
<td>• Massive fat deposits over back and base of tail</td>
</tr>
<tr>
<td>Body Score</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| 1          | **Emaciated/ Very Thin**  
|            | - Ribs are visible  
|            | - No palpable fat |
| 2          | **Thin/ Underweight**  
|            | - Ribs are easily palpable with little fat cover  
|            | - Lumbar vertebrae obvious  
|            | - Minimal abdominal fat |
| 3          | **Ideal**  
|            | - Well proportioned  
|            | - Slight fat covering over ribs  
|            | - Minimal abdominal fat  
|            | - Observable waist behind ribs |
| 4          | **Heavy/ Overweight**  
|            | - Moderate fat covering over ribs  
|            | - Obvious rounding of abdomen; moderate abdominal fat |
| 5          | **Grossly Obese**  
|            | - Heavy fat cover over ribs  
|            | - Heavy fat deposits over lumbar area, face and limbs  
|            | - No discernible waist  
|            | - Extensive abdominal fat deposits |
BIBLIOGRAPHY

1. “Beef Cattle Foot Rot”  
   visited on July 14, 2005

2. “Nuflor-BRD and Footrot”  
   http://www.nuflor.com/diseases/fr-frp.html  
   visited on July 14, 2005

3. “Hoof Diseases”  
   http://www.horse-diseases.com/clubfoot.html  
   visited on July 14, 2005

4. www.paulnoll.com/oregon/Birds/Avian-Respiratory.jpg


6. www.4-hontario.ca


8. www.upei.ca/~cidd/intro.htm


13. www.duchessfund.org/disease.htm#pss_ptl

14. www.uoguelph.ca/zoology

15. www.mic-d.com/gallery/brightfield