

Teaching Outline for the 4-H's for Clean Water Manual



If you are interested in using the 4-H's for Clean Water manual as part of your club's curriculum, this is an outline to help you get started. Feel free to use it exactly as it is written or simply use it as a guide in developing your own program!

Chapter 1: Healthy HorseKeeping Basics

What is Healthy HorseKeeping? Answer: Actions you can take that are good for your horse's health AND good for the environment. These Healthy HorseKeeping actions can also make chores easier and save you money.

Key Principle #1: Why Healthy HorseKeeping is important for horse health.

(Activity 1-1: Mud and Horse Health)

Have everyone to turn to page 13. Look through the photos as a group and discuss the different horse health issues. Questions:

- What is one horse health problem that can result when pastures are overgrazed and horses ingest dirt because most of the grass is gone? Answer: Sand colic.
- What are some horse health problems that can occur when horses live in muddy conditions? Potential answers: hoof abscesses, mud fever, thrush.
- Which common insect pest lays eggs in muddy areas with stagnant water (any water standing for a week or more)? Answer: Mosquitoes. Mosquitoes can breed in as little as a thimble full of standing water! The amount of water in an empty soda can is capable of housing hundreds of mosquito larvae! Question: What disease can mosquitoes cause? Answer: West Nile Virus
- Which common insect pest breeds in manure? Answer: Flies. Question: What are some problems that flies can cause? Answer: Allergies and conjunctivitis (pinkeye). Some "fly facts" you may want to share: Houseflies breed in manure and each female can produce up to 1,200 eggs in her lifetime! Houseflies don't bite but Stable flies do. Stable flies feed on a horse's blood several times a day, taking one or two drops at each meal. Stomping of feet is a good indication that Stable flies are present, since they normally attack a horse's legs and belly.

Do **Activity 1-1: Mud and Horse Health** as a group or in small groups. You may want to discuss the different horse health problems and ask individuals to share with the group any personal experiences they might have had with their own horses. Consider inviting a veterinarian to talk about these issues and the impact mud can have on horse health.

Key Principle #2: Why Healthy HorseKeeping is important for clean water.

(Activities 1-2, 1-3 and 1-4)

Have everyone look at the drawing on page 17. Discuss how rain falls and travels along the ground until it ends up in a stream, lake, river or other body of water. Talk about the contaminants this water may pick up along the way as it travels along the ground.

Do **Activity 1-2: Pointing Out Pollutants** as a group.

Have the group look at the photos on page 19. We talked about how mud can cause problems with horse health. Now we're going to talk about why mud is also bad for our water. Questions:

- What happens when rain travels across a muddy pasture? What do you think the rain might pick up and carry to a nearby stream or lake? Answer: Soil

- Why does it matter if soil is carried into a nearby stream? How does it affect the fish that live there? Answers: (2nd paragraph, page 19) 1) Soil in water makes water cloudy, which keeps fish from being able to see their prey (insects that live in the water). 2) Soil can smother fish eggs, making it impossible for them to hatch.

Do **Activity 1-3: Keeping Soil in Place** as a group. Discuss what happens when rainwater travels across a bare muddy pasture versus a pasture full of grass. Talk about how grass roots hold soil in place and prevent soil from being carried away.

Have everyone turn to page 20. Questions:

- What does manure have in it that helps plants to grow? Answer: *Nutrients*
- If rain picks up soil when it travels across a muddy pasture, what do you think rain might pick up when it rain travels across a pasture full of manure? What will the rain pick up and carry into our water? Answer: *Nutrients*
- Nutrients don't just help plants to grow on land; they also cause plants like algae to grow in water. Question: Why does it matter if plants like algae grow in our lakes? Why is it bad for us and for fish? Answers: 1) *Ruins swimming areas* 2) *Plants like algae use up the oxygen in the water, making it hard for fish to breathe.*

Do **Activity 1-4: Manure in Water, Manure on Land** as a group.

Chapter 2: Conquering Mount Manure

Key Principle #1: Clean stalls and paddocks often

(Optional Activity 2-1)

Question: Why shouldn't horses graze in an area with lots of manure? Answer: *Increases the chance of a horse getting internal parasites (a.k.a. "worms").* Explain how manure often contains parasite eggs that hatch and the larvae crawl onto nearby grass. Horses grazing on this grass ingest the parasites. Even if you deworm your horse on a regular basis, they can become re-infested by eating near manure.

Question: What can you do to prevent this from happening? Answer: *Clean manure out of stalls and paddocks every day or at least once every three days. This will not only help you prevent your horse from getting worms, it will also reduce fly populations. This is not only good for horse health, it's also a good neighbor policy!*

Optional group activity, Activity 2-1: This could be done as a group activity by assigning members to do the research on their own and then, at the next club meeting, they can share with the group the de-worming programs they've developed.

Key Principle #2: Rubber stall mats

(Activity 2-2)

Have everyone turn to page 26. Go through the bulleted list as a group to discuss the ways that stall mats can benefit horse health. Questions:

- What can happen when a horse ingests dirt? Answer: *It can cause a blockage in the intestines and cause them to colic.*
- What are some horse health problems that can result when they live in a dusty stall? Answer: *It can harm their respiratory system, causing coughing and breathing problems.*
- Horses kept in stalls with dirt floors sometimes get into the habit of pawing and can even dig holes in the floor. What are some problems that can result when this happens? Answer: *Loose shoes, joint problems.*

Do **Activity 2-2: Stall Mat Match-Up** as a group.

Key Principle #3: Choosing a place to store manure.

(Activity 2-4)

Have everyone turn to page 30. Questions:

- Why is it important to store manure as far away as possible from streams, rivers, lakes and ditches? *Answer: To prevent water pollution.*
- Why is it important to store manure in a dry area that doesn't get muddy? *Answer: To keep the manure from turning into a big pile of mush!*
- Where can you store your manure to make cleaning fast and convenient? *Answer: Close to stalls and paddocks; on a flat area, not on steep hills.*
- Should manure be stored where horses might be eating near it? Why? *Answer: No, increases chance of parasite re-infestation.*

Do **Activity 2-4: Picking a Place for Manure** as a group.

Key Principle #4: Cover manure pile

(Activity 2-5)

Question: Do you remember why it's bad for fish when nutrients end up in their water? *Answer: Nutrients cause plants like algae to grow and these plants use up the oxygen in the water, making it hard for fish to breathe.*

Explain that humans don't want nutrients in our water either: Nutrients are usually good for our health, right? But when certain kinds of nutrients, like those from manure, end up in our drinking water, it can be bad for human health. Let's talk about one way that nutrients from manure can end up in our drinking water

Have the group turn to page 21 and look at the drawing on this page. Explain that many people get their water from groundwater (water that is underground). Wells pump the water up to the surface and into houses where it is used for all kinds of things, including drinking water. When it rains, some of the rain soaks down through the ground and into groundwater.

Question: When you clean your stalls and paddocks, where do you put the manure? Do you add it to a big pile of manure outside? When rain falls on a manure pile, the water mixes with manure and some of it soaks into the ground. If there is groundwater beneath the surface, the rain will soak through the ground, into the water, carrying the nutrients with it!

Have the group turn to page 32. Question: What's one way you can keep rainwater out of manure piles and prevent it from getting contaminated with nutrients? *Answer: Cover your manure pile!* (Discuss different ways to cover your manure pile.)

Do **Activity 2-5: Tarping a Mini "Manure" Pile** as a group.

Chapter 3: Tackling Mud

Key Principle #1: Create a winter paddock

(Activity 3-1)

Question: What happens to grass during the winter? *Answer: It stops growing. And if horses keep grazing in pastures during the winter, eventually most of the grass will be gone. Soon you'll have a bunch of bare spots that turn to mud when it rains.*

Question: What is a winter paddock? *Answer: A place where you keep your horse during the winter, instead of leaving them out on pastures.*

Do **Activity 3-1: Winter Living Space** as a group.

Key Principle #2: Fighting Compaction

(Activity 3-3, 3-4)

Another reason to keep horses off pastures during the winter is because their heavy weight can compact the soil. What does it mean when soil is compacted? *Answer: The soil is pressed or packed together, squeezing out the pockets of air between the soil particles.* (You can use a damp sponge as a visual aid.)

Question: Why do you think it might be bad for the grass in your pastures if the soil is compacted and those little pockets of air disappear? **Answer:** Plants need air in the soil so their roots can breathe and grow. They also need space in the soil so that rain is able to make its way down to the grass roots. If there isn't any space for the water, it will just run off instead of soaking into the ground—kind of like on concrete. The roots of the grass need water in order to live.

Do **Activity 3-3: Edible Soil Compaction** as a group. You can also do **Activity 3-4: Soil Absorption Rates** if you have easy access to outdoor areas.

Key Principle #3: Roof Runoff

(Activity 3-6)

Have everyone turn to page 52 and look at the drawings of the winter paddocks.

Question: What's the difference between these two pictures? What's happening to the rain from the roof in each drawing? **Answer:** In the top picture the rain is running down the roof and straight into the paddock. In the bottom picture, the gutters and downspout are catching the rain and sending it away from the paddock.

Question: Why would the bottom picture be better for horse health and the environment? **Answer:** Less water in paddocks means less mud! Also, the rainwater stays clean because it doesn't run through the manure and soil in the paddock.

Do **Activity 3-6: Calculating Runoff from Your Roof** as a group. (In step 3 you can either have everyone use the number listed for the same city or you could split into small groups and have different groups use a different city.)

Chapter 4: Perfect Pastures

Key Principle #1: The Golden Rule of Grazing

Explain that to have healthy grass plants you need to keep the grass in your pastures at least three inches tall. This is called the Golden Rule of Grazing.

Have everyone turn to page 58 and look at the drawing at the bottom of the page. Explain that grass blades gather energy from the sun so the plant can make food. The grass plant needs to have blades that are at least 3 inches high to do the job. Think of these bottom 3 inches as the grass plant's energy collector. If grass gets too short, it starts to take the food it's stored in its roots (see drawing on page 58). If a grass plant keeps doing this it will eventually run out of food and die.

Key Principle #2: Rotational Grazing

(Activity 4-2)

Questions:

What is rotational grazing? **Answer:** When you take a pasture and divide into sections. When the grass in one section has been grazed down to 3 inches, you move your horses onto a new section.

Have everyone turn to page 60. Let's pretend that both Pasture 1 and Pasture 2 both have grass that is about 6 inches tall. You start by putting your horse out on Pasture 1.

- When will you move your horse into Pasture 2? **Answer:** When the grass in Pasture 1 has been grazed down to about 3 inches.
- So you move your horses to Pasture 2. **Question:** When the grass in Pasture 2 has also been grazed down to 3 inches, what do you do? **Answer:** If the grass in Pasture 1 has re-grown to about 6 inches, then you can move your horse back into Pasture 1
- Where could you put your horse if the grass in Pasture hasn't had time to re-grow to 6 inches? (This takes about 2-6 weeks during the growing season.) **Answer:** Your winter paddock.

Do **Activity 4-2: Dividing Your Pastures** as a group. You could put a large sample diagram in the front of the room (with a horse barn, pasture, water trough, winter paddock) and then discuss potential ways to divide the pasture. Or you could have everyone do their own drawings and share their

ideas with the group or within small groups. (The drawings on the bottom half of page 61 may help people come up with their own designs.)

Chapter 5: Clean Streams

Key Principle #1: Why trees and shrubs are important for healthy streams.

(Activity 5-1, 5-2)

Starting on page 67, go through the list of reasons why trees and shrubs are important for streams.

Questions:

- Why is it important for streams to be shaded? Answer: To keep the water cool. Cool water has more oxygen in it than warm water and fish need oxygen to survive. Fish can die when water gets too warm.
- How do trees provide fish with food? Answer: Insects from the trees fall into the stream and the fish eat these insects. Leaves also fall into the stream—these leaves provide food for insects already living in the stream and these insects are a source of food for fish.
- How do trees and shrubs help keep soil out of streams? Answer: The roots hold the soil in place.

Do **Activity 5-1: Stream Fill-in** and **Activity 5-2: Identifying Healthy Streams** as a group.

Consider doing **Activity 5-3: Stream Planting Project** as a group. Contact the Stilly Snohomish Fisheries Enhancement Task Force (contact info on page 72) if you'd like to help with one of their planned projects.

Chapter 6: Making a Place for Wildlife

Key Principle #1: Different bird houses for different birds.

(Activity 6-1)

For this section, you may want to consider bringing in some sample bird houses so that everyone can see how the different types of houses for different types of birds. If you don't have this expertise yourself, consider contacting Pilchuck Audubon Society. They may be willing to do a presentation for your club or you could attend one of their field trips. (See page 89 for Pilchuck Audubon contact information)

For **Activity 6-1: Putting Up a Bird House** you may want to build bird houses as a club activity. (Designs are available through 4-H.) If building Violet-green swallow boxes, try to do it before March when these birds return to the Northwest.

Key Principle #2: Basic needs for wildlife

(Activity 6-3)

Question: What do wildlife need in order to survive? Answer: Food, water, shelter, and a place to raise their young.

In order for the group to get familiar with snags and how important they are to wildlife, have everyone turn to page 78. Questions:

- What is a snag? Answer: Dead trees that are still standing.
- What do birds like woodpeckers and chickadees find to eat in snags? Answer: Insects
- What do birds use the holes in snags for? Answer: A place to escape from bad weather, build nests, and raise their young.
- What kind of creatures find shelter under the loose bark of snags? Answer: Salamanders, tree frogs, bats.
- Why do eagles, hawks and owls perch on snags? Answer: It's a good place for them to hunt because they can see mice and other rodents.

Do **Activity 6-3: Wildlife Fill-in** as a group.