

Girl Guides of Canada - Ontario Council presents Watershed CSI Challenge

Note: crest supplies for this Ontario Challenge are available until stock is depleted.



It's Fun! It's a nature-oriented Guiding Challenge!

Your assignment should you choose to accept it:

You will be Crime Scene Investigators and will gain skills to **solve the case of: Healthy or Unhealthy Watershed?** If you find that the watershed is unhealthy you will **then take action to improve it.** Case Closed!



During the challenge, you will play, explore, learn, be challenged and have fun!

All the tools are here to tackle this project in approximately 4 meetings. You don't need to know everything about the topic. Help is available – see the Resource in Appendix for some ideas.

Meeting 1: Gather the Clues

The challenge starts with a visit to a local waterbody (stream, lake, pond, or wetland) **in the fall**. You will “Gather the Clues” with a naturalist. Click here to access Ontario Nature website <http://www.ontarionature.org/network/groups.html>.

Meeting 2: Investigation Background Check

You and your Unit will learn about watersheds.

Meeting 3: Solve the Case!

Look at what goes into the water body and what could be done to improve it .

Meeting 4: Close the Case!

In the last meeting you will undertake a project **in the spring** to improve the watershed. All sorts of projects are appropriate for this. We are sure you'll find one that fits your group!

MEETING #1: GATHER THE CLUES

Preparing for the First Meeting

- **The first meeting is at a local body of water.** Find one to meet at and to study. You will be looking at the waterbody and at the surrounding land. During the first meeting you will gather the clues.
- **Contact your Naturalist now!** S/he will be your “Forensics Officer” who will make this meeting easy, fun and interesting to assist you in gathering the clues about your waterbody, Ontario Nature has advised local Field Naturalist organizations across Ontario that you may be calling them. Click here to find her/him: <http://www.ontarionature.org/network/groups.html>
- Call the field naturalist group nearest you and ask if they will meet you at your waterbody. Send them the “**Dear Naturalist**” letter (sample at the end of this document).
- Didn't find a local field naturalist group? Ask your Conservation Authority biologist, Ministry of Natural Resources Office biologist, or a knowledgeable outdoors enthusiast. Anglers, farmers, and hunters often know what makes a waterbody healthy. (See “Contacts” at the end of the document for suggestions)
- **Read through the first meeting.** Make copies of the “Clue Search” document at the end of the Meeting 1 section
- **Prepare a game** in case your Unit finishes the activity early!

The first meeting! Include the following:

- 1) Introductions to the Naturalist and to the site
- 2) Learning to Look, Looking to See
- 3) Gathering Clues (Watershed CSI Clue Search)
- 4) Talking out the case with the Forensics Officer (the naturalist)
- 5) Discuss "Solving The Case" with the Forensics Officer
- 6) Optional: A short game if you have time - two fun options have been suggested!

1) Introduce the Naturalist and the waterbody. You may want to briefly discuss what experience, if any, the girls in the group have with the water body. Why is it important that the water body is healthy? After their clue search you'll be talking through the clues you gather to answer this question.

2) Learning to Look, Looking to See

In order to be a good Crime Scene Investigator you have to be a good observer.
Are you?



Ask the girls to practice "seeing", instead of just "looking", by standing alone (at least 10 metres from the nearest girl) beside the water body for 5 minutes (10 min for Guides; 15 min for Pathfinders and Rangers). Ask the girls what they see. Remind girls to use their ears, nose, hands, as well as their eyes to "see". Try cupping their hands around their ears and closing their eyes to better hear sounds.

Try to remember everything you "see".

Once back in a group, talk about what you saw. Did you find it hard to keep finding new things to see? Why is it important to see? [It helps us to understand, appreciate, and respect what's around us.]

3) Gathering Clues: Complete the *Watershed CSI Clue Search* in pairs or small groups!

Guides, Pathfinders and Rangers can fill out the second page with comments. Lead Brownies (find 12 clues) and Sparks (find 8 clues) in a discussion instead of having them write down the clues.

4) Talking through the case with the "Forensics Officer" (the naturalist). Talk about what you found from the Watershed CSI Clue Search. Some of these questions might also be useful:

Clues to the WATER...

- Does this look like a healthy water body? Observe water colour, clarity, visible pollution, algae, aquatic plant life, and condition of bed.
- What aspects are healthy? Which aspects aren't healthy? Can you tell?

Clues to the ANIMALS IN AND AROUND the water body...

- The waterbody is like the town/city you live in; it has different habitats for fish, birds, bugs (you could have them turn over some stones to take a look at one of these habitats).
- What creatures do you think use this water body?
- How many different animals can the girls count in total?
- You could also mention if there are any endangered or threatened species found in and around the watershed.

Clues to the SCENE...


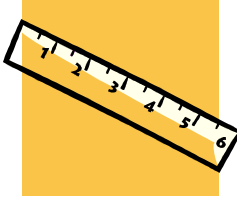
- Describe the three zones: the water (aquatic), beside the water (riparian), and all around the water (upland).
- How are they different and why are they important?
- Make clear that what looks degraded, like duck weed, isn't always bad and what looks good, like mown grass, isn't necessarily good. Does it look "wild"?
- Is there a healthy riparian buffer protecting the water body?
- How have humans changed the area?
- Is there a lot of pavement close by?
- Is there erosion, fish barriers, or an outfall?
- Where does the water come from and where does it go?
- Why is it important that the water body is healthy?
- Afterwards, you can talk about any current or past projects people are doing on the water body and how they are helping preserve the water body.



5) **Ask the naturalist for suggestions for "Solving the Case"**. To solve the case you'll do a one-time project in the spring that could improve the "health" of the watershed. Examples include: planting trees/shrubs/wetland plants, storm drain marking, installing nesting boxes, garbage clean-up, write a letter to the local newspaper Editor, or deliver targeted information to all residents in a specific area. Discuss this with your volunteer.

6) **The attached optional activities are extra fun if you have time!**

Watershed CSI CLUE SEARCH
Try to find them all! Note their characteristics!

<p>Water Color</p> 	<p>Fish in Water</p> 	<p>Bugs in/near Water</p> 	<p>Is the water moving? Quickly?</p> 	<p>Plants in Water</p> 
<p>Water Clarity (Is the water clear? cloudy?)</p> 	<p>Plants on water's edge</p> 	<p>Garbage or pollution present?</p> 	<p>Where is the water coming from?</p> 	<p>Where is the water flowing to?</p> 
<p>Shoreline – covered with plants? grass? rocks? bare soil?</p> 	<p>Does the waterbody look wild? Or groomed?</p> 	<p>Slopes – are they steep? Flat?</p> 	<p>Pavement in the area? Gravel? Other human-made surfaces?</p> 	<p>How is the land being used?</p> 
<p>Forest, wetland or meadow around?</p> 	<p>Birds in the area</p> 	<p>Animal tracks</p> 	<p>Food Sources – leaf litter, acorns, seeds</p> 	<p>Shade – Do trees or shrubs shade the waterbody?</p> 
<p>Pipes into the waterbody?</p> 	<p>Can fish get to the waterbody and live there?</p> 	<p>Size of waterbody (compare it to something)</p> 	<p>Animal habitat</p> 	<p>Is it a wetland? Lake? Creek? Pond? River?</p> 

Watershed CSI Clues Search – Notes Page

For Guides, Pathfinders and Rangers.



Water Colour: _____

Fish In Water? Describe & estimate number: _____

Bugs In/Near Water? Describe: _____

Is the Water Moving? Quickly? Sluggishly? _____

Plants in Water? Describe: _____

Water Clarity (Is it clear? Cloudy?): _____

Plants on Water's Edge? Describe: _____

Is Garbage or Pollution Present? Describe: _____

Where is the Water Coming From? _____

Where is it Flowing To? _____

Shoreline Covered in Plants, Grass, Rocks? Bare Soil? _____

Does the water body look wild? Or groomed? Mown? _____

Slopes – are they steep? Flat? _____

Pavement in the area? Gravel? Other human-made surfaces that might speed up the rate at which runoff reaches the water body and may increase pollution into the water body?

How is the land being used? _____

Is there forest, wetland or meadow around? _____

Are there birds in the area? Nests? Describe _____

Do you see animal tracks? Describe _____

Are there food sources (leaf litter, acorns, seeds)? _____

Shade – Do trees or shrubs shade the water body? _____

Are there pipes into the water body? From where? _____

Can fish get to the water body and live there? _____

Size of water body (compare it to something) _____

Animal habitat _____

Is it a wetland? Lake? Creek? Pond? River? _____

6) Optional, Fun, Educational Games!

Game Activity Option 1 - Habitat Lap Sit – Guaranteed to make you laugh! Takes 5 minutes!

Have girls number off from one to four. All of the “ones” stand together in a group, all of the “twos” stand together, etc.

Ones represent water

Twos represent food

Threes represent shelter

Fours represent space



Have the ones stand and form one quarter of a circle, then the twos, then threes, then the fours. Once you have a full circle, with everyone standing shoulder to shoulder ask the girls turn to their right.

Then have everyone take one step into the centre of the circle. On the count of three, have everyone sit down on the knees of the person behind them. It may help to put your hands on the shoulders of the person in front of you.

The girls will either fall or sit down. Once they have finished laughing, remind them about how all four things are necessary for people, and wildlife. If one element is removed, everyone falls. Show this by getting everyone into position again and ask them to sit down on each other's laps. Take one of the girls representing water out of the circle, saying that some of the water became polluted. Watch the circle collapse again.

Game Activity Option 2 – Just Passing Through – Lots of Action!

Find a gentle slope near your water body and lay a rope down the slope, to represent a stream. Divide the girls into two groups, **raindrops** and plants (or **vegetation**).

Part 1 - Start with a thunderstorm on the slope with vegetation. Raindrops start at the top of the slope, and try to walk quickly towards the stream. Vegetation, who can swivel on one foot, reach out to try to touch the raindrops, representing roots trapping water. If a raindrop is tagged, they must circle around that vegetation 5 times, and then crawl towards the stream, representing groundwater. Once raindrops reach the stream, they can stand and walk the length of the stream.

Part 2 - Have a thunderstorm on the slope without vegetation. Those who were vegetation are now rocks. The rocks sit on the ground with their arms and legs tucked in. Raindrops start at the top of the slope, jump over rocks when they come to them, and then continue to the stream.

Part 3 - Next, set up as in Part 1. As raindrops flow through the site, they pick up soil (pebbles, twigs, dead leaves, or biodegradable items such as popcorn). If tagged by vegetation, the raindrops drop all the tokens they have collected, representing water filtering into the ground. They circle around vegetation 5 times, crawl to the stream without picking up any more sediment. After all of the raindrops have made it to the end of the stream, count the number of items the raindrops are holding.

Part 4 - Finally, set up as in part 2, play as in part 3. You should find that a larger amount of sediment has been collected by the raindrops than in the previous situation. This shows how it is better to have plants on the slopes around water, so that soil doesn't get into the water easily.

Although some soil is always being washed from the land to the water, having slopes without plants speeds this up. Too much soil in the water, instead of on the land, can harm the fish. It can also mean that there will not be as much soil on the land for plants.

MEETING #2: INVESTIGATION BACKGROUND CHECK



Preparing for Meeting #2:

- Order the free poster about watersheds from Canadian Wildlife Federation: <http://www.cwf-fcf.org/en/resources/posters--handouts/posters/watershed.html>
- Ask your local Conservation Authority or Conservation Ontario (www.conservation-ontario.on.ca) for copies of the Conservation Ontario brochure “*Conservation Authorities, Natural Champions for Healthy Watersheds.*”
- If you can show a video at your location, line up the equipment to show one and download www.youtube.com/watch?v=xUYWb8XT058
- Prepare one or more of the games below

Meeting #2: Investigation Background Check

All investigations require a background check that informs the Crime Scene. In our case, we need to check out the background of our watershed.

We’ll learn about watersheds and why the watershed is a key clue in the investigation.

First, we need to introduce the idea that a watershed is the land that drains to a waterbody.

Do one of the following three:

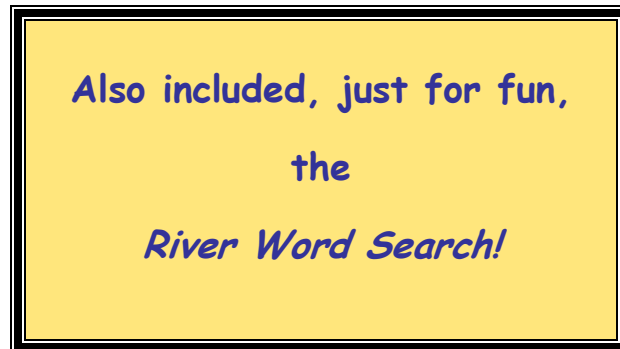
- 1) Show video: www.youtube.com/watch?v=xUYWb8XT058
- 2) Create a watershed by crumpling a piece of paper. Partially unfold it and trace along the high ridges with green marker. Trace the valleys along the inside creases in blue using washable marker. These would create the streams. Add a farm by making an X in brown marker and a city with an X in purple marker. If you’d like, add a mine, a dump, or a pollutant in another colour of marker. Add rain to the watershed (spray water on the model). Discuss what happens. Explain that the ridges are the boundaries of the watershed and how everything flows down to the creeks and ponds in the valleys. Do any water bodies appear on your example? What happens to the city and farm? How many watersheds are on the landscape? (If you’d like, each girl can create her own watershed model).
- 3) Ask your local Conservation Authority or Conservation Ontario (www.conservation-ontario.on.ca) for copies of the Conservation Ontario brochure “*Conservation Authorities, Natural Champions for Healthy Watersheds.*” Talk through the diagram of the watershed. **Then, do one or more of the following hands-on activities:**

Option 1 - Meet Fran the Fish (Sparks, Brownies)

Option 2 - Create Your Own edible Watershed (Sparks, Brownies)

Option 3 - Aquifer in a Cup (Brownies, Guides, Pathfinders)

Option 4 - Build Your Own Watershed (Guides, Pathfinders, Rangers)



Option 1 - Fran the Fish (Sparks, Brownies)

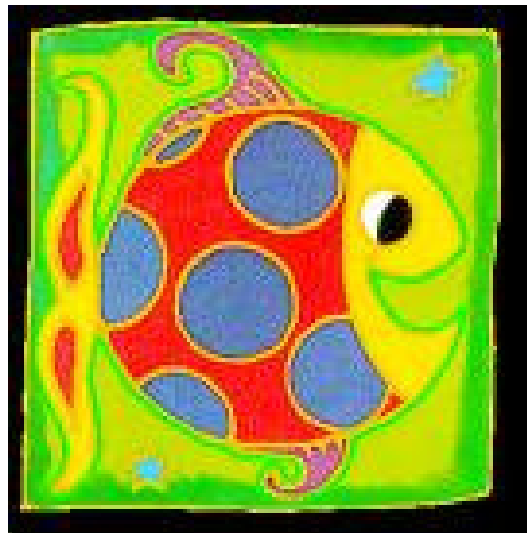
Show how polluted a river in a city can get by swimming with Fran the Fish for a day. Watch Fran as she travels through a construction site, a residential area, a commercial area, a park, and a landfill site.

Have the girls create a watershed on a large piece of paper by drawing all of the above landmarks beside a winding river. Fill a large glass bowl or jar with water and secure a piece of sponge in the shape of a fish to the bottom with a stone and piece of string. Introduce the fish as Fran the Fish. Tell the girls that Fran has grown up in a protected stream in a nature preserve, but she is about to leave the preserve and journey downstream. The girls are invited to share her adventures. Note how Fran looks and the water in the jar before moving on.



Move the bowl along the river and methodically have each girl add a teaspoon of dirt (soil from your garden), pesticide and fertilizer (green food colouring), road salt (table salt), pet waste (chocolate sprinkles), litter (confetti), and hazardous waste (red food colouring) into the bowl as it moves downstream. Explain that these things travel to the water when it rains or when snow melts. Every time one is added, the girl should be able to answer, "How is Fran?"

Afterward, save Fran by moving her back upstream and taking suggestions for how we can keep all of these things from getting into the water. Not only do they make the water unlivable for fish, but also to the humans who need to use the water to drink.



Option 2 - Edible Watershed (Sparks, Brownies)

A Crime Scene investigator sometimes needs to recreate the crime scene in order to figure out what went wrong. Have you ever recreated something?

Go back to a picture or diagram of a watershed. Discuss how watersheds have high parts and low parts, and how water is always found at the lowest points.

Set out various snack foods, such as graham crackers, different coloured frosting, sprinkles, chocolate kisses, marshmallows, etc. Use your imagination to create a healthy version. A healthier version could be also be created of this idea! Also set out non-edible items such as toothpicks, plates, etc. Make sure none of your girls have allergies to the foods being used.

Suggest to girls that they try to recreate the watershed in the image, without suggesting how exactly the various items are to be used. They will have to have a waterbody (creek, river, pond, lake or wetland) at the low point and higher elevations sloping down to it. They may want to include houses, farms, roads, industry, schools, etc.

Enjoy your creation as a snack!



Option 3 – Aquifer in a Cup

BACKGROUND:

Many communities obtain their drinking water from underground sources called aquifers. Wells are drilled through soil and rock into aquifers to provide groundwater for use. Unfortunately, the ground water can become contaminated by harmful chemicals like lawn care products and household cleaners that were used or disposed of improperly. These chemicals can enter the soil and rock, polluting the aquifer and threatening human health. And cleaning up a contaminated aquifer is expensive!



OBJECTIVE:

To illustrate how water is stored in an aquifer, how groundwater can become contaminated, and how this contamination ends up in a drinking water source, get a clear understanding of how careless use and disposal of harmful contaminants above the ground can end up in the drinking water below the ground. This particular experiment can be done by each girl.

MATERIALS NEEDED PER GIRL:

- **1 clear plastic cup** that is 2 3/4" deep x 3 1/4" wide for each girl
- **1 piece of modeling clay or floral clay** that will allow a 2" flat pancake to be made by each girl for their cup
- **White play sand** that will measure 1/4" in bottom of each girl's cup
- **Aquarium gravel** (natural color if possible) or small pebbles (about 1/2 cup per girl)
(HINT: As many small rocks may have a powdery residue on them, you may wish to rinse them and dry on a clean towel prior to use. It is best if they do not add cloudiness to water.)
- **Red food coloring**
- **1 bucket of clean water** and **small cup** to dip water from bucket

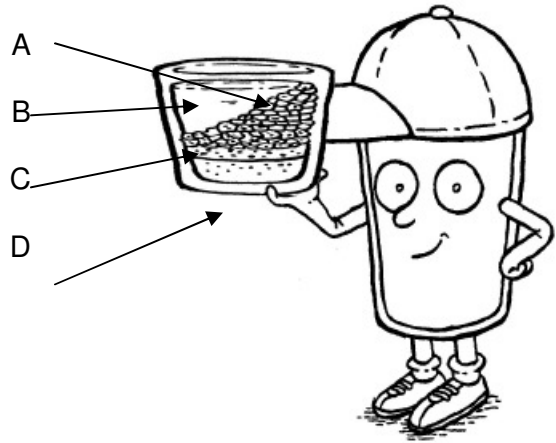
PROCEDURE:

- 1) Pour 1/4" of white sand in the bottom of each cup completely covering the bottom of the container. Pour water into the sand, wetting it completely (there should be no standing water on top of sand). See how the water is absorbed in the sand, but remains around the sand particles as it is stored in the ground and ultimately forming part of the aquifer.
- 2) Flatten the modeling clay (like a pancake) and cover 1/2 of the sand with the clay (have each girl press the clay to one side of the container to seal off that side). The clay represents a "**confining layer**" that keeps water from passing through it. Pour a small amount of water onto the clay. See how the water remains on top of the clay, only flowing into the sand below in areas not covered by the clay.
- 3) Use the aquarium rocks to form the next layer of earth. Place the rocks over the sand and clay, covering the entire container. To one side of your cup, slope the rocks, forming a high hill and a valley (see illustration below). Explain that these layers represent some of the many layers contained in the earth's surface. Now pour water into your aquifer until the water in the valley is even with your hill. See the water stored around the rocks. Explain that these rocks are porous, allowing storage of water within the pores and openings between them. They will also notice a "**surface**" supply of water (a small lake) has formed. This gives a view of both the ground and surface water supplies which can be used for drinking water purposes.

- 4) Use the food coloring and put a few drops on top of the rock hill as close to the inside wall of the cup as possible. Explain that often old wells are used to dispose of farm chemicals, trash and used motor oils and other activities above their aquifer can end up in their drinking water. They will see that the color spreads not only through the rocks, but also to the surface water and into the white sand at the bottom of their cup. This is one way pollution can spread throughout the aquifer over time.

FOLLOW-UP:

Discuss other activities that could pollute an aquifer. Think about activities around your school or your home that could pollute drinking water. Drain off the water in your cups and take it home to show it to your family. Discuss your aquifer, how it gets contaminated, and how you can prevent contamination with someone. Think about what steps you can take as a household to prevent water pollution.



MATERIALS:

A: Rocks

B: Water

C: Clay

D: Sand

Option 4: Build Your Own Watershed – Girl Best suited to Guides, Pathfinders, Rangers

A great plan for creating a Watershed Model is given here:

<http://www.miseagrant.umich.edu/flow/pdf/U2/FLOW-U2-L1-MICHU-08-402.pdf>

OR, make this model:

Down the Hill

Girls will create a simple **watershed** model, discovering hills, rivers and lakes from a bird's eye view. They add rain to the model and describe water's flow pattern. This activity can be used to introduce the topic of water pollution.



Materials for one batch of salt dough – prepared in advance

- 2 cups of flour (250 ml)
- cup of salt (125 ml)
- 1 Tbsp of cooking oil (15 ml)
- 1 tsp cream of tartar (10 ml)

Mix and heat ingredients until a ball forms. You will also need:

- pans for each salt dough relief model (9x11 cake pans work great!)
- watering cans for each group (or jars with small holes poked in their lids)
- packages of powdered drink mixes
- coloured water (food colouring) or soy sauce

Procedure

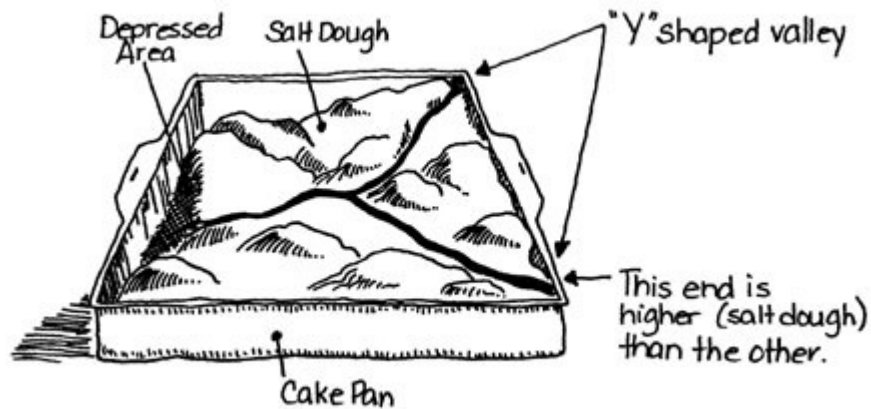
Break the girls into small groups and have each group construct a simple watershed relief map in their pans. One end of their landscape should be higher than the other, and part of the landscape should include a Y-shaped valley, with the tail of the "Y" ending in a depression. You can use the diagram below for a model. Explain that water runs downhill. River water is water that has drained off the surrounding ground and water that comes from underground. Have the girls sprinkle rain over their model and observe the path of the water as it runs through the model. Where does the rain collect?

Explain that areas where water has collected become bodies of water (lakes, ponds, streams, rivers, etc.). Let the "rain" continue until the pan begins to fill. Explain that if water has no way to be carried off, then flooding occurs. Flooding can also occur when water cannot be carried off quickly enough.

Sprinkle a bit of powdered drink mix on the model, and explain that the drink mix represents chemicals that come from products we use daily. Ask the girls to name some of the products the drink mix powder might represent.

Sprinkle water on the model, and explain that now it is raining again. You've just demonstrated "runoff". Discuss how pollutants enter the water and are carried by the water.

Discuss point source pollution and non point source pollution. Simulate these by pouring coloured water into the river at one point in the model (point source) and by raining coloured water (non point source).





All About Lakes, Rivers & Fly Fishing Too!

Wordsearch

D E H S R E T A W I H E R W S
 M N T G T C S C E E Y N I O I
 H G R A R R H O A W S I V L R
 F G R E R A E D I R P L E F B
 L A E O N T W A E L R E R D E
 O K T N U A S I M Y I R B Y D
 O R E L T N C B U S N O D Z Y
 D L E E E A D V U R G H D C S
 P I R G L D N W G S S S K R L
 L S T G N R I P A R I A N X Y
 A X P R E C I P I T A T I O N
 I N O I S O R E K K E V P D S
 N E A G L A Q N N N W R E G I
 V A L L E Y A S A N D Q S L L
 A V X Y J B X L H R D W E W T

- | | |
|-------------|---------------|
| ALGAE | PRECIPITATION |
| BANK | RIPARIAN |
| CHANNEL | RIVER |
| CREEK | SAND |
| DEBRIS | SHORELINE |
| DELTA | SILT |
| EROSION | SOIL |
| FLOODPLAIN | SPRINGS |
| FLOW | STREAMS |
| GLACIERS | SUBSTRATE |
| GRAVEL | VALLEY |
| GROUNDWATER | WATERSHED |
| HEADWATERS | |

MEETING #3: SOLVE THE CASE: Sparks & Brownies**Preparing for Meeting #3:**

- Take pictures of the land that drains to the water body, the watershed. Bring pictures to the meeting. Prepare paper and markers, crayons or pencil crayons for colouring.
- Think about the project you might do to improve your watershed.

Guiders - This won't take an entire meeting, so have something else to do, too!

Solve the Case : In this part of the investigation, the CSI investigators will *solve the case*.

- Step 1 – Know your scene and think like an investigator
- Step 2 – Find a solution to solve the case
- Step 3 – Find your Investigator's Sidekick

**Step 1: Know your Scene**

Talk about the land surrounding the water body that drains into it. (If you have time, look at Meeting 3 for the Guides – it shows you how to find your watershed. You might want to know what land drains to your water body if you can.)

Show pictures of the landscape and talk about what the land is like. Are there: Lots of houses? Parking lots? Parks? Woods? Fields? (See Major Suspects in the Guides Meeting 3 if you would like to talk about the impact these have on the water.)

Have the girls compile the clues by drawing a picture of the watershed or of the water body.

Step 1 – Find a solution to solve the case

Investigators have to think of solutions. So now come up with a solution to improve the watershed.

- Do you think the watershed would be most improved if you did a **planting project**? If so, what kind? A shoreline planting? Trees? Native flowers and shrubs?
- Or would your watershed be most improved by informing residents that what runs off of their lawns and driveways runs straight into a waterbody? You might tackle a “**Yellow Fish Road**” project to do this. All the supplies and directions are sent to you for free and it's a great Guiding event. <http://www.yellowfishroad.org>
- Or perhaps you could do the most good by **building bird boxes or nesting boxes**? <http://www.hww.ca/hww2.asp?id=196> Your local Stewardship Council can usually help with this project, too! See the Contact List for help

- Perhaps there is a lot of trash around your watershed that would be beneficial to **clean up**? See if the municipality will provide trash bags, gloves, and pick up of your collected trash.
- Maybe it would be of most use to host a day where you **celebrate your waterbody** and get **media coverage** of the event. Show people where your watershed is and have a festival?
- Perhaps you could help **get the word out** to conserve the land near your waterbody?
- Maybe animals would benefit from your **creating a small habitat area** of piled logs and brush or stones? <http://www.hww.ca/hww2.asp?id=198>
- There are other suggestions for great restoration projects and good directions for completing them through Canada's Hinterland Who's Who: <http://www.hww.ca/hww.asp?id=43&pid=3>

Step 3 – Investigator's Sidekick

All good investigators have a sidekick. You might need one, too! Think about contacting one of the following to help plan or execute the project. See the Contact List for help.

- Stewardship Council (Does a lot of on-the-ground projects to restore the environment)
- Conservation Authority (Stewardship staff might have some ideas or some projects already underway)
- Field Naturalists (perhaps have gotten some ideas from Meeting #1) (They may take on projects or know what needs doing)
- Ducks Unlimited (They make wetlands and build and install nesting boxes)
- Trout Unlimited Canada (They run Yellow Fish Road, the storm sewer painting project that is so effective at reminding people where their stormwater goes – straight to the water!)

MEETING #3: SOLVE THE CASE: Guides, Pathfinders, Rangers**Preparing for Meeting #3:**

- Get a topographic map of the area around your watershed if you can. You can order one from: <http://www.fedpubs.com/mpchrt/maps/sontindx.htm> Or a hiker, naturalist or map store may have one, or contact your conservation authority. If you cannot get a topographic map, a road map will do (see below).
- Prepare a game or two (see below)
- **Guiders** - This plan might not take an entire meeting, so have something else to do, too!

Solve the Case : In this part of the investigation, the CSI investigators will *solve the case*. This will entail identifying the extent of the watershed is that drains to their waterbody. Then you'll think about the watershed, and, just like finding clues to the scene of a crime, you will identify what might be missing in the watershed. Maybe the watershed needs trees, nesting boxes, or plantings. Or maybe neighbours surrounding the water body could be reminded about the connection between what they do on their lawns, driveway and street and water quality.

There are 4 steps to Solve the Case:

- Step 1 – Identify your watershed
- Step 2 – Think like an investigator
- Step 3 – Find a solution to solve the case
- Step 4 – Investigator's Sidekick
- Then: Step 5 – Play!

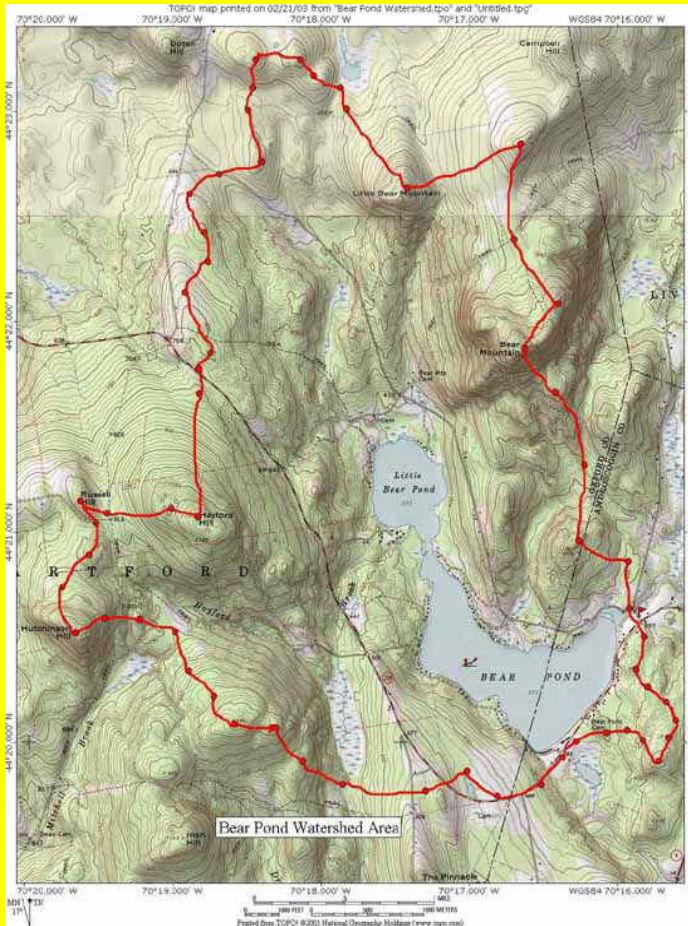


Identify what might be done to improve the watershed and pick a project (or a few alternatives in case one does not work out) that you might complete in the spring.

Step 1 – Identify your watershed

- Try to get a topographic map of the area around your water body (one that shows elevation of the land). [You can order these for your local region at <http://www.fedpubs.com/mpchrt/maps/sontindx.htm>. There is a cost, so perhaps you can find someone who has one already!]
- Make some copies for girls to share in small enough groups that they will be able to see it clearly. Have the girls find the high parts on the map, like the top of hills where they might go sledding. Some of the land around your waterbody will slope to your water body – find the slope and the high points around your water body. They girls may need your help depending on the age group.
- The watershed boundaries are where the high points connect. All the water from the high points to your water body forms the watershed.

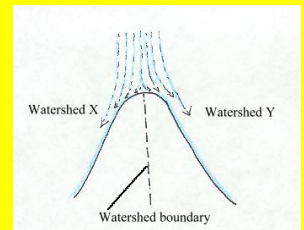
See how two girls, Ranger Rachelle and Pathfinder Polly drew the boundaries of their Bear Pond Watershed. They are going to walk you through how to do it for your watershed!



Hi Girls! Polly here! We started by looking at the numbers on the light lines that are all over the map. These are contour lines and show the elevation of the ground.



Then we figured out that when we moved away from the pond, the numbers on the lines were going up. We moved across the lines uphill to their highest points (except directly downstream of the waterbody).



Hey! Rachelle here! We noticed that sometimes the highest point above the pond was a peak, shown as a closed circle. Other times, the highest point was a ridge, shown as an elongated U- shape. In any case, on the other side of these highest points, a new watershed began. So we connected the highest points around the pond with a line - drawing the boundaries of their watershed! You can do it, too!

Good Luck ! Polly and Rachelle

If you can't get a topographic map, you might work from a road map of the area around your water body, but you'll need to take a look at the site, to confirm how the land lies and what drains to your water body. The road map will show any major creeks that drain to your water body, but may not show small tributaries. Does the watershed extend over kilometers or just meters? What land uses does it include? You might try to trace the area on your road map before the meeting. Your Conservation Authority or Ministry of Natural Resources office can help you with this, too, if you can tell them where the water body is.

- You'll also want to think about where the watershed drains to, which will be a larger watershed. Is it to a creek or river? Where does that drain to? Does it eventually drain to the Great Lakes or to Hudson Bay? If you don't know, you can get this information from the Government of Canada interactive webpage "Know Your Watershed" <http://map.ns.ec.gc.ca/kyw/> or refer to the map you ordered from Canadian Wildlife Federation (Meeting #1)

- Think about how everything from the watershed affects the water quality in their waterbody. And everything from the waterbody eventually affects the bigger waterbodies, even the oceans!

Step 2 – Think like an investigator

- Next, you'll want to think like a CSI investigator. What is your watershed like? Is it developed into cities or subdivisions? Is it farmed? Are there factories? Are there parking lots? Are there forests? Wetlands? Highways? Is it largely natural with leaf litter on the ground to slow down and soak up rainfall? Or is it largely roads and parking lots that rain races off of? What kind of animals have you seen there?
- Does it include your school? Town Hall? Any stores you shop at?
- Are any of the **MAIN SUSPECTS** harming your watershed? **Check the Main Suspects page.**
- You might want to show some pictures of the watershed to help everyone think about it.

Step 3 – Find a solution to solve the case

Investigators have to think of solutions. So now come up with a solution to improve the watershed.

- Do you think the watershed would be most improved if you did a **planting project**? If so, what kind? A shoreline planting? Trees? Native flowers and shrubs?
- Or would your watershed be most improved by informing residents that what runs off of their lawns and driveways runs straight into a waterbody? You might tackle a “**Yellow Fish Road**” project to do this. All the supplies and directions are sent to you for free and it's a great Guiding event. <http://www.yellowfishroad.org>
- Or perhaps you could do the most good by **building bird boxes or nesting boxes**? <http://www.hww.ca/hww2.asp?id=196> Your local Stewardship Council can usually help with this project, too! See Contacts List.
- Perhaps there is a lot of trash around your watershed that would be beneficial to **clean up**? See if the municipality will provide trash bags, gloves, and pick up of your collected trash.
- Maybe it would be of most use to host a day where you **celebrate your water body** and get **media coverage** of the event. Show people where your watershed is and have a festival?
- Perhaps you could help **get the word out** to conserve the land near your waterbody?
- Maybe animals would benefit from your **creating a small habitat area** of piled logs and brush or stones? <http://www.hww.ca/hww2.asp?id=198>
- There are other suggestions for great restoration projects and good directions for completing them through Canada's Hinterland Who's Who: <http://www.hww.ca/hww.asp?id=43&pid=3>

Step 4 – Investigator’s Sidekick

- All good investigators have a sidekick. You might need one, too! Think about contacting one of the following to help plan or execute the project. (INSERT LINK TO CONTACTS)
- Stewardship Council (Does a lot of on-the-ground projects to restore the environment)
- Conservation Authority (Stewardship staff might have some ideas or some projects already underway)
- Field Naturalists (perhaps have gotten some ideas from Meeting #1) (They may take on projects or know what needs doing)
- Ducks Unlimited (They make wetlands and build and install nesting boxes)
- Trout Unlimited Canada (They run Yellow Fish Road, the storm sewer painting project that is so effective at reminding people where their stormwater goes – straight to the water!)

Step 5 – You’re Done (for today)! Have More Fun!

- You’ve solved the case and you’ll close the case in the spring with your restoration project! Tonight have fun with any of the games from the 2nd meeting list OR:
- Play the Hydropoly Game! <http://www.shadowhabitat.org/education/PDF/Hydropoly-ALL.pdf>

Pathfinders/Rangers could build a watershed that shows the interactions of groundwater and surface water with "Build Your Own Watershed" (you’ll need to prepare your supplies before the meeting!) www.epa.gov/safewater/kids/activity_grades_9-12_buildyourownwatershed.html .

OR they could play more with topographic maps:

<http://www.epa.gov/region01/students/pdfs/wetaccp5.pdf>

Note for more fun:

Now that your CSI Watershed Investigators know so much about watersheds, they might have fun playing this on-line watershed game! Maybe you can send the link home with them so they can check it out at school or wherever they have web access:

<http://www.bellmuseum.org/distancelearning/watershed/watershed2.html> (You might want to tell parents/girls that there is no need to download Apple QuickTime7 or to view the panoramas – just have fun answering the questions.)

THE MAIN SUSPECTS

There are some bad guys in watersheds.

Do you see any of these Most Wanted in your watershed???

Mown Grass



Looks normal, right? But it's not healthy! Water bodies need a buffer of unmowed plants to trap pollutants before they reach the water! The plants also provide habitat, and their roots keep the banks in place. Most mown lawns are also fertilized – guess where the fertilizer ends up – in the water – making algae!

Activities in your Driveway



All the soap and oil and gunk you use in your driveway or on the street goes straight into a waterbody – untreated – through the storm drains!

Parking Lots



Water flows much faster off parking lots than off of fields or woods, causing erosion to creeks unless the water is managed properly. And think of the oil and road salt and sand that runs off the parking lots into the creeks!

Fertilizer

It makes lawns grow faster, but it also feeds algae if it runs into the water!

If applied properly, it is okay, but most homeowners apply WAY more than their lawns need! And then guess where it goes?

The algae, by the way, takes oxygen out of the water when it decomposes that the fish need to breathe.



Pets

Yes – even this cutie is a watershed villain if his owners don't scoop his poop! The feces run off into the storm drains and right out into the water. With enough pet poop around, this can become quite a problem!



Erosion

See how this bank is caving in? It is also adding sediment to the water, that could be burying fish nesting sites or making it hard for fish to breathe.

In this case, the erosion is definitely working with another Major Suspect. Can you guess who? Yep – mown grass. What a creek killer combination!



MEETING #4 OF 4: CLOSE THE CASE

Meeting 4. At watershed restoration project site in the spring.

Close the case by reversing the damage that the crime created. Do your restoration project!

You've completed the Watershed CSI Challenge! Congratulations!



A perfect crest to award the accomplishment is the Environment Girl crest. Visit thegirlguidestore.ca to order!

Contacts



Ontario Nature: 416-444-8419; Toll free (in ON): 1-800-440-2366;
Email: info@ontarionature.org
(Ontario Nature is the umbrella group for all of the local field naturalist groups.)

Your local Field Naturalist Group:

<http://www.ontarionature.org/network/groups.html>

(They know a LOT about nature! Contact them for Meeting 1)



Trout Unlimited Canada

ontario@yellowfishroad.org [ontario@yellowfishroad.org](http://yellowfishroad.org)

(This is the Yellow Fish Road Program – a great program for most watersheds! It's run by Guider Sheila McKnight who helped write this challenge!)



Your local Conservation Authority

<http://www.conservation-ontario.on.ca/find/index.html>

(They have experts on water, water quality, biology and environmental stewardship projects like the one you might do!)



Your local Ministry of Natural Resources Office:

<http://www.mnr.gov.on.ca/en/ContactUs/1ColumnSubPage/STEL02179001.html>

(They have experts on water and biology. They might know of some special projects in your region as well)



Your local Stewardship Council:

<http://www.ontariostewardship.org/index.php/maps>

(They do a lot of environmental projects. They'll have some ideas and might even have some projects on the go!)



Ducks Unlimited Canada: webfoot@ducks.ca

(DUC does wetland projects and installs duck boxes – they might have a great project for you!)

Send this letter to the Naturalist or other Nature Knowledge Volunteer before the Meeting!

Letter for the Naturalist

Dear Naturalist/Volunteer,

[Insert Date]

Girl Guides of Canada, Ontario Council has developed a new Challenge for all branches of Guiding: Sparks, Brownies, Guides, Pathfinders and Rangers. It is the **Watershed CSI Challenge** in which the girls will learn about watersheds in their own neighbourhood. They start by learning about a local water body and end with a group project to improve the watershed.

In this challenge the girls will be asked to solve the case: Health or Unhealthy Watershed and they will need a key expert -

And we need a key expert – you – as the “Forensics Officer” in their investigation!

To complete this challenge we are asking if you could meet us at our local water body (insert name) on (insert date) and help our Unit solve the case of: Healthy or Unhealthy Watershed. When you meet with our Unit it would be helpful if you could help the girls discover the following clues:

Clues to the water...

- Does this look like a healthy water body? Have girls observe water colour, clarity, visible pollution, algae, aquatic plant life, and condition of bed.
- What aspects are healthy?
- Which aren't?

Clues to the animals in and around the water body

- The water body is like the town/city you live in; it has different habitats for fish, birds, bugs (you could have them turn over some stones).
- What creatures do you think use this water body?
- How many different animals can the girls count in total?
- You could also mention if there are any endangered or threatened species found in and around the watershed.

Clues to the scene...

- Describe the three zones: the water (aquatic), beside the water (riparian), and all around the water (upland).
- Why are they different and why are they important?
- Make clear that what looks degraded, like duck weed, isn't always bad and what looks good, like mown grass, isn't necessarily good.
- Does it look “wild”?
- Is there a healthy riparian buffer protecting the water body?
- How have humans changed the area?
- Is there a lot of pavement close by?
- Is there erosion, fish barriers, or an outfall?
- Where does the water come from and where does it go?
- Why is it important that the water body is healthy?
- Can you see what land is draining toward the water body that makes the watershed?

You could then talk about your connection to the water body, your thoughts about preservation, the lay of the land that makes a watershed, or any current or past projects on the water body and how they are helping/helped preserve the water.

Once the girls have determined if the watershed is health or unhealthy they will identify a project they can undertake to improve or restore their watershed. Any suggestions you have about what could be done in a manageable project to enhance the watershed would be welcome!

Thank you for your work with Girl Guides of Canada, Ontario Council!

Sincerely,

[Sign your name here. Also include a copy of the Watershed CSI Clues Search.]

