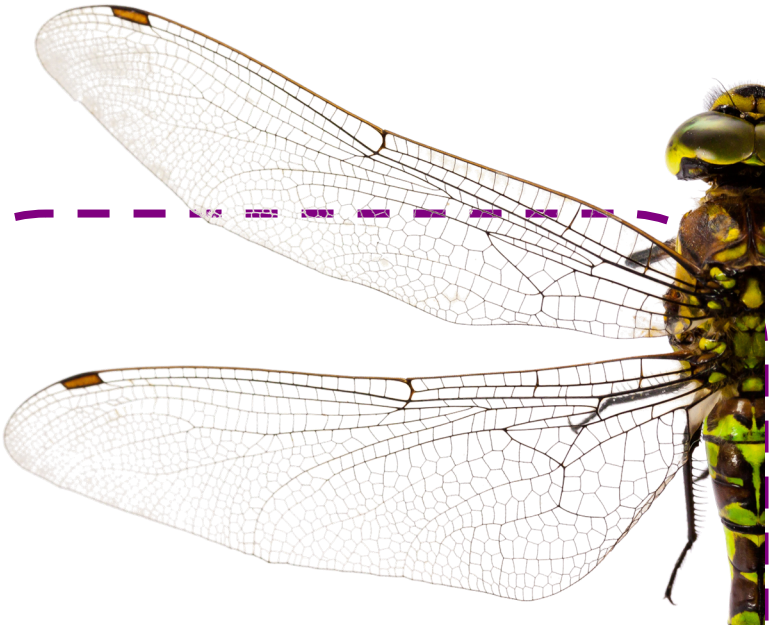


’s

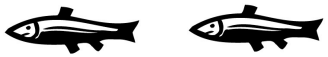
_____

STREAM Girls

field notebook

TROUT UNLIMITED

Welcome . . .



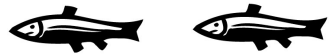
. . . to your stream! Trout Unlimited is excited to offer you and other Girl Scouts the chance to really get to know your home waters. Over the next three days, you will explore this stream as a scientist, an artist and an angler (person who fishes). Whether you come here all the time or have never been here before, we hope you learn something new.

About this handbook

This handbook is all for YOU. Some of the pages are worksheets to help you complete STREAM Girls activities. Other pages are blank for you to use however you want. You might fill this entire handbook with data, drawings, and observations, or you might have some blank pages. Whatever you put in here, there are no wrong answers—just record what you observe and feel.

Let's get started!

What is today like?



Fill the box with words or pictures about today: how you got here, how you're feeling, what the weather is like and anything else about today.

What do you want to learn?

Fill the box with words or pictures about what you'd like to learn as a STREAM Girl. STREAM stands for **S**cience, **T**echnology, **R**ecreation, **E**ngineering, **A**rts, and **M**ath. But it also means running water, like a river, creek, or stream.

S

T

R

E

A

M

Streamwalk Site Survey Data

Location

Stream name: _____

Date: _____ Time: _____

County: _____ State: _____

Stream location (park or property):

_____

Site (description of exact location of the stretch of stream you are studying):

_____

_____

_____

Weather

Current temperature: _____

Sky and precipitation (circle all that apply):

Clear *Clouds* *Overcast* *Rain*

Showers *Storm* *Wind*

What colors do you see in the sky?

_____

Other notes on location and weather:

_____

_____

_____

Stream Description

Depth (estimated average):

_____

Width (estimated average):

_____

Clarity – Does water appear (circle one):

Clear *Cloudy*

Color—What color is the water? _____

Water flow (circle all that apply):

Pools *Riffles* *Runs*

Draw the shape of the stream cross-section below:

Streamwalk (continued)

Does the water have a smell? If so, what?

_____

_____

What sounds is the stream making?

_____

_____

_____

_____

Stream Bottom (circle all that apply):

Clay/Mud *Cobbles (2-10 inches)*

Sand (up to 0.1 inch) *Boulders (over 10 inches)*

Gravel (0.1 – 2 inches) *Bedrock (solid)*

What colors do you see…

on the stream bottom? _____

_____

on the stream bank? _____

_____

in the rocks?_____

_____

in the soil?_____

_____

Width of Riparian Zone (streamside plants)

Left looking downstream _____ ft
Right looking downstream _____ ft

Streamside Vegetation (plants)

	None	Occasional	Common
Evergreen trees	☐	☐	☐
Deciduous trees	☐	☐	☐
Small trees/shrubs	☐	☐	☐
Grasses	☐	☐	☐

Plants appear (circle all that apply):

natural *planted by humans*

growing thickly *growing thinly*

What colors do you see in the plants, in their leaves, stems, fruits, and flowers

_____
_____
_____

Do any plants grow in the stream? If so, describe them.

_____
_____
_____
_____

Describe and draw one short plant you see:

Describe and draw one tall plant you see:

Do any plants hang over the stream to make it shady?
(this is called the "canopy" or sometimes "cover")

Yes *No*

Extent of Overhead Canopy
(circle closest fraction):

1/4 *1/2* *3/4* *all*

Extent of Artificial Bank Protection,
which is where stream bank has been built by humans
(circle fraction):

1/4 *1/2* *3/4* *all*

Presence of Large Woody Material in Stream,
which is big tree branches or logs
(circle best word):

None *Occasional* *Common*

Presence of other Organic Material,
anything that used to be alive, like leaves or sticks
(circle best word):

None *Occasional* *Common*

Wildlife

What animals live next to or visit the stream? How do you know? What evidence do you see, hear, smell, or feel to know this? You can write or draw.

Animal:_____

Evidence:

Animal:_____

Evidence:

Do you see fish in the stream? *Yes* *No*

What animals (fish or others) live in or spend time in the stream? How do you know? What evidence do you see, hear, or feel to know this? You can write or draw.

Animal:_____

Evidence:

Animal:_____

Evidence:

Streamwalk (continued)

Human Activity

What types of buildings are near the stream?

_____

_____

Is there construction near the stream? *Yes* *No*

Are there roads near the stream?

Paved *Unpaved* *No roads*

Are there livestock near the stream? *Yes* *No*

Are there farm fields near the stream? *Yes* *No*

Does the stream flow under or through anything?
If so, what?

_____

What else is going on near the stream?
(recreation, logging, something else?)

_____

_____

Describe or draw the things you see near the stream:

What do the stream banks look like? (describe)

_____

_____

_____

Do you see garbage or junk next to the stream? *Y N*

Do you see garbage or junk in the stream? *Y N*

Do you see mud, silt, or sand in the stream? *Y N*

Do you see human-built structures on the bank? *Y N*

Do you see human-built structures in the stream? *Y N*

Algae or scum? *Y N*

Foam or sheen? *Y N*

Organic waste in the stream? *Y N*

Livestock in the stream? *Y N*

Discharging pipes? *Y N*

Any pipes? *Y N*

Ditches entering the stream? *Y N*

For any "yes" answers above, describe what you see:

_____

_____

_____

_____

_____

_____--

Streamwalk Follow-up

What was your overall impression of the stream?
Sketch a picture, make a list, or write a poem.

What three pieces of evidence did you find for ways that humans use this water?

What evidence did you find for ways that plants and non-human animals use this water?

Streamwalk Follow-up (continued)

What color was the water? Was it clear? Did it smell?

From what you observed while visiting the stream, what can you say about the quality of the water?

Do you think water quality is a problem at this site? What evidence do you have for your answer?

We just spent time surveying the land uses next to the site. Do you think this has an effect on the quality of the water? If so, how?

_____
_____
_____
_____
_____
_____
_____

Do we have enough evidence to say whether the water is polluted or what it is polluted with? What else might we need to learn?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Each state submits information regularly to the Environmental Protection Agency about the quality of the state's watersheds. You can visit the Watershed Information Network (http://www.epa.gov/win) to find your watershed and learn about its health.

Go with the Flow! measuring, recording, calculating

Researchers names: _____

Date: _____ Time: _____

Reach Description:

_____

Stream temperature_____ Water clarity level _____

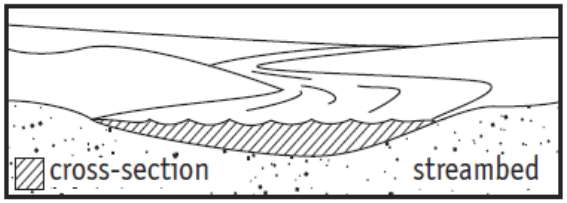
Measuring Stream Velocity

Measure the length of time for the ball to travel 30 feet. Repeat this measurement and use the table at right to record, calculate, and average the results.

Result: _____ft/s
(average velocity)

Velocity Work Area				
tries	distance	time		velocity
1	30 ft	÷	s =	ft/s
2	30 ft	÷	s =	ft/s
3	30 ft	÷	s =	ft/s
4	30 ft	÷	s =	ft/s
			total =	ft/s
			÷ 4	
			average velocity	ft/s

Calculate the Area



Choose a cross-section of creek in the middle of the 30-foot section of creek and calculate the cross-section area.

Result: _____ft (width) x _____ft (average depth) = _____ft² (area)

Average Depth Work Area			
	depth	convert to feet	
1	in	÷ 12 =	ft
2	in	÷ 12 =	ft
3	in	÷ 12 =	ft
		total=	ft
		÷ 3	
		average depth	ft

Calculate Flow

Now use your two results above to find flow! Multiply velocity times area to calculate flow.

_____ft/s (velocity) x _____ft² (area) = _____cfs (flow)

Macroinvertebrate Collection

Location

Stream name: _____

Date: _____ Time: _____

County: _____ State: _____

Stream location (park or property):

_____

Site (description of exact location of the stretch of stream you are studying):

_____

_____

_____

Weather

Current temperature: _____

Sky and precipitation (circle all that apply):

Clear *Clouds* *Overcast* *Rain*

Showers *Storm* *Wind*

Collection

Which method did you use to get macroinvertebrates?

_____

_____

Were macroinvertebrates present? *Yes* *No*

Macroinvertebrate Types

What kinds of macroinvertebrates did you find?

List them all here:

Macroinvertebrate Observation

Sketch a few of your favorites in the boxes below:

Type:_____

_____

Type:_____

_____

Type:_____

_____

Type:_____

_____

Macroinvertebrate Calculation

The diversity and abundance of underwater insects living in a particular stream tell us about long-term water quality. Some of these insects are only present in streams of the highest quality, while others thrive in poor quality water.

Mayflies (*Ephemeroptera*), Stoneflies (*Plecoptera*), and Caddisflies (*Trichoptera*), are often referred to as EPT, and these are the most sensitive of insect orders, living only in the cleanest streams. The abundance of a high diversity of insect orders, including EPT, usually indicates a healthy stream.

Total number of types of macroinvetebrates found:

_____ (*Ideal: 13+*)

Total number of kinds of EPT:

_____ (*Ideal: 7+*)

Overall Stream Score (add two numbers):

_____ (*Ideal: 20+*)

Fly Casting

What does fly casting feel like?
Did anything about it surprise you?

Fly Casting

Any other thoughts, notes or doodles?
Put them here.

Fly Tying

What is fly tying like? Sketch your tying set-up here.
Did anything about it surprise you?

Fly Tying

Which fly is your favorite to tie?
Sketch it here and write down your fly "recipe."

Reflection

Choose one color. Where are all the places you see it?

Reflection

What are all the different textures you can feel here?

Reflection

Sit still for at least one minute. What are new things you didn't notice before?

Reflection

Wander. Where did you end up? What brought you to that place?

Reflection

Where was the water before it was here? And before that? And before that? And before that . . .

Reflection

Where is the water going next? And after that? And after that? And after that . . .

Reflection

What day is it? What did you do today? How does what you did make you see this place differently?

Reflection

What day is it? What did you do today? How does what you did make you see this place differently?

Stream Scavenger Hunt

All the Ingredients of a Stream

Now, you and your team get to go on a scavenger hunt and find the nine different ingredients that make up a healthy stream!

The next nine pages of this workbook are where you'll write or draw your ideas and observations about each scavenger hunt item you find. There is one page for each of the nine stream ingredients.

You can go in any order but be sure to find a good example of each stream ingredient. And be sure you and your team record complete, detailed answers for each one:

1. WATER
2. RIFFLES
3. ROCKS
4. TREES
5. WOOD
6. SHORT PLANTS
7. SKY
8. ANIMALS
9. BUGS

1. WATER

Does the water look clear, cloudy, or both? What color is the water? Why?

2. RIFFLES

What's a riffle? How many do you see? What does a riffle do to the water?

3. ROCKS

What's the stream bottom made of? What colors is it? How big are the pieces you see?

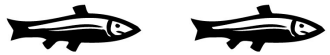
4. TREES

How many trees do you see by the stream? What kinds? What do trees do for the stream and animals?

5. WOOD

How many big pieces of wood do you see in the stream? What animals benefit from wood? How?

6. SHORT PLANTS



Are the plants by the stream growing thickly or thinly? Name or describe as many as you can.

7. SKY

What color is the sky today? What's happening? How does what's happening in the sky affect the stream?

8. ANIMALS

What animals (bugs and non-bugs) live NEAR the stream? What evidence do you find that tells you?

9. BUGS

How many kinds of bugs do you see that live IN the stream? What kinds are they?

S

T

R

E

A

M

Further Activities


In the Community

Decide on a community action you can take to help your local streams. You (and your troop, if you have one) may decide to do a stream clean -up, put on a water festival, go to town hall to advocate for a change, or think of something else entirely!

Further Exploration

Several organizations offer girls additional opportunities to learn about science, both in school, after school, and during the summer. Spend time, either by yourself or with other Scouts, exploring what might be available in your area to further your wildlife biology and stream ecology education initiated by being a STREAM Girl!


Further Activities

Taking Lessons Home

On the following pages you will find a checklist from the U.S. Environmental Protection Agency (EPA) that you can take home and complete with your family. Your goal is to answer the checklist and honestly as possible and then strive to convert at least three "no" answers into "yes" answers.

Projects and Activities

Home and Lawn Care Checklist: "Personal Pollution"

When rain falls or snow melts, the seemingly small amounts of chemicals and other pollutants in your driveway, on your lawn, and on your street are washed into storm drains. In many older cities, the storm water runoff is not treated and runoff flows directly into rivers, streams, bays, and lakes. Pollutants in this runoff can poison fish and other aquatic animals and make water unsafe for drinking and swimming.

What can you do to help protect surface waters and groundwaters? Start at home. Take a close look at practices around your house that might contribute to polluted runoff. The following is a checklist to help you and your family become part of the solution instead of part of the problem!

Do-It-Yourself Home Cleaning Products

General, multipurpose cleaner (for ceramic tiles, linoleum, porcelain, etc.): Measure 1/4 cup baking soda, 1/2 cup white vinegar, and 1 cup ammonia into a container. Add to a gallon of warm water and stir until baking soda dissolves.

Window Cleaner: 3 tablespoons of ammonia, 1 tablespoon of white vinegar and 3/4 cup of water. Put into a spray bottle.

Visit http://www.epa.gov/grtlakes/seahome/housewaste/src/recipes.htm for more ideas on nontoxic alternatives!

Household Products

1. Do you properly dispose of household hazardous waste such as leftover oil-based paint, excess pesticides, nail polish remover, and varnish by taking them to your city's or county's hazardous waste disposal site or by putting them out on hazardous waste collection days? Labels such as WARNING, CAUTION, and DANGER indicate the item contains ingredients that are hazardous if improperly used or disposed of.
   ☐ Yes ☐ No
2. Do you use less toxic alternatives or nontoxic substitutes? Baking soda, distilled white vinegar, and ammonia are safe alternatives to caustic chemicals. And they save you money.
   ☐ Yes ☐ No
3. Do you limit the amount of chemicals, fertilizers, and pesticides you use and apply them only as directed on the label?
   ☐ Yes ☐ No
4. Do you recycle used oil, antifreeze, and car batteries by taking them to service stations and other recycling centers?
   ☐ Yes ☐ No

Landscaping and Gardening

5. Do you select plants with low requirements for water, fertilizers, and pesticides? (e.g., native plants)
   ☐ Yes ☐ No

Notes:

6. Do you preserve existing trees and plant trees and shrubs to help prevent erosion and promote infiltration of water into the soil?

☐ Yes ☐ No

7. Do you leave lawn clippings on your lawn so that the nutrients in the clippings are recycled, less fertilizer is needed, and less yard waste goes to landfills? If your community does not compost lawn trimmings, they usually go to landfills.

☐ Yes ☐ No

8. Do you prevent trash, lawn clippings, leaves, and automobile fluids from entering storm drains? Most storm drains are directly connected to our streams, lakes, and bays.

☐ Yes ☐ No

9. If your family uses a professional lawn care service, do you select a company that employs trained technicians and minimizes the use of fertilizers and pesticides?

☐ Yes ☐ No

10. Do you have a compost bin or pile? Do you use compost and mulch (such as grass clippings or leaves) to reduce your need for fertilizers and pesticides? Compost is a valuable soil conditioner that gradually releases nutrients to your lawn and garden. In addition, compost retains moisture in the soil and thus helps conserve water and prevent erosion and runoff. Information about composting is available from your county extension agent (see the blue pages in your phone book).

☐ Yes ☐ No

11. Do you test your soil before fertilizing your lawn or garden? Overfertilization is a common problem, and the excess can leach into groundwater and contaminate rivers or lakes.

☐ Yes ☐ No

12. Do you avoid applying pesticides or fertilizers before or during rain? If they run off into the water, they will kill fish and other aquatic organisms.

☐ Yes ☐ No

Did You Know?

One quart of oil can contaminate up to 2 million gallons of drinking water!

Water Conservation

Homeowners can significantly reduce the volume of wastewater discharged to home septic systems and sewage treatment plants by conserving water. If you have a septic system, you can help prevent your system from overloading and polluting ground and surface waters by ensuring that it is functioning properly and decreasing your water usage. For other ideas on what you can do to conserve water, check out a new Web site, http://www.h2ouse, developed in partnership with the California Urban Water Conservation Council.

13. Do you use low-flow faucets and shower heads, and reduced-flow toilet flushing equipment?

☐ Yes ☐ No

14. When washing your family's car, do you use a bucket instead of a hose to save water?

☐ Yes ☐ No

15. Do you use dishwashers and clothes washers only when fully loaded?

☐ Yes ☐ No

Notes:

Give Water A Hand

What is your city, town, or school doing to prevent polluted runoff? GIVE WATER A HAND ACTION GUIDE contains checklists for schools, communities, and farms. This guide can help you and your school identify potential problems in your community and take action.

You can download a free copy of ***Give Water A Hand Action Guide and Leader Guidebook*** at http://www.uwex.edu/erc/gwah. Or to order printed copies call:

University of Wisconsin-Extension
608-262-3346
Items 4-H460 & 4-H865
Leader Guidebook ($4.92)
Action Guide ($6.96)
Price includes shipping.

16. Do you take short showers instead of baths and avoid letting faucets run unnecessarily (e.g., when brushing teeth)?

☐ Yes ☐ No

17. Do you promptly repair leaking faucets, toilets, and pumps to conserve water?

☐ Yes ☐ No

18. Do you conserve the amount of water you use on your lawn and water only in the morning and evening to reduce evaporation? Overwatering may increase leaching of fertilizers to groundwater.

☐ Yes ☐ No

19. Do you use slow watering techniques such as trickle irrigation or soaker hoses? These devices reduce runoff and are 20 percent more efficient than sprinklers.

☐ Yes ☐ No

In Your Community

20. Do you always pick up after your pet (e.g., Rover's poop)? Be sure to put it in the trash, flush it down the toilet, or bury it at least 5 inches deep. Pet waste contains viruses and bacteria that can contaminate surface and groundwater.

☐ Yes ☐ No

21. Have you helped stencil stormdrains to alert people that they drain directly to your local waterbody? If not, get involved with a local conservation group or organize your own stenciling project.

☐ Yes ☐ No

22. Do you ride or drive only when necessary? Try to walk instead. Cars and trucks emit tremendous amounts of airborne pollutants, which increase acid rain. They also deposit toxic metals and petroleum by-products.

☐ Yes ☐ No

23. Do you participate in local planning and zoning decisions in your community? If not, get involved! These decisions shape the course of development and the future quality of your watershed.

☐ Yes ☐ No

Notes: