Getting to Know StreamWebs

Every year thousands of students from around the state of Oregon collect a wide range of watershed data in the field, and StreamWebs provides a way for them to quickly and easily analyze and share that data online.

StreamWebs is a web-based platform from Oregon Sea Grant that helps build on field experiences. StreamWebs provides resources and tools to help contextualize and expand concepts introduced during field trips. With data templates designed to mirror field data forms, students have an intuitive venue to report the results of their field findings.

Getting Started

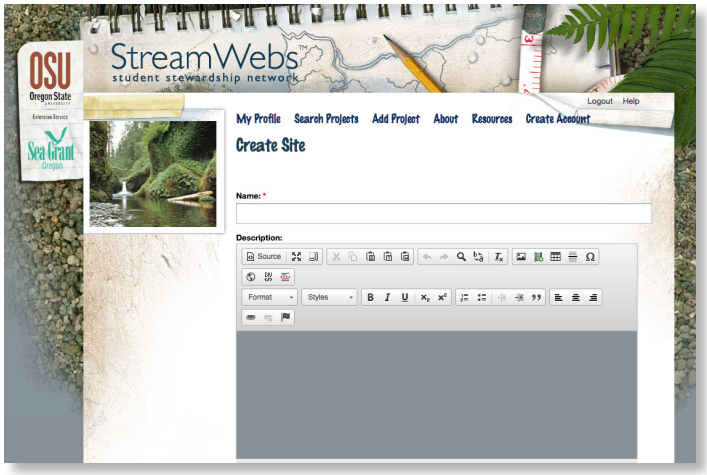
Simply go to www.streamwebs.org and select Create New Account. It is recommended that you make one account that your class can login to so be sure to choose a user name and password that you will be comfortable sharing with students.

Once you fill out the form and submit you will quickly receive an email that will allow you to continue with registration. Once you click on the link in the email, you will be ready to set your password and start exploring StreamWebs!

Create a Project Site

StreamWebs allows you to enter your data by location, so you'll want make sure that there is a project site on the map provided.

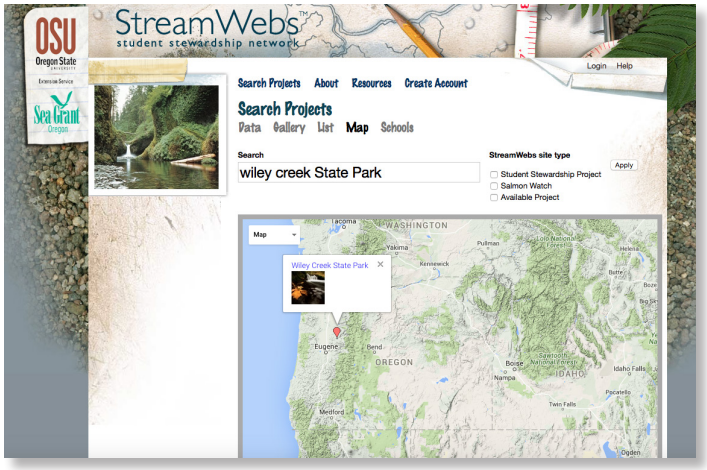
If you need to create a project site select Add Project from the menu and enter in the information about your project site. Once you create a project site it will be attached to your profile page.



Find a Project Site

If there is an existing project site that you plan to work at you can locate it by selecting Search Projects from the menu. Sites are found by using the search bar and on the map by colored "pegs". Find your project site on the map and click on it to be taken to the profile page for that site.

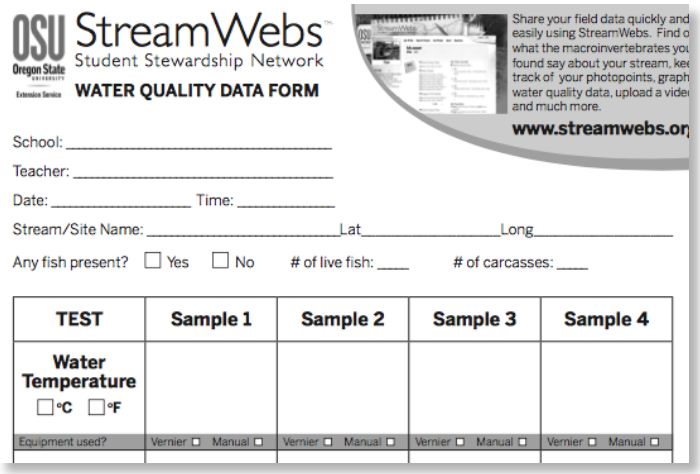
Once you have a project site identified, you are ready to begin entering your data!

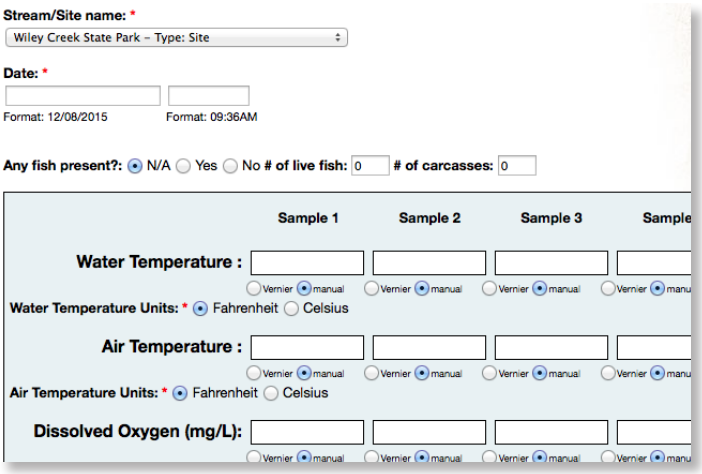


Entering Data

On your site profile, you will notice two categories for entering information into StreamWebs. The first is Data, which is a menu of all data for which StreamWebs has an input template. They include Water Quality, Macroinvertebrates, Riparian Transect, Riparian & Aquatic Survey, Canopy Cover Survey, Soil Survey, and Streamflow. Each of the data templates in StreamWebs closely mirrors the data field forms, so please be sure to use the StreamWebs data forms in the field!

The second category for entering information is called the Gallery. This includes a series of input pages to allow you and your class to enter other documents relevant to your watershed study, including videos, photos, Word documents, PDFs, and other types of files. Feel free to use the Gallery to catalog addition projects from the field or classroom.



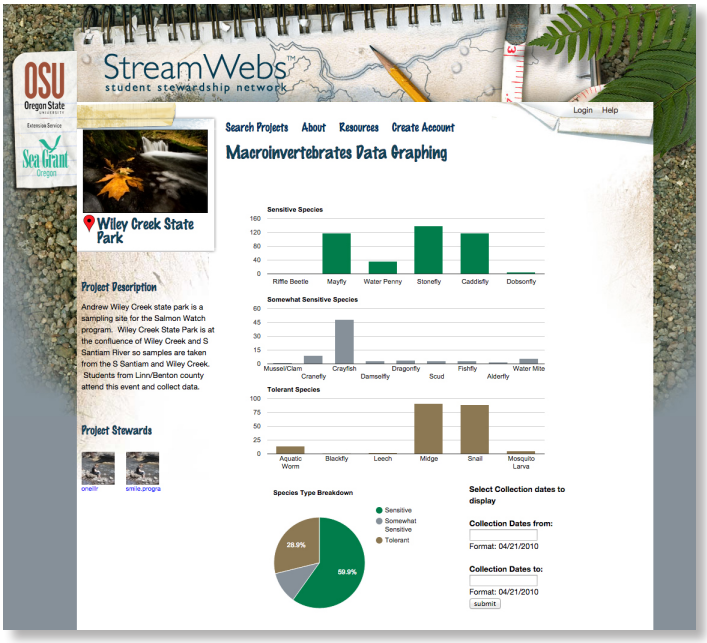


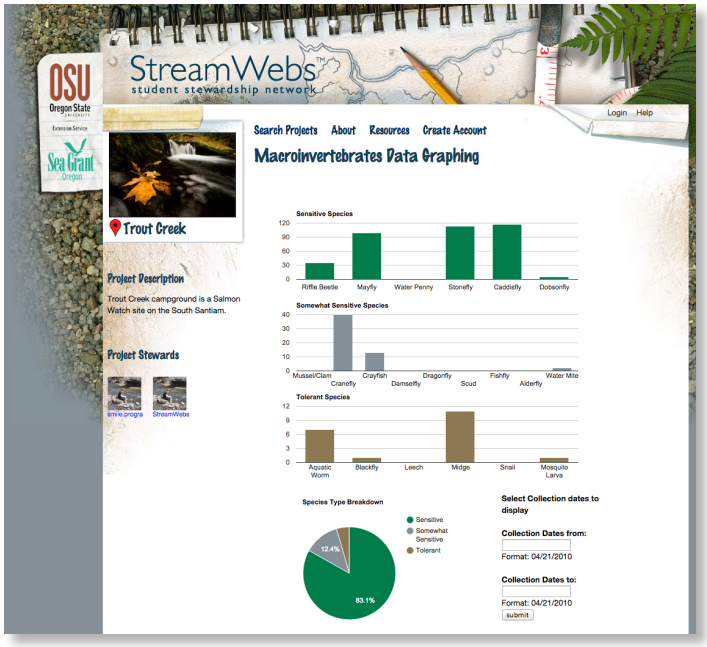
Comparing Data

Through StreamWebs you can compare project sites. In order to find other sites that have comparable data go to http://streamwebs.org/search/projects and search for a school or site that you would like to compare to. Some good example sites to compare student collected data include: Beaver Creek State Natural Area Site 2, Amazon Creek, Wallowa River, Wallowa River, No Name Creek, Hamilton Creek, Lebanon Canal, Marys River Natural Area

Looking for some "mock data" to play with? Mock City Data, Mock Forest Data

You may want to have different students pull up different sites if they are using individual computers or ipads or choose one to look at as a class. If you don't want to go back and forth between project sites it is recommended that you open the different sites in two different web browser pages to look at them simultaneously.





OSU Oregon State University
Sea Grant Oregon

Timeframe

1-2 Fifty minute class periods

Materials

- Data collected in the field and recorded on StreamWebs data sheets
- Computer and projector
- Access to StreamWebs database and Salmon Watch project site data
- Extra water quality and macroinvertebrate field data sheets for each team
- StreamWebs water quality parameters and standards sheets

Objectives

- Work and collaborate in groups
- Learn how to organize and input raw data into the StreamWebs database
- Recognize and discuss any data or equipment issues
- Answer questions about their data
- Compare their own data to other Salmon Watch sites chosen on StreamWebs
- Consider variability within data typical of complex systems such as watersheds
- Examine and analyze trends and relationships between water quality and macroinvertebrates

www.streamwebs.org

Following Up with Salmon Watch Data

Teacher Background

Scientists collect and use data for a variety of reasons. Often times watershed data is collected and analyzed to monitor water quality, certain species, and relationships over time to track the health of a watershed, and how it might affect the communities' health, land usage and building projects' affects on the stream, future plans for the land, and the overall care of that watershed.

Discussions with students will include the idea that other project sites may have many similarities and many differences. For example, they may have more or less tree coverage to help keep the stream cool, add more or less debris in the stream, and/or to affect bank stability and erosion. The general watershed location, conditions, and how the land is used greatly affect the stream.

Description

In this lesson students will work back in the classroom with their field data to specifically learn how to read data, enter it into a spreadsheet, or database such as StreamWebs, and to begin to build data analysis and interpretation skills that allow them to explain and share their data with their community. Students will answer questions concerning their field experience, about their data, and begin to consider what this data might tell them about their stream or body of water. Students will also use StreamWebs to compare their data to other students' data and project findings.

Preparation

Write the StreamWebs username and password on the board for students to reference. If you do not have ipads in the classroom for students to use then you will need to reserve a computer lab for this lesson (or if students are unable to enter data make sure it is entered in advance of lesson and skip to part two).

Field data sheets will need to be available for students to use. Ideally students have all of their data recorded on their data sheets and/or in journals.

Students can compare their findings to other salmon watch project site data within the StreamWebs database. You may want to assign different sites or choose one to look at as a class. Salmon Watch sites are indicated on the map in StreamWebs by color.

Activity Introduction

Today we are going to follow-up with the data that your class collected during the salmon watch event as well as look at what other classes collected while they were there. We are going to try to answer the question:

- Is X Creek healthy for the salmon that live there?

You may have tried to come up with answer to this question on your field trip based on the data that you collected and what you observed at X Creek. Today, we are going to use a larger pool of data to try to answer this question. We are going to look at ALL of the data that was collected during Salmon Watch for X Creek.

Reviewing/Entering Field Data

The data that your class and other classes collected during Salmon Watch was entered into an online database called StreamWebs. StreamWebs is a statewide database that houses student watershed data from various monitoring projects. *(Show students map of Oregon in StreamWebs and then zone in on your site).* Who can remind me what the name of the site you went to for Salmon Watch was?

Next Generation Science Standards

Performance Expectations

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Disciplinary Core Ideas

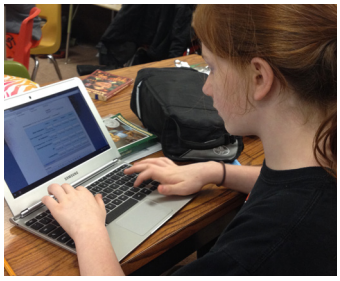
LS2.A: Interdependent Relationships in Ecosystems

Practices

Practice Four: Analyzing & Interpretting Data

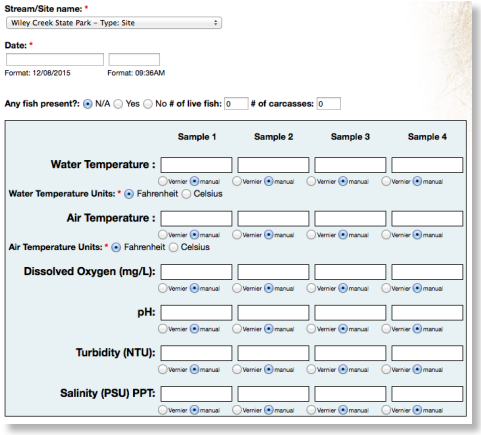
Crosscutting Concepts

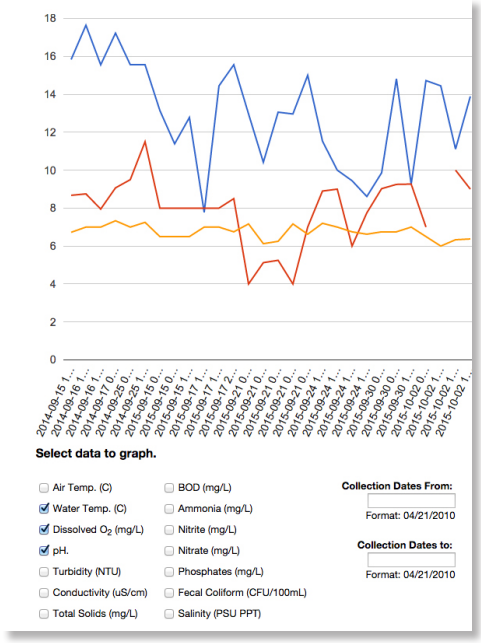
Stability & Change



Reviewing/Entering Field Data continued

1. Group students into their previous research teams or groups of 4-6.
2. Pose the following questions one at a time giving students time to discuss with their group and then share out:
   - What problems did you encounter collecting the data in the field? *Problems with tools, group dynamics, recording proper information, recording information neatly.*
   - What went well while collecting data in the field? *Enjoyed using the tools, good teamwork, recording proper information, recording information neatly, discovered new information or questions in regards to their study.*
3. Provide students with data sheets from their field experience or example student data sheets provided at the end of the lesson. If students are going to enter their own data remind them that though many of them may have recorded data, they will only enter data recorded by just a single member (unless they were sampling at different times/places).
4. Have students login to www.streamwebs.org with class username and password. Students can login as a team on tablets or computers, and take turns reading and entering their data (if students aren't entering data skip to #6).
   - Direct students to the project site where you collected data.
   - Demonstrate for students how to enter their data into the class StreamWebs webpage.
   - Ask students to enter their team's data into the class StreamWebs project site.
5. Pose the following questions one at a time giving students time to discuss with their group and then share out:
   - Did you have problems reading your data sheets?
   - Were your field data sheets organized well, filled out completely, and information recorded neatly?
   - Were you missing any data?
   - How did/would that affect entering the data into StreamWebs?





Missing Information!

If the person entering the data doesn't have all of the information then they have to guess or throw out the data. When you spend so much time collecting data you want to make sure that you can use it! The time that data was collected is often missing. Since this is a required field the person entering the data would either have to guess (not very scientific!) or throw out the data (what a waste!).

Interpreting Field Data

1. Explain to students that they will now begin to explore their data a little deeper to better understand what it tells them about their body of water, and what they can learn about watershed health from their data.
2. Ask students what might we learn from our data? *Information about water quality, macroinvertebrates, and overall watershed health, new questions or ideas we have to study further.*
3. Introduce students to the StreamWebs graphing function (if students aren't working on ipads/computers demonstrate on projector). Point out to students that they need to enter the date range at the bottom of the page. Have students practice (or demonstrate) making 3-4 different graphs with their data in StreamWebs. Look at each parameter 1 at a time and have students use their water quality parameter sheets to determine whether it was in a healthy range for salmon. *(Is water temperature in a healthy range for salmon? etc.)*
4. Ask students to consider any interesting data that they see on their graphs. For example, are there any really high or low data points? What might have caused these points to be so different?
5. Have students look at two parameters together (i.e. temperature and dissolved oxygen) and discuss what sort of relationships they saw or what they learned from their graphs. *Dissolved oxygen levels went up with cooler water, weather may affect results such as turbidity levels may be higher on a rainy day, etc.*

If time allows, have students draw the graphs that they create using StreamWebs so that they may compare them to other graphs later on.

Guiding Questions

Water Quality

- What was the lowest water temperature recorded? The highest? Is this data in line with what you would expect to see? What factors night have influenced these results? Repeat questions for each parameter (dissolved oxygen, pH).
- How might water temperature influence dissolved oxygen? Do dissolved oxygen levels go up or down in cooler water?
- What sort of human activities might affect pH and turbidity? Hint: think about ways that individuals, businesses, and other organizations use the land and water within a watershed, and how this might affect the stream.

Macroinvertebrates

- What percentage of tolerant, intolerant, and somewhat tolerant species did you find?
- Using the macroinvertebrate data sheet, what is the overall water quality rating?
- What might that tell you about this stream?
- What factors might have influenced the type of macroinvertebrates that you found?
- How might the type of macroinvertebrates change throughout the year at this location? Explain.

Comparing Your Data:

1. Have students compare their data to other data in StreamWebs such as a site different than yours (rural, urban, coastal, mountains, forest).
2. Assign one or two different Salmon Watch study sites to each team (or choose one to look at as a class).
3. Have students make and record predictions about how our data might compare to the other site. Have students consider:
   - Which study site is more urban or rural?
   - How does being more urban or rural affect a stream?
4. Now ask students to share as a class what similarities and differences they found within the site comparisons. Ask them to hypothesize why this might be. Were their predictions correct?

Activity Wrap Up:

- How do the water quality and macroinvertebrate data work together to inform us about the health of a stream? *Higher temperatures and turbidity may lower dissolved oxygen which means certain species of macroinvertebrates may not be able to live there, high or low pH levels may cause us to see more tolerant species. Can you think of other examples?*
- Can our data help us answer our class/team's question (i.e. is X creek healthy?)? *Would you need to collect more data in order to answer your question? If so, what kind of data would you collect? Do you need to revise your original question?*
- If we looked at our site over time, how might our data change? For example, if there was heavy rainfall in April how might it affect/change our data? *The rainfall may bring more pollution from run-off in the streets or chemicals from agricultural land as it flows into the local stream, this may affect turbidity, pollution levels, temperature, and dissolved oxygen levels; there might also be higher levels of tolerant species recorded because intolerant species may die off, or move if they are able to swim, or even fly away if they have hatched into their adult stage).*
- Do we have enough data to make some assumptions about how our body of water might affect the greater watershed?

Guiding Questions

Comparing Data

- How is this sites data similar or different to your own?
- How much data did they collect? More or less than your team? How does this affect what you can learn from their data?
- How does this stream compare to your own stream? Is your stream urban or rural?
- What is the overall water quality rating compared to your own stream (this is based on the rating found on the macroinvertebrate data sheet(s)?
- How might being an urban or rural stream affect the overall water quality rating?

OSG

WORK FOR CLEAN RIVERS - HELP RESTORE STREAMBANKS AND FISH HABITAT

CITY OF PORTLAND ENVIRONMENTAL SERVICES WORKS FOR CLEAN AND HEALTHY WATERSHEDS

WE ALL LIVE IN A WATERSHED - REDUCE - REUSE - RECYCLE - FOR A HEALTHY ENVIRONMENT

Dissolved Oxygen (D.O.)

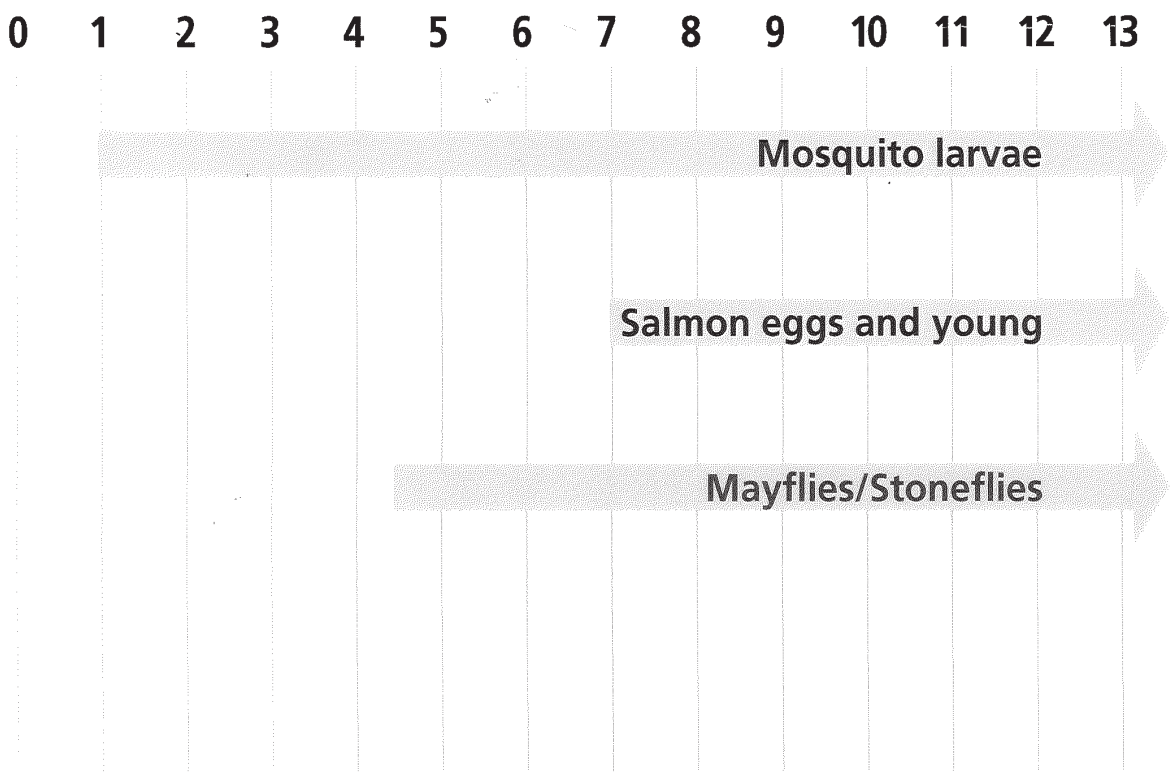
Definition: **The amount of oxygen in the water.**

Importance: **Required by aquatic life to breathe.**

How is it measured? **In Parts Per Million (PPM).**

(some scientists use mg/l or percent saturation)

Dissolved Oxygen (PPM)



HELP PREVENT POLLUTION - HELP KEEP OUR RIVERS AND STREAMS HEALTHY

OSG

WORK FOR CLEAN RIVERS - HELP RESTORE STREAMBANKS AND FISH HABITAT

CITY OF PORTLAND ENVIRONMENTAL SERVICES WORKS FOR CLEAN AND HEALTHY WATERSHEDS

Temperature

Aquatic organisms breathe oxygen that is dissolved in the water.

- **Warmer water may mean less dissolved oxygen is available for aquatic animals to breathe.**
- **Colder water can hold more dissolved oxygen.**

Rapid changes in water temperature can kill aquatic organisms.

°C	°F	Preferred Temperature
50	122	**Warm** **Above 68° F (20° C)** **dragonflies, bass, carp, catfish**
40	98.6	
30	86	**Cool** **55-68° F (13-20° C)** **Chinook, coho, sturgeon, cutthroat trout, mayflies**
20	68	
10	50	
0	32	**Cold** **Below 55° F (13° C)** **Steelhead, caddisflies, stoneflies, salmon eggs and alevins**
-10	14	
-20	0	

WE ALL LIVE IN A WATERSHED - REDUCE - REUSE - RECYCLE - FOR A HEALTHY ENVIRONMENT

HELP PREVENT POLLUTION - HELP KEEP OUR RIVERS AND STREAMS HEALTHY

WORK FOR CLEAN RIVERS - HELP RESTORE STREAMBANKS AND FISH HABITAT

CITY OF PORTLAND ENVIRONMENTAL SERVICES WORKS FOR CLEAN AND HEALTHY WATERSHEDS

pH

Definition: Measure of how acidic or basic (alkaline) the water is.

Importance: Pollution can change the pH of water.
If water is too acidic or too basic aquatic life can die.

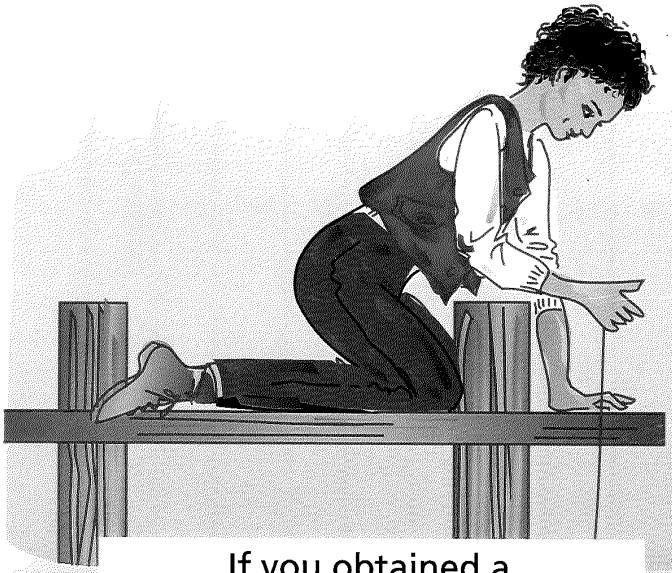
	pH scale	*Examples of pH levels*
ACIDS	0	**battery acid** 0.3-1.0
	1	**stomach acid** 1-3
	2	**lemon juice** 2.3
	3	**cola** 2.6
	4	**coffee** 4.9-5.2
	5	**NW acid rain** 5.2-5.4 **normal rain** 5.7
	6	**milk** 6
NEUTRAL	7	**distilled water** 7.0 **human blood** 7.3-7.4
	8	**baking soda** 8
	9	
BASES	10	**antacids** 10.5
	11	**ammonia** 11
	12	**bleach** 12.6
	13	
	14	**drain cleaner** 14

best range for most aquatic life

WE ALL LIVE IN A WATERSHED - REDUCE - REUSE - RECYCLE - FOR A HEALTHY ENVIRONMENT

HELP PREVENT POLLUTION - HELP KEEP OUR RIVERS AND STREAMS HEALTHY

Turbidity Chart

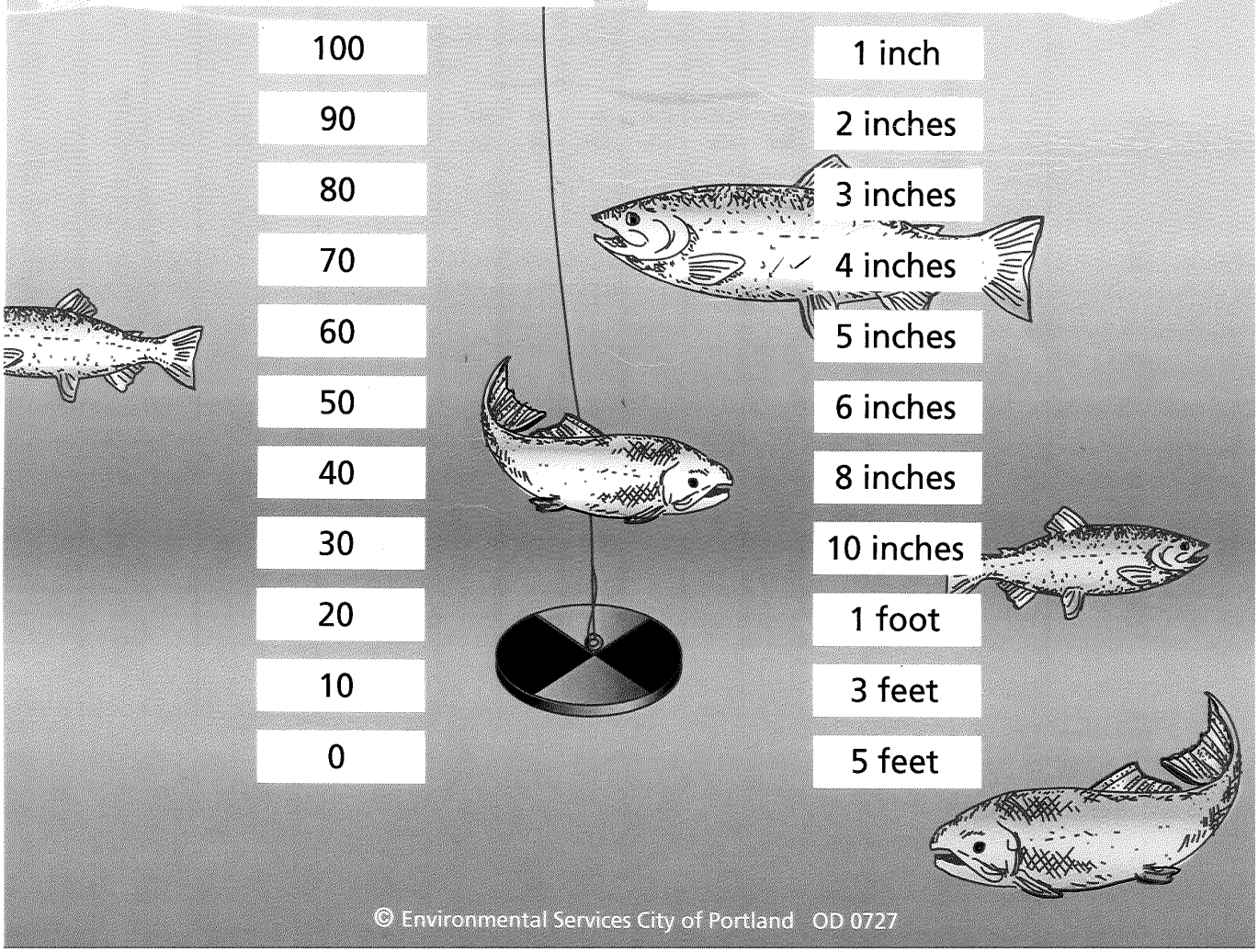


Turbidity: A measure of the cloudiness of the water.

Why is it Important?

- Sediment can smother eggs.
- Sediment can clog the gills of fish and other stream animals making it hard for them to breathe.
- Increased turbidity can result in warmer water, leading to lower levels of dissolved oxygen.

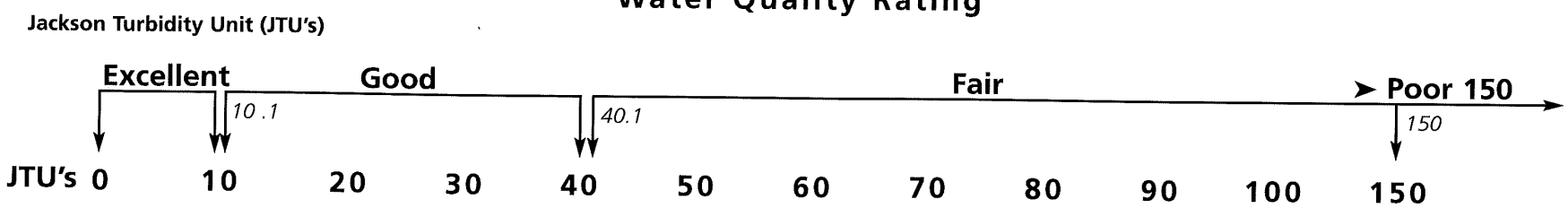
If you obtained a JTU measurment of . . .	You would be able to see down this far with a Secchi Disk.
100	1 inch
90	2 inches
80	3 inches
70	4 inches
60	5 inches
50	6 inches
40	8 inches
30	10 inches
20	1 foot
10	3 feet
0	5 feet



Turbidity Test Results

Number of Measured Additions	Amount in mL	25 mL Graduation
1	0.5	10 JTU
2	1.0	20 JTU
3	1.5	30 JTU
4	2.0	40 JTU
5	2.5	50 JTU
6	3.0	60 JTU
7	3.5	70 JTU
8	4.0	80 JTU
9	4.5	90 JTU
10	5.0	100 JTU
15	7.5	150 JTU
20	10.0	200 JTU

Water Quality Rating



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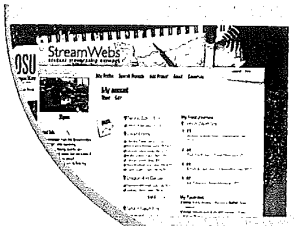
StreamWebs™
Student Stewardship Network

WATER QUALITY DATA FORM



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www.streamwebs.org

School: Oak hi Eight

Teacher: hopdih a

Date: Sept 29 Time: 9:30

Stream/Site Name: S. santiam @ trout creek Lat_____ Long_____

Any fish present? ☐ Yes ☒ No # of live fish: ____ # of carcasses: ____

TEST	Sample 1	Sample 2	Sample 3	Sample 4
Water Temperature ☒ °C ☐ °F	10 10			
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Air Temperature ☐ °C ☐ °F	[illegible]			
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Dissolved Oxygen (mg/L)	[illegible]			
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
pH	7.0 7.5 7.0 7.5 7.0 7.5 7.5 7.5 7.5			
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Turbidity (NTU)	20cm 55cm 50cm 53cm 60cm 60cm			
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐

Adapted from: Environmental Services City of Portland

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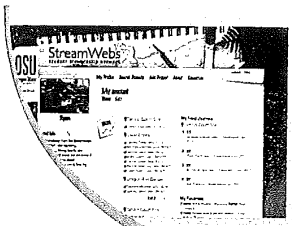

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www.streamwebs.org

School: _____

Teacher: _____

Date: _____ Time: _____

Stream/Site Name: _____ Lat _____ Long _____

Any fish present? ☐ Yes ☐ No # of live fish: ____ # of carcasses: ____

TEST	Sample 1	Sample 2	Sample 3	Sample 4
Water Temperature ☑ °C ☐ °F	10°C 56.f 47.f	11°C 52.f 15.C	12°C 50.f	10°C
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Air Temperature ☐ °C ☐ °F	61.F 19.C	16.C 61.F		
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Dissolved Oxygen (mg/L)	11			
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
pH	7.0 7.5	7.5	7.0	8.0
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Turbidity (NTU)	52 53 11 45	52 60	58 49 13 54	33 37
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐

Adapted from: Environmental Services City of Portland

GP #1

OSU Oregon State University Extension Service

StreamWebs™
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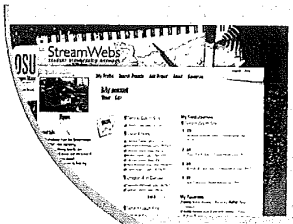
WATER QUALITY DATA FORM



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www.streamwebs.org

School: _____

Teacher: _____

Date: _____ Time: _____

Stream/Site Name: _____ Lat _____ Long _____

Any fish present? ☐ Yes ☐ No # of live fish: ____ # of carcasses: ____

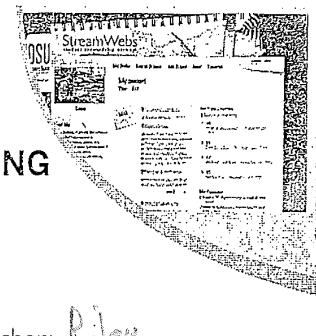
TEST	Sample 1	Sample 2	Sample 3	Sample 4
Water Temperature ☐ °C ☐ °F	11, 10, 10	11 °C,	10°C	
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Air Temperature ☐ °C ☐ °F				
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Dissolved Oxygen (mg/L)				
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
pH	7.5, 7	7.5	7.0	
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐
Turbidity (NTU)	58.4574, 5	60	53	
Equipment used?	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐	Vernier ☐ Manual ☐

Adapted from: Environmental Services City of Portland

OSU Oregon State University Extension Service

StreamWebs™
Student Stewardship Network

MACROINVERTEBRATE SAMPLING



Share your field data quickly and easily using StreamWebs. Find out what the macroinvertebrates you found say about your stream, keep track of your photopoints, graph water quality data, upload a video, and much more.

www.streamwebs.org

Name: Group 1

School: Oak Grove Elementary Teacher: Riley

Date: 9/17/13 Time: 10:50 Weather: Very Rainy

Stream/Site Name: Wiley Creek Time spent sorting/identifying: 1 hour

# of people sorting/identifying: 9 ☑ Riffle ☑ Pool

Directions:
1. Record the number of each type of organism found in the # found column of each section.
2. Then circle the number in the score column (3, 2, or 1) if any of that organism was found.
3. Complete the equation at the bottom by adding up the circled numbers from each score column.

SENSITIVITY TO POLLUTION

Sensitive / Intolerant

	# found	score
caddisfly	1	3
mayfly	1	3
riffle beetle		3
stonefly	4	3
water penny		3
dobsonfly		3
Sensitive TOTAL =		18

Somewhat Sensitive

	# found	score
clam/mussel		2
crane fly		2
crayfish		2
damselfly		2
dragonfly		2
scud		2
fishfly		2
alderfly		2
mite		2
Somewhat Sensitive TOTAL =		

Tolerant

	# found	score
aquatic worm		1
blackfly		1
leech		1
midge	8	1
snail		1
mosquito larva		1
Tolerant TOTAL =		8

18	Sensitive total
+	Somewhat sensitive total
+ 8	Tolerant total
= 26	**Water Quality Rating**

☒ Excellent (>22) ☐ Good (17-22)
☐ Fair (11-16) ☐ Poor (<11)

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MACROINVERTEBRATE SAMPLING

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www.streamwebs.org

Name: Arika

School: NAES Teacher: Mrs. Blaire

Date: 9-21-15 Time: 12:30 Weather: Sunny

Stream/Site Name: Wiley Creek Time spent sorting/identifying: 11 people

# of people sorting/identifying: _____ ☒ Riffle ☒ Pool

Directions:
1. Record the number of each type of organism found in the # found column of each section.
2. Then circle the number in the score column (3, 2, or 1) if any of that organism was found.
3. Complete the equation at the bottom by adding up the circled numbers from each score column.

SENSITIVITY TO POLLUTION

Sensitive / Intolerant

	# found	score
caddisfly		3
mayfly		3
riffle beetle		3
stonefly		3
water penny		3
dobsonfly		3
Sensitive TOTAL =		

Somewhat Sensitive

	# found	score
clam/mussel		2
crane fly		2
crayfish		2
damselfly		2
dragonfly		2
scud		2
fishfly		2
alderfly		2
mite		2
Somewhat Sensitive TOTAL =		

Tolerant

	# found	score
aquatic worm		1
blackfly		1
leech		1
midge		1
snail		1
mosquito larva		1
Tolerant TOTAL =		

☐ Sensitive total
+ ☐ Somewhat sensitive total
+ ☐ Tolerant total
= ☐ **Water Quality Rating**

☐ Excellent (>22) ☐ Good (17-22)
☐ Fair (11-16) ☐ Poor (<11)

Adapted from: Environmental Services City of Portland

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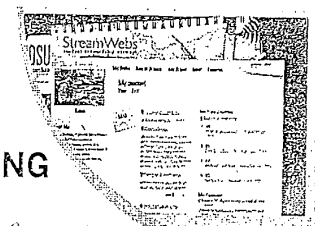
MACROINVERTEBRATE SAMPLING



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www.streamwebs.org

Name: Trout Creek Campground Group 2

School: Foster Elementary Teacher: Mrs. Hawkin

Date: 9-21-15 Time: _____ Weather: Slightly cloudy w/ chance of rain

Stream/Site Name: Trout Creek Time spent sorting/identifying: 30 minutes

# of people sorting/identifying: 9 ☐ Riffle ☑ Pool

Directions:
1. Record the number of each type of organism found in the # found column of each section.
2. Then circle the number in the score column (3, 2, or 1) if any of that organism was found.
3. Complete the equation at the bottom by adding up the circled numbers from each score column.

SENSITIVITY TO POLLUTION

Sensitive / Intolerant

	# found	score
caddisfly	2	3
mayfly	22	3
riffle beetle		3
stonefly	21	3
water penny		3
dobsonfly		3
Sensitive TOTAL =		9

Somewhat Sensitive

	# found	score
clam/mussel		2
crane fly	2	2
crayfish		2
damselfly		2
dragonfly		2
scud		2
fishfly		2
alderfly		2
mite	1	2
Somewhat Sensitive TOTAL =		4

Tolerant

	# found	score
aquatic worm	6	1
blackfly		1
leech		1
midge	1	1
snail		1
mosquito larva		1
Tolerant TOTAL =		2

9	Sensitive total
+ 4	Somewhat sensitive total
+ 2	Tolerant total
= 15	**Water Quality Rating**

☐ Excellent (>22) ☐ Good (17-22)
☑ Fair (11-16) ☐ Poor (<11)

Adapted from: Environmental Services City of Portland