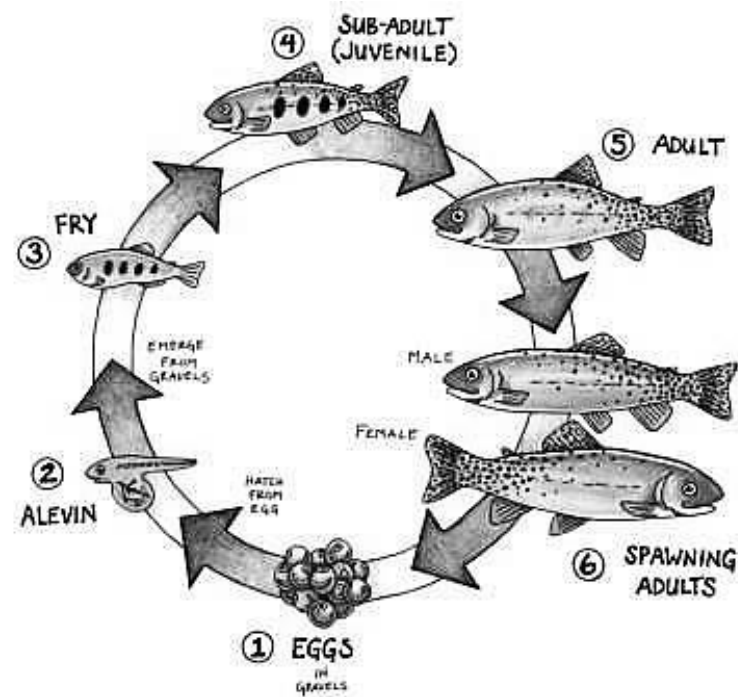


FIELD JOURNAL

Rainbow Trout



Name

Teacher

Period

Trout Anatomy

Eyes – A sensory organ used for sight. The pupils are slightly triangular instead of circular, allowing for a larger field of vision. Trout can see clearly in front of them. Above and slightly behind them the images are not as clear. In addition, the eyes have large pupils which allow for available light to be admitted.

Nares – A sensory organ used to smell. The nares are closed sacs and function as a nostril, helping the trout to detect odors. Trout return to their home stream yearly to spawn. They can identify their home stream by the smell of the water.

Mouth – A sensory organ to taste and eat. The trout will take a lot of things into its mouth to see if it is worth eating. It closes its mouth to crush it. If it feels good and the juices taste good, it will reposition it in its mouth and swallow it whole. If it does not like what it tastes, it will spit it out. It is also used to *feel* things.

Gills – A respiratory organ used to breathe. Trout draw in water through their mouths, this passes through their gills where blood vessels exchange CO₂ for O.

Operculum – A hard plate that protects the gills.

Pectoral fins – These are paired fins that act as brakes and help with side to side and gliding movement in fast currents.

Pelvic fins – These are paired fins that help with up and down movement.

Vent – This opening is where water is excreted as waste. It is also the opening through which eggs or sperm (milt) pass through during spawning.

Anal fin – Located behind the vent, this fin is used for swimming and stabilization.

Caudal fin – This fin provides the initial *push* for the trout to start moving and acts as a rudder for steering through the water. It is the biggest, most powerful fin.

Dorsal fin – This single fin is used for swimming and stabilization.

Adipose fin – This small fin keeps the water running alongside the fish rather than crossing over its back. Like the dorsal fin it is used for swimming and stabilization. The word adipose means that it is a fatty fin without rays.

Lateral line – A sensory organ that runs from the operculum to the caudal fin. It detects pressure waves or vibrations. It helps the trout maintain its position without bumping into other fish or objects in the water. It can even detect when someone is stepping on the bank or a log on shore

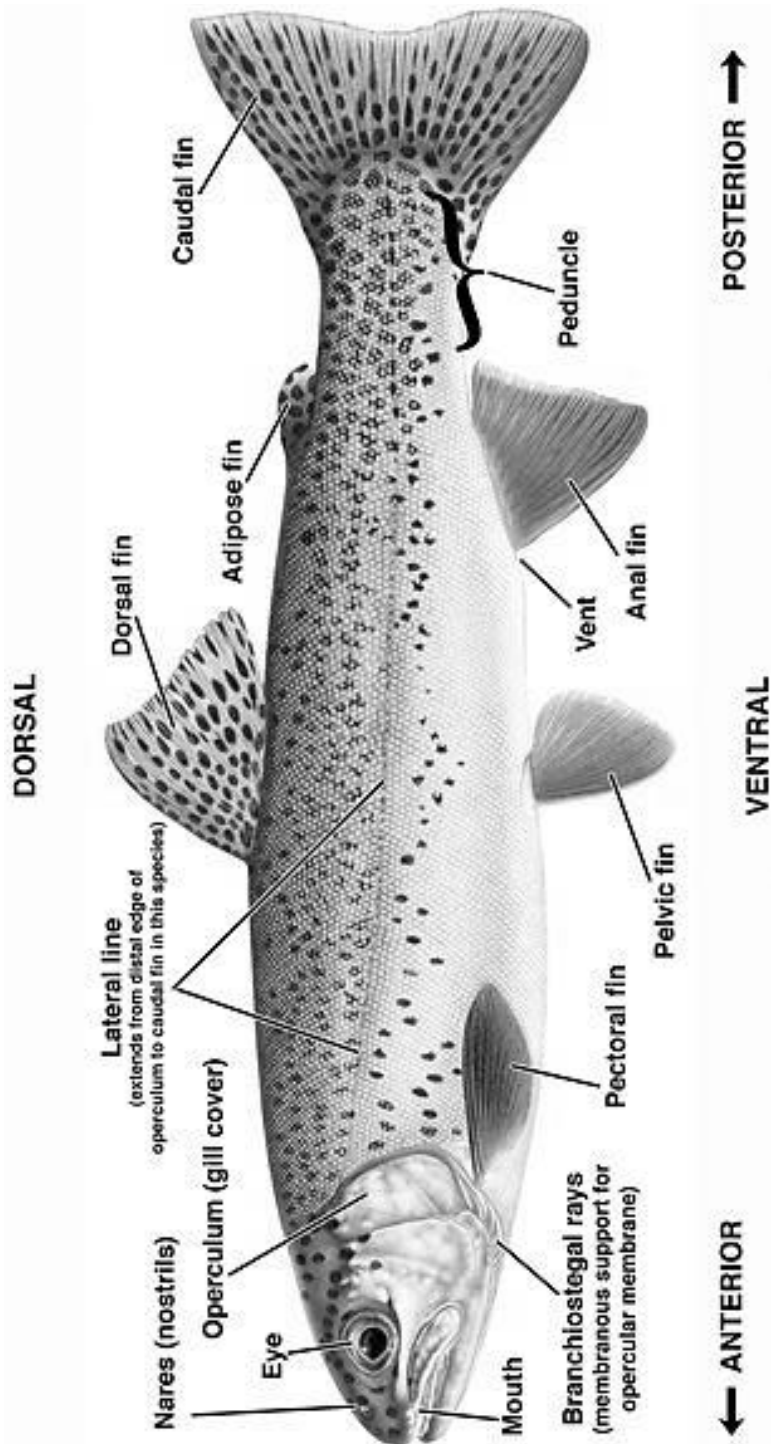


Image source: faquaticpath.php.ufl.edu/lesionguide/images/rainbow%20trout-web.jpg

FIELD JOURNAL Rainbow Trout

OBJECTIVE

Understand the basic needs of the trout we will be raising and how the aquarium meets those needs. Maintain a record of water quality parameters and record regular observations of the trout as they grow.

REQUIREMENTS

- ☐ Labeled tank diagram
- ☐ Natural vs. aquarium habitat
- ☐ ____ Journal entries, including...

- ✓ date & time
- ✓ water quality measurements

Groups will be responsible for monitoring the aquarium's temperature; the other measurements will be copied from the data sheet stored below the aquarium.

- ✓ written observation
- ✓ quick sketch

Drawings should be relatively accurate, big, and detailed. Anything discussed in your observation should be labeled.

SO WHAT SHOULD YOU WRITE ABOUT?

Possibilities include, but are not limited to...

What do you see? Is there anything that surprises you?

How have the trout changed since your last observation?

Can you identify any on sight? How does their coloration vary?

Are you able to identify any obvious adaptations?

How would you describe the fish's movement?

How do the fish behave? Do they interact?

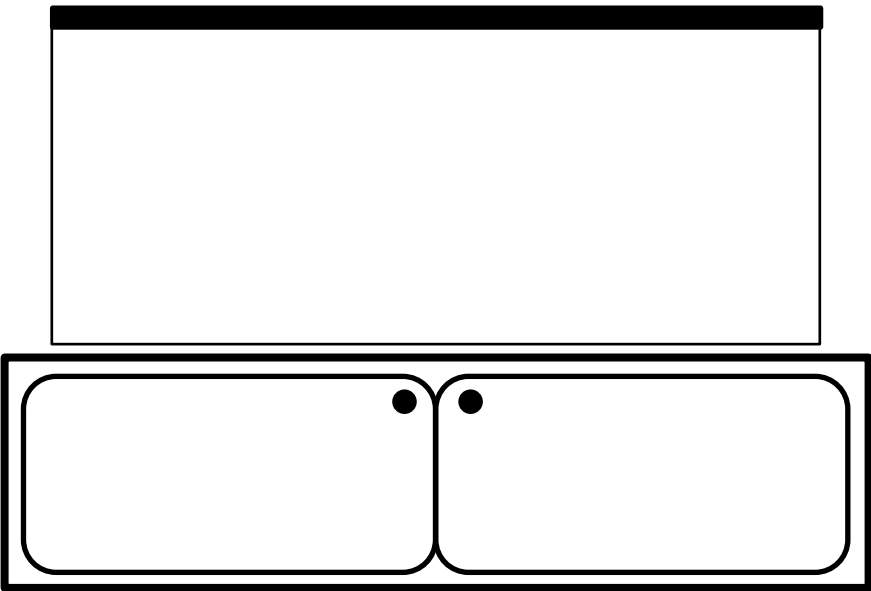
Use proper vocabulary when possible (see last page)!

ADDITIONAL INFO

Near the end of the school year we will release our young trout into the wild. It is our responsibility to care for them and give them that chance. Additionally, if we prove ourselves capable, our school could eventually earn the opportunity to raise Rio Grande Cutthroat trout –our state fish. This is a privilege that must be earned as their subspecies is considered vulnerable.

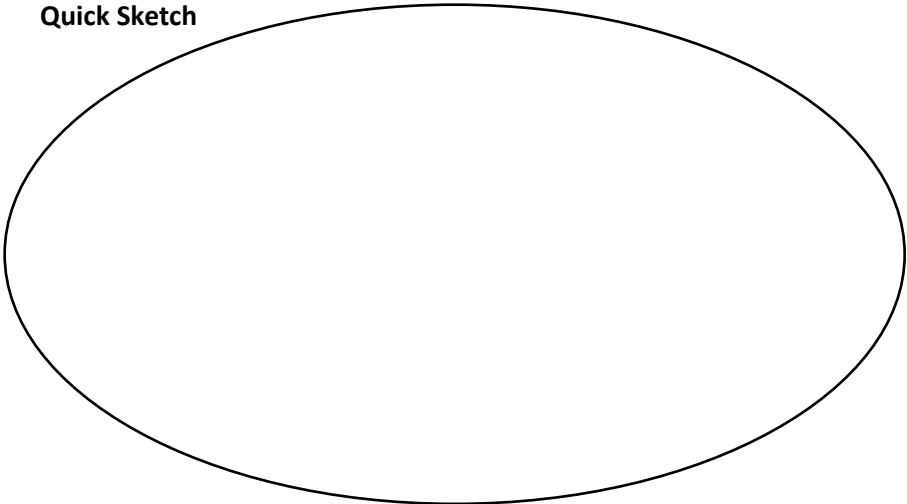
Aquarium Set-up

Complete the diagram below. This will include drawing several missing parts (use basic shapes) and labeling them with the appropriate letter.



PART	DESCRIPTION
A. Air stones	Porous structure that aerates (adds oxygen) to the water
B. Aquarium	A container where living organisms are kept
C. Aquarium stand	A platform designed to hold the weight of the aquarium
D. Chiller	Cools the water to the appropriate temperature
E. Chiller plumbing & pumphead	Actively moves water between the aquarium and chiller
F. Filter	As water moves through this, beneficial bacteria break down ammonia and nitrites. It also filters out waste.
G. Insulation	Prevents/slows heat transfer, keeping the tank cool
H. Thermometer	Measures temperature

Quick Sketch



Date:

Time:

Water Quality Parameter

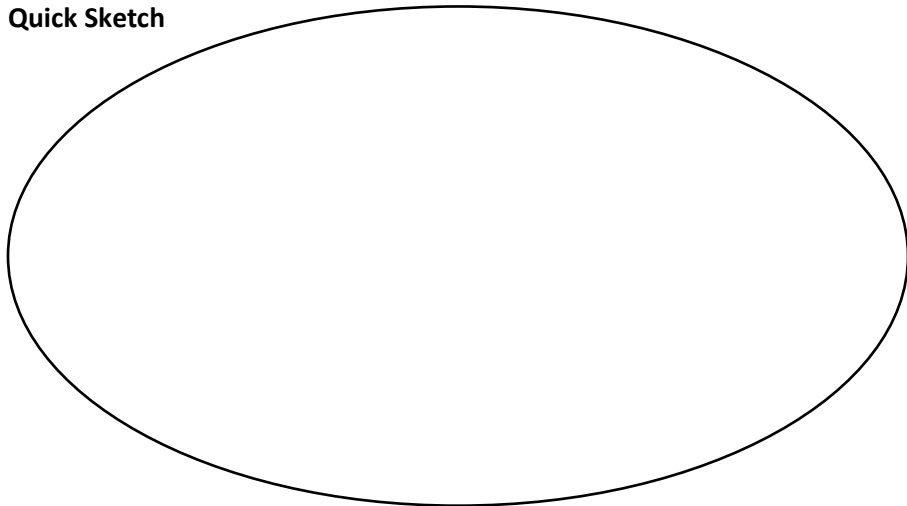
Level

Ammonia	_____ppm*
Nitrite	_____ppm*
Nitrate	_____ppm*
pH	_____*
Temperature	_____°F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Quick Sketch



Date:

Time:

Water Quality Parameter

Level

Ammonia

_____ ppm*

Nitrite

_____ ppm*

Nitrate

_____ ppm*

pH

_____ *

Temperature

_____ °F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Water Quality Parameters

For the health of the trout, it is important to understand and monitor water quality. This will be done regularly and a record will be kept.



Parameter	What it tells us	Acceptable Level	How to Fix it
Temperature	The water is too cold or too warm	45°F – 55°F	Check to ensure thermostat is set correctly and chiller is functioning
Ammonia	Decomposing and decaying animal waste is present	0 <i>Anything over zero is considered toxic.</i>	✓ Water change ✓ Remove waste ✓ Check feeding level and lower if necessary
Nitrite	Nitrosomonas bacteria is present and breaking down ammonia compounds	0 <i>Anything over zero is considered toxic.</i>	✓ Water change ✓ Remove waste ✓ Check feeding level and lower if necessary
pH (power of Hydrogen)	Degree of acidity or alkalinity: 0-7 indicates acidity, 7-14 indicates alkalinity	6.5 – 8.0	Water change
Nitrate	There is a buildup of organic material and waste	< 40 ppm	Water change
Chlorine	Presence of a disinfecting agent used during water purification	0 <i>Anything over zero is considered toxic.</i>	Age water before adding to tank so that chlorine will evaporate or use a de-chlorinator in an emergency

Source: *Native Fish in the Classroom: Rio Grande Cutthroat Trout Reference Guide and Activities*. New Mexico: U.S. Fish and Wildlife Services, 2011.

Habitat Requirements

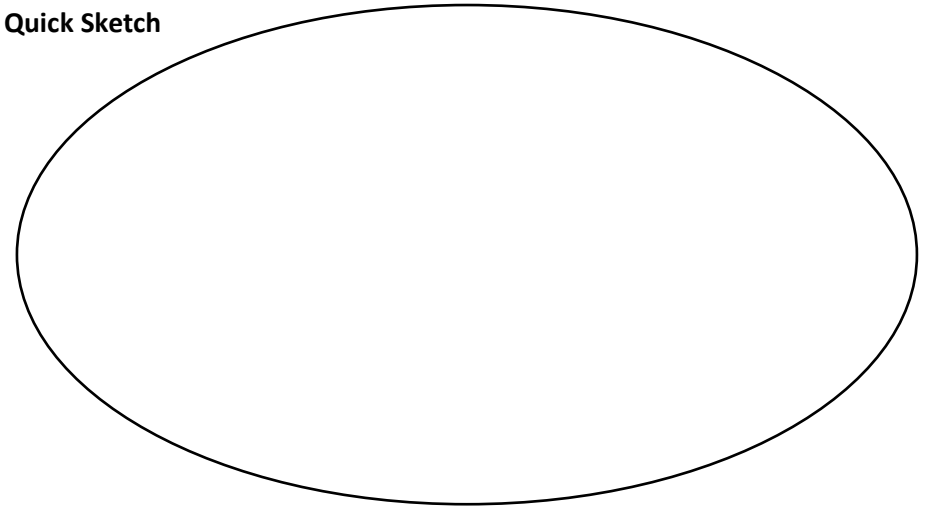


Trout can be found in many cold, freshwater streams and lakes in New Mexico. Together these ecosystems meet its needs throughout its life cycle—from egg to adult.

NEED	HOW IT IS MET IN NATURE
Limited light	Overhanging vegetation, trees, and deep pools
Cold water temp.	High elevation, spring fed, snow melt, and shade
Oxygen	Turbulence over gravel and boulders aerate (add oxygen) to the water, and during the day plants add oxygen through the process of photosynthesis
Clean Water (ammonia & nitrites)	Bacteria break down decaying matter in streams, plants absorb nitrates, and storm events flush a stream
pH (7.0 – 8.5)	Run-off, decaying organic matter, and human caused pollutants can cause pH to fluctuate
Predation	Bears, raccoons, nonnative trout, and humans limit trout populations
Food	Zooplankton, aquatic bugs (invertebrates), terrestrial bugs (insects), and other small fish

Source: *Native Fish in the Classroom: Rio Grande Cutthroat Trout Reference Guide and Activities*. New Mexico: U.S. Fish and Wildlife Services, 2011.

Quick Sketch



Date:

Time:

Water Quality Parameter

Level

Ammonia

_____ppm*

Nitrite

_____ppm*

Nitrate

_____ppm*

pH

_____*

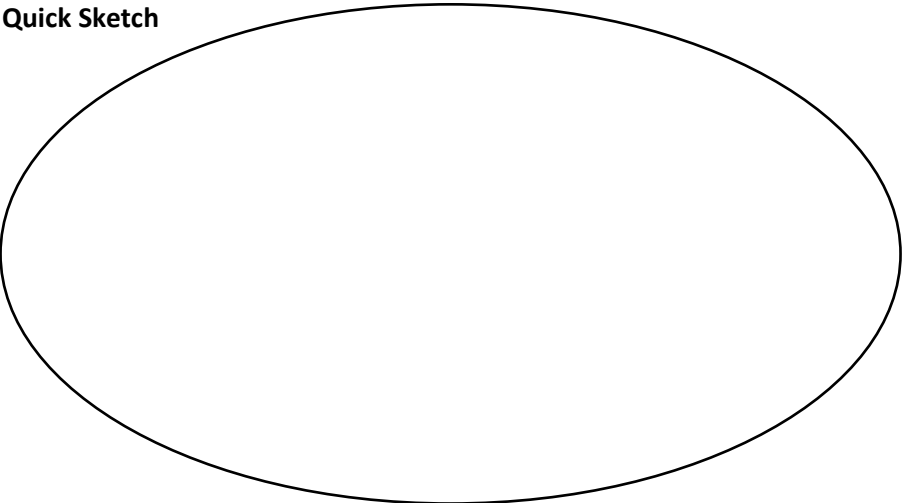
Temperature

_____°F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Quick Sketch



Date: _____

Time: _____

Water Quality Parameter	Level
Ammonia	_____ppm*
Nitrite	_____ppm*
Nitrate	_____ppm*
pH	_____*
Temperature	_____°F

Written Observation

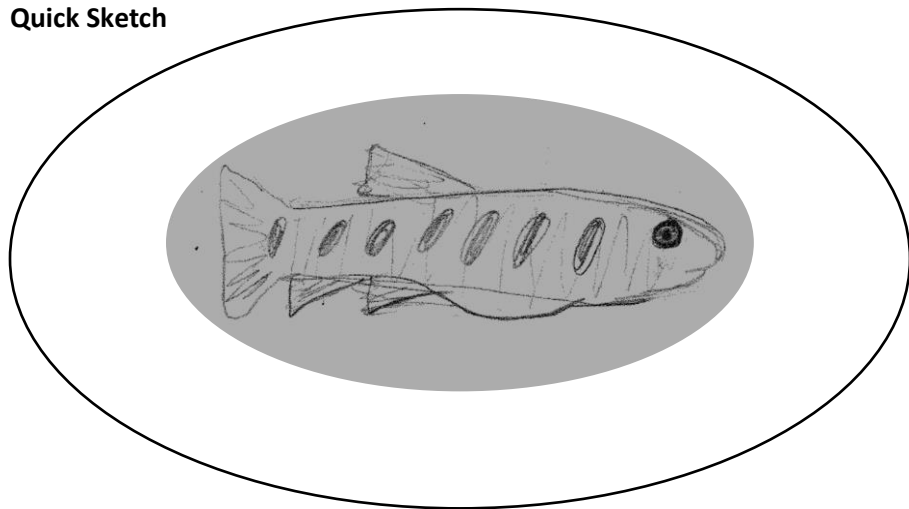
*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.



Our goal is to create a simplified version of this complex ecosystem in the aquarium. Consider its location and parts. Complete the table below.

NEED	HOW IT IS MET IN THE AQUARIUM
Limited light	_____ _____
Cold water temp.	_____ _____
Oxygen	_____ _____
Clean Water (ammonia & nitrites)	_____ _____
pH (7.0 – 8.5)	_____ _____
Predation	_____ _____
Food	_____ _____

Student Sample
Quick Sketch



Date: 02/18/14

Time: 1:03

Water Quality Parameter

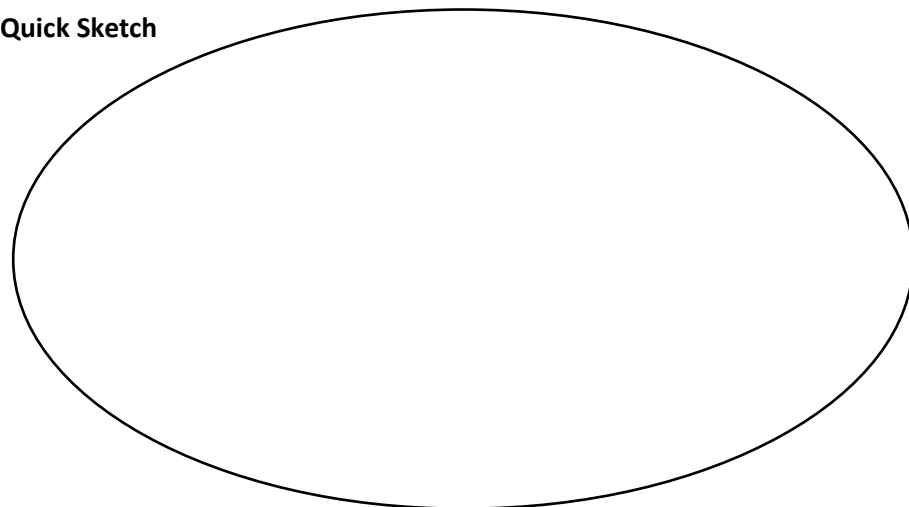
Level

Ammonia	0.25	ppm
Nitrite	5	ppm
Nitrate	80	ppm
pH	7.6	
Temperature	51	°F

Written Observation

- clearly larger
- shinier coloration and new markings (like slashes)
- more spread out around the tank, less clustering
- yolk sac almost completely gone

Quick Sketch



Date:

Time:

Water Quality Parameter

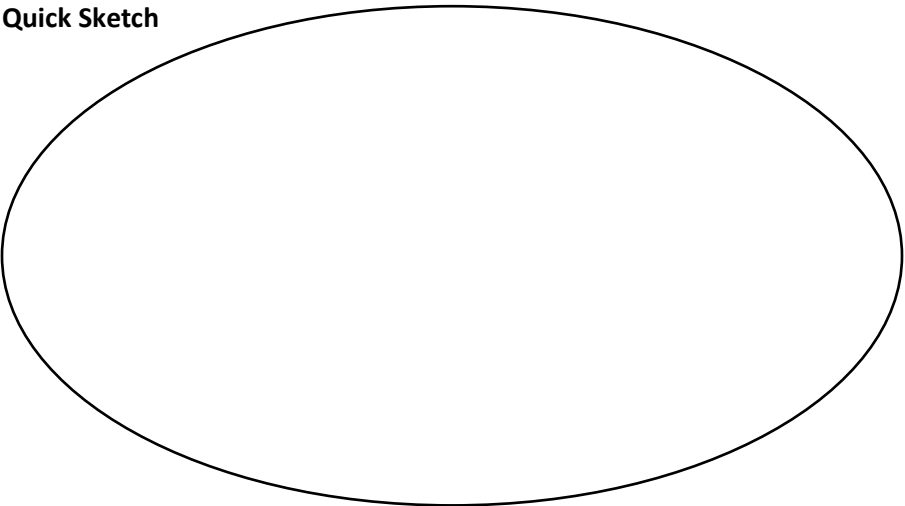
Level

Ammonia	_____ ppm*
Nitrite	_____ ppm*
Nitrate	_____ ppm*
pH	_____ *
Temperature	_____ °F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Quick Sketch



Date: _____ Time: _____

Water Quality Parameter

Ammonia

Level

_____ ppm*

Nitrite

_____ ppm*

Nitrate

_____ ppm*

pH

_____ *

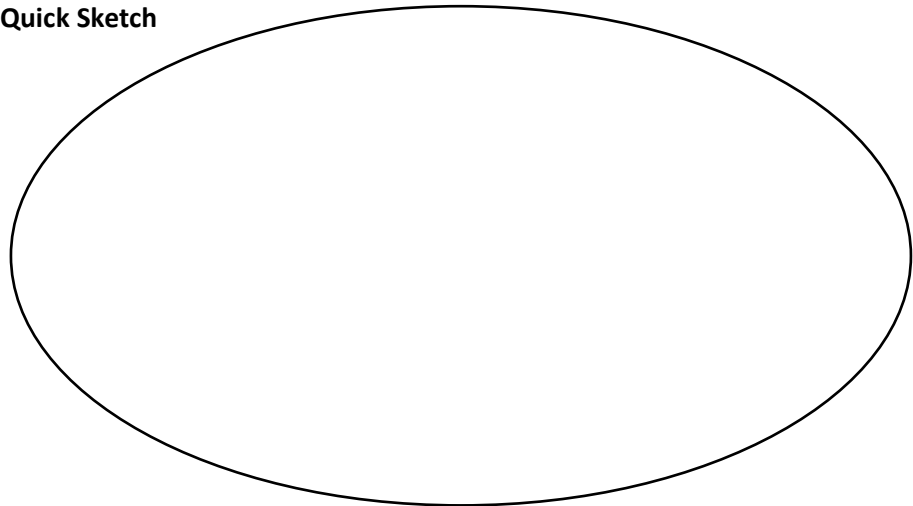
Temperature

_____ °F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Quick Sketch



Date: _____ Time: _____

Water Quality Parameter

Ammonia

Level

_____ ppm*

Nitrite

_____ ppm*

Nitrate

_____ ppm*

pH

_____ *

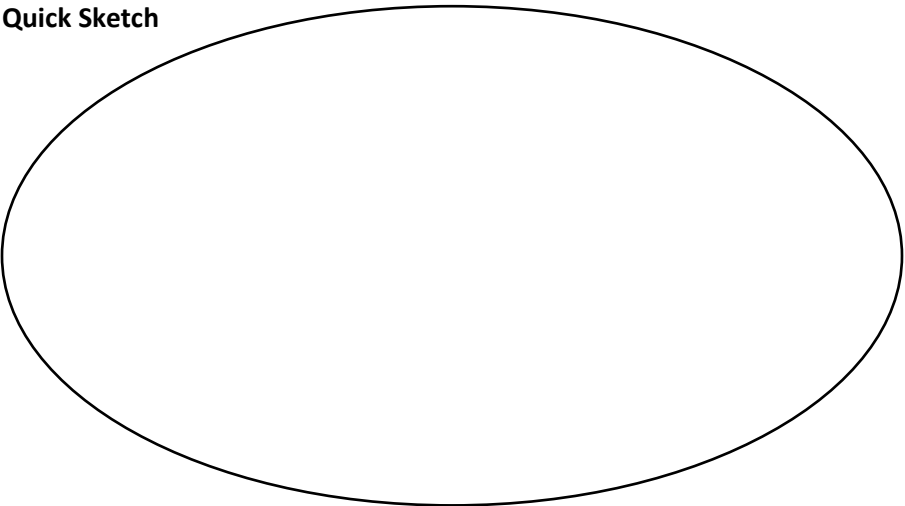
Temperature

_____ °F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Quick Sketch



Date: _____ Time: _____

Water Quality Parameter

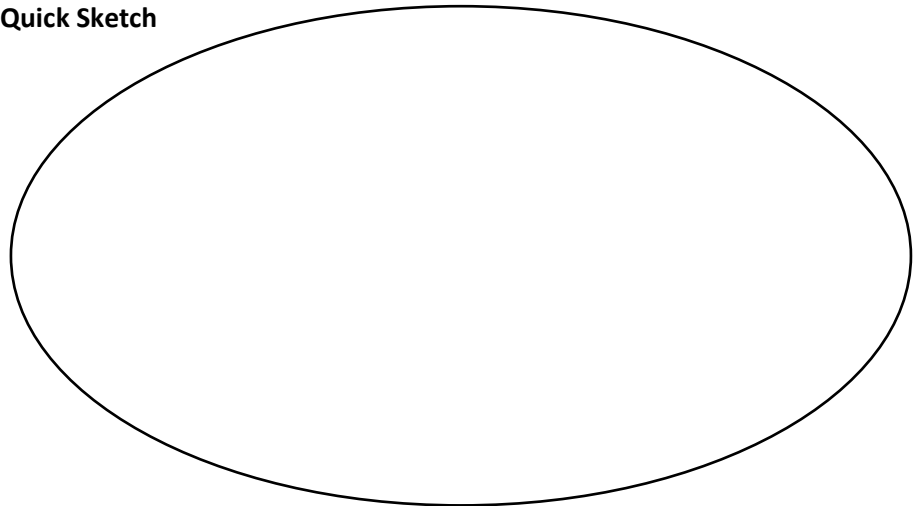
Level

Ammonia	_____ ppm*
Nitrite	_____ ppm*
Nitrate	_____ ppm*
pH	_____ *
Temperature	_____ °F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.

Quick Sketch



Date: _____ Time: _____

Water Quality Parameter

Level

Ammonia	_____ ppm*
Nitrite	_____ ppm*
Nitrate	_____ ppm*
pH	_____ *
Temperature	_____ °F

Written Observation

*These measurements may have been taken by other students. You will simply copy the **most recent** numbers from the class data sheet where you will **also** record the temperature.