Tulare County
Office of Education
Tim A. Hire, County Superintendent of Schools

Grade 5 Pond & Stream Investigation: How do they breathe?

Objective: Students will:

a.) Treat the animals with respect by ensuring they stay in ample water, are handled gently, and are safely returned to the pond habitat.
b.) Observe and describe the breathing mechanisms of different aquatic insects.
c.) Accurately sketch and identify the body parts of the aquatic life (Eyes, wing buds, gills, legs, cerci, antennae, etc.)
d.) Accurately record the species they find in their sample on the "Monitoring Macroinvertebrates" data sheet

Grade Five Science Standards: Students know
2a. Many multicellular organisms have specialized structures to support the transport of materials.
6g. Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences from that data.

Materials:

- Plastic Tanks (stay on table)
- Tupperware containers (students use)
- Magnifier Boxes
- Turkey basters and smaller pipettes

- Plastic depression slides w/ little round basin
- 12 Brock Microscopes
- I.D. sheets for insects
- Diagrams illustrating breathing mechanisms
- Life Cycle Diagram

Introduction: On the hike down to our station, we will see two different examples of a wetland. The first one is the Pond wetland. Is the pond water flowing or still? What plants do you see? What else about the pond environment do you notice?

The second wetland type is the Stream. Is the water flowing or still? What plants do you see? What else do you notice about the stream?

Careful use only!
Turkey basters and pipettes for sucking up insects and placing them in depression slides or in plastic cubes for viewing.

TADPOLES & FROGS ARE VERY FRAGILE!!

You may collect only 5 total frogs or tadpoles all day! Tadpoles may be carefully collected only with direct supervision by adults! They must be kept in the tanks with lids and not placed under microscopes. They may be kept for a brief time in specimen jars with water. They are very fragile! After viewing, please release them in the exact same spot you found them.

Think-Pair-Share: What is similar about the Pond and Stream environments? What is different?
Theme: *Animals that live in wetlands are adapted to life in water!* They MUST be kept in the water in order to survive! If I pull a fish out of water and hold it in the air, what happens? It may die if I hold it out of the water too long because it needs to be in the water to breathe! Many of these wetland creatures breathe using gills, and so they must be kept in the water!

[Show the diagrams of breathing mechanisms of aquatic creatures as you present]

The creatures living in the pond exhibit adaptations that help them survive in a world of water. Let's compare how humans breathe to how aquatic insects breathe. We humans live in a world surrounded by an atmosphere of air. We breathe through our lungs- everyone take a deep breath- and exhale. Who can explain what happens in our body when we breathe? (We inhale air into our lungs, tiny blood vessels surround our alveoli, oxygen from the air moves through our lung tissue and is absorbed into the blood, our blood carries the oxygen to all parts of our bodies- such as the brain, muscles, organs.) Aquatic insects also need oxygen to survive, but they breathe through gills, breathing tubes, or they carry a bubble of air along with them.

Now we are ready for you to collect creatures and examine them under microscopes.

A.) Teacher demonstrates how to:

- Fill & keep the proper amount of water in the collecting tubs
- Use BIG pipettes to place creatures bigger than 3 mm in the insect cubes
- Use SMALL pipettes to place small creatures in depression slides.
- Focus the microscopes

The Wetland Creature Lover's Oath-raise your right hand and repeat after me:
"I solemnly swear I will treat all wetland creatures with respect by making sure there is ample water and by using the proper size pipette. I also promise to return the creatures back into the same watery spot I found them."

B.) Exploring the Wetland Area

- Boundaries are (show everyone the boundaries of this activity)
- Fill collecting tub or bucket with 2" water, carefully use strainers or cups to skim near plants or along rocks
- Bring your tub over to the examination tables and let the silt settle out
- Look for tiny wiggling, moving creatures

C.) Microscope Viewing

- Prompt: How are these creatures adapted for survival in water? Look for:
- Movement: Does the creature have special structures (legs like oars or flipper like tail) to help it move in water?
- Breathing: Does this creature have special structures (such as gills or ability to carry a portable air bubble)?

- Camouflage: Does this creature have the ability to hide itself to avoid being detected by a predator?

D.) Observe and Describe at least 2 ways creatures are adapted to survive in wetland environment (students sit on bench)

Show "How do they Breath" diagrams
Show a water boatman and allow students to see how the legs are like oars
Show fish, frog or caddisfly larva and describe how coloring or ability to construct case out of sticks allows animal to hide
Ask students to form pairs and Think-Pair-Share their favorite animal and 2 ways it is adapted for survival!

Conclusions:

1.) Wetland creatures have special breathing structures that help them to survive in their watery environment!
2.) The pond and stream are different examples of wetland environments!

Clean up, taking care to return all creatures to the same place they were found!

The follow materials are to be cleaned and then stored in the storage bin w/ green lid:

- Wipe and stack collecting tubs
- Wipe microscopes and place in large storage container with lid
- Wipe and place insect cubes & pipettes into storage boxes
- Depression slides go into small containers w/ blue lids

The 2 aquatic nets and all books & ID sheets are returned to the building area.