Exploring Science Field Trip Lesson Plan

Setting: A park, ecological preserve or appropriate outdoor space and indoor space
Grade: 1st grade – 3rd grade
Time: 3-4 hours

Overview
Students will learn to make insightful observations and ask good questions and learn how to record them

Students will become familiar with the uses of a microscopes and nets – equipment that scientists use to study aquatic organisms

Students will have hands-on interaction with macroinvertebrates, and other organisms that they collect

Materials
- Educators and students should dress for the weather and wear boots (or at least closed toed shoes that can get dirty) and have a water bottle with them
- First aid kit
- Rain ponchos
- Buckets
- Kick nets
- White dish pans
- Small white containers (repurposed small yogurt cups work well)
- Plastic spoons
- Rocks (same number as number of students involved)
- Crayons, colored pencils, and paper
- Microscopes
- Magnifying glass
- Macroinvertebrate guides
- Trout Are Made of Trees book

Possible Time-line for Field Trip
First Station begins at 9:30 and each station will last for 40 minutes
There will be a 10 minute transition time between each station
One class will go to the tree planting activity for the morning while the others go through the two stations. They will switch for the afternoon.
Lunch will be from 11:00-11:30 am
Engagement

1. **Rock Activity**

   Time: 15 minutes 9-9:15am

   When the class arrives handout name tags and rocks (give each student one rock)
   a. Have students sit in a circle and observe their rocks
   b. Then have the students put their rocks in the center of the circle
   c. Have students close their eyes and mix up the rocks
   d. Have students open their eyes and calmly find their rock
   e. Have students sit back down in a circle and ask them to say their name and then how they knew it was their rock...did they remember the color? The size? The texture? Remind students that they are using their senses and observation skills to find their rock. This is what scientists do and they will be scientists throughout the rest of the day.
   f. Once the activity is over send students with appropriate educators to their first station

   **Students will be pre-split up into groups and this information will be on their name tags.**

Exploration

**Station 1: Microscopes**

**Materials:** microscopes, pencil, crayons, magnifying glasses, 2 tables (one table should be dedicated to a terrestrial habitat and one table should be dedicated to an aquatic habitat; have pictures with examples of what students might find on each e.g. a dragonfly nymph on the aquatic table), Trout Are Made of Trees book

**Time:** 40 minutes

1. Each student will have a microscope to use
2. Each student will have a journal, pencil, colored pencils and crayons
3. Students are asked to observe something they found on their hike or in the pond, or they can choose from pre-collected materials
4. Educators should walk around and help students use the microscopes, it is very important that students are able to see something under the microscope
5. Students will write or draw observations and record what they are seeing under the microscope in their journals (*I notice, I wonder, it reminds me of*). Make sure each student has recorded one observation from their microscope work in their journal
6. After students have observed their object, they will then choose if it belongs in a terrestrial habitat (on land) or aquatic habitat (in the water).
7. There will be two tables set up with pre-placed examples and decorations/food web examples. When students place their object down on the table, educators should speak to them about why they think it belongs there
Station 2: Pond Exploration
Time: 40 minutes
Materials: kick nets (2 extra in case they break or for educators to demonstrate), leaf packs (which should be placed in the pond at least 2 weeks in advance), white dishpans, small white containers (old yogurt cups work well), plastic spoons, macroinvertebrate guides, buckets, scissors, journals, pencils, large flipchart or white board and marker
1. Split students into 2 groups and switch after 20 minutes

Group 1:
1. Give each student a net and allow them to explore around the pond
2. Provide white dishpans and small white containers for students to put organisms they catch into for closer observation
3. Tell them to collect in their nets anything they are interested in
4. Collect leaf packs and put some material from the leaf pack into a dishpan labeled “Leaf Pack”.
5. Talk to them about macroinvertebrates, birds and other animals/plants they may come across
6. Encourage students to explore, play and ask questions
7. Tell students that what they collect they will be able to look at inside under microscopes
8. Record what students are finding in their nets vs in the leaf packs. Keep a running list of observations and collections on a large flipchart or white board.

Group 2:
1. Go on a short observation walk with students close to pond
2. Play I notice, I wonder, it reminds me of

On-site Activity (planned for 2020, subsequent years may require an alternative large group activity):
Tree planting (at least 3 educators)
Time: 1 ½ hours
Materials: trees to plant, shovels, rake, spade or sod cutter, garden hose or watering cans, gloves
Educators: Make sure to demonstrate planting trees
Discuss with students about the importance of trees in urban environments...shade, connection, happiness, health, biodiversity, important for life...etc.
Have fun and be enthusiastic!!

Explanation
Station 1: Microscopes
1. Discuss with students observations and help them formulate questions about what they are seeing. Talk about the objects they have brought to observe and why, what made that object interesting to them. Remind them that making observations and asking good questions is exactly what scientists do.
2. Explain that scientists use microscopes to correctly identify organisms and that many organisms have very small differences that can only be seen with a microscope. Besides
identification, why else would scientists use microscopes? (to study adaptations and understand how organisms survive e.g. looking at gills on a very small mayfly nymph.)

3. Once students place their object on the appropriate table (aquatic or terrestrial), ask them some questions about their object. Why does it belong on that table? What adaptations does it have? Is the object biotic or abiotic (living or non-living)? Ask them to think about how the object they have chosen fits into the food web. What does it eat? What eats it?

4. Allow 5 minutes at the end for students to share what they observed. What did they see under the microscope that they didn’t notice before?

Station 2: Pond Exploration
While students are exploring the pond and surrounding area encourage students to make close observations and ask good questions. See “Four Criteria for Good Questions” for guidelines on asking good questions in science.

Remind students that observations are things we notice with our senses (they are not opinions), saying that something is “gross” or “awesome” is not an observation, it's your opinion. Observations are descriptions, they aren’t an explanation. For example, if a leaf has holes, saying that “the leaf was eaten by a bug” is not an observation unless we actually see the bug eating the leaf.

Circle students up before its time to move on to share what they have found. Ask students if they saw a difference in what they found in their nets vs the leaf packs.

Extension
This field trip can be taught with multiple mini (approx.. 30 minute) in classroom lessons that teach about the following:
Extension 1. Macroinvertebrates and their life cycles
Extension 2. Microscopes
Extension 3. Macroinvertebrates and the food chain
Extension 4. Dissolved Oxygen and Temperature
Extension 5. Cooking Up A Pond

Evaluation
For an evaluation of the field trip material along with pre/post lesson material, see this bingo sheet for 2nd graders and this bingo sheet for 3rd graders. The sheets provide a pre-lesson bingo and a post-lesson bingo. Educators can also evaluate student progress by seeing what students have recorded in their journals and how well they are able to adapt to tree planting, using a microscope and using a kick-net.

This field trip also includes two post-lesson extensions that are based on storytelling and can be used as an evaluation of what students learned on the field trip and in the lessons:
For K-2: Extension 6: Storytelling Reflection and Evaluation (K-2)
For 3-5:  [Extension 7: Storytelling Reflection and Evaluation (3-5)]

**Resources**
1. For more background information please see this [link](#)
2. I notice, I wonder, it reminds me of
3. Four Criteria for Questions

**Standards**

**Science Learning Standards for Elementary School**

**P-2nd grade**

**P. Life Sciences:**
P-LS1-1. Observe familiar plants and animals (including humans) and describe what they need to survive.

**K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment:**
K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
K-ESS3-3. Communicate solutions that will reduce the impact of humans on living organisms and nonliving things in the local environment.

**2. Interdependent Relationships in Ecosystems**
2-LS4-1. Make Observations of plants and animals to compare the diversity of life in different habitats

**ELA:**
KW6, 1W6, 2W6. Develop questions and participate in shared research and explorations to answer questions and to build knowledge

**3-5th grade**

**3. Interdependent Relationships in Ecosystems:**
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

**3. Inheritance and Variation of Traits: Life Cycles and Traits**
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment

**4. Structure, Function and Information Processing**
4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction.

**5. Matter and Energy in Organisms and Ecosystems**
5-PS3-1. Use models to describe that energy in animals’ food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the Sun
5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

5-LS2-1. Develop a model to describe the movement of matter among plants (producers), animals (consumers), decomposers, and the environment

ELA:

3W6, 4W6, 5W6. Conduct research to answer questions, including self-generated questions, and to build knowledge through investigating multiple aspects of a topic