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School: Paul Robeson Academy  
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Target Grade: 7th Grade  

Duration: One day (plus a pre trip activity and a post trip assignment)  

Lesson Overview: They will participate in a field trip to the Belle Isle Nature Center. They will practice their observational skills by taking a nature walk around the Nature Center and recording what they see. They will use GPS units to find caches near the center. They will complete a frog survey and complete a stream investigation for macro invertebrates. Students will participate in a pre trip activity to make observations and gather information. They will also complete a post trip assignment to demonstrate their learned knowledge of the concepts presented.  

Student Learning Objectives:  
Students will be able to:  
- Conduct observation of the ecosystem around their school and at the Belle Isle Nature Center.  
- Compare and contrast longitude and latitude as they are used for measurement and direction.  
- Use GPS (global positioning satellite) equipment to find hidden caches using latitude and longitude data.  
- Monitor stream habitat by identifying and assessing macro invertebrate levels in a stream or pond.  

Grade Level Content Expectations Addressed:  
S.IP.07.11 Generate scientific questions based on observations, investigations, and research.  
S.IA.07.14 Draw conclusions from sets of data from multiple trials of a scientific investigation to draw conclusions.  
L.HE.07.21 Compare how characteristics of living things are passed on through generations, both asexually and sexually.  
E.ES.07.81 Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.  

ACTIVITIES  
Pre Trip: Walking field trip to local garden  
1) Students will observe the local wildlife, local flowers, trees and overall health of the ecosystem around their school area. They will record their observations in a nature journal, both in written and picture form. They will discuss whether the observations made were qualitative or
quantitative. They will also brainstorm about ways to quantitatively assess a local ecosystem. (This is introduction to the macro invertebrate investigation they will perform later.)

2) The teacher will introduce the concept of geocaching. The teacher will have a class discussion about lines of latitude and longitude using globes and maps in the classroom. The students will identify the lines (coordinates) of latitude and longitude for their school. They will then use a handheld GPS unit to find hidden caches around their school. The caches will be hidden the day before by the teacher.

Field Trip to Belle Isle Nature Center

1) **Nature Walk**
   Students will complete a nature walk in order to make observations of the local ecosystem and habitat of the local animals. They will record their observations and sketch what they see in a nature journal that they make out of recycled sheets of paper. The journals can be constructed upon arrival at the Nature Center.

2) **Geocaching**
   Students will use handheld GPS units to determine their starting point at the Nature Center and enter it as a waypoint. Then they will enter the first set of coordinates for the hidden cache into the unit. They will set the unit to direction mode in order to find the hidden cache. Once they find it, they will record their group’s names on the record in the cache and return it to the exact spot where they found it. Multiple teams can work on this simultaneously (limit 5 to a group) as there are multiple preexisting caches on the island. Students can also use this time while they are searching for the hidden caches to expand upon their earlier journal entries from their nature walk.

3) **Frog Survey**
   Students will listen to a set of audio tapes in the center first to introduce them to the wide variety of frogs that live on the island. They will then go outside and try to determine the location and number of frog calls they hear in a twenty minute period. Each group of five students will be given a section around the center to collect data from. Once the twenty minutes is over and the data has been collected, the students will compile their findings. They will then compare their notes with the data on file at the center taken earlier by the center’s staff. This data will give insights into the health of the habitat and the current size and variety of the frog population.

4) **Stream Monitoring**
   They will sample streams and ponds on Belle Isle. They will identify and catalog macro invertebrate levels using the “Stream Insects and Crustaceans” guide from *Save Our Streams*. This will enable the students to classify and count three groups of organisms they might find. They will use their data to determine the condition of the stream and ponds based upon how tolerant each group of macro invertebrates is to pollution and low dissolved oxygen levels.

Student Assessment:

**Formal**

**Pre trip Assessment:**
1) Journal and picture from nature walk will identify key components of their ecosystem and its overall health.
2) The students will correctly identify the lines (or coordinates) of latitude and longitude for their school.
**Post trip Assessment:** Students will complete an Exit Brief. An Exit Brief is a three page paper, in their own words, which reviews the concepts learned and any questions, observations or insights they have gained during the lessons. (This serves as Writing in Science activity which serves to strengthen the students’ ability to use data to form conclusions. Their reflections will include key concepts such as analyzing their observations from their local ecosystem, GPS systems, Geocaching, latitude, longitude, macro invertebrate organisms, how tolerant species can be used to gauge the health of a stream.

**Informal**

- Successfully finding caches both at school and at the Belle Isle Nature Center.
- Conduct a frog survey.
- Conducting a stream habitat evaluation through the collection of macro invertebrate samples.

**Special Comments or Tips:** The initial activity can be completed by visiting a local garden or by simply walking around the school

**Suggested Timeline for Field Trip**

8:00am   Depart for the Belle Isle Nature Center.
8:45am   Arrive at the Belle Isle Nature Center. Check in with Center staff and separate students into working groups of five.
9:00am   Create Nature Journals from recycled sheets or scraps of paper and decorate.
9:30am   Go on Nature Walk to make observations of local environment. Remind students to write and draw what they see.
10:15am  Conduct Frog Survey around the Nature Center. Each group will be assigned a 50 yard section to investigate.
10:45am  Share individual group results with the other groups. Draw conclusions about the size and variety of the frog population based on observations.
11:00-11:30pm Lunch
12:30pm  Teacher (or other leader) will review how to operate a handheld GPS unit. Each group of students will then be given a list of GPS coordinates to use to find their hidden caches. The group who finds the most caches in forty five minutes will receive a reward to be chosen by the teacher.
1:15pm   Meet at the Nature Center to pickup the needed equipment to perform the stream investigation. Three groups can be assigned to each sampling location with two adults present with each group for guidance and safety. This includes identification sheets, buckets, nets, waders, gloves, ice cube trays, magnifying glasses, tweezers, blanket or plastic tarp, clipboard, data record sheet, wax pencils.
2:00pm   Meet at the center to review what was collected and analyze results. Once the overall health of a particular site has been identified, compare and contrast the results for each of the sites in order to patterns.
2:30pm   Depart for school.