**5E Template- Science**

|  |  |
| --- | --- |
| **Name: Beth Gall** | **Date: 7/14/11** |
| **Content Area: Environmental Science or Earth Science** | **Grade Level(s): 9-11** | **Topic(s): School Yard Study** |

**Standards (SOL)**

**Note: Environmental Science SOLs are locally developed, not state standards.**

ENV. 3 – Students will investigate and understand how everything is connected in an ecosystem. Concepts include the connection between abiotic and biotic factors.

Or ES.1b

**CTA Session/ Resources –** Technology in Science Education – David Slykhuis

**Objectives (UKD’s)**

Students will plan and conduct an investigation that will correlate temperature, moisture and light to plant species growing in an area.

**Materials & Resources**

*A school yard plot or other suitable area accessible from your school, Vernier LabQuest equipment with probes for temperature, soil moisture and light sensor, plant identification keys….. trees, woodland plants, grasses, a meter stick*

**Safety Considerations**

*When students are working outside, close supervision of students is paramount. Be aware of any allergies to bees that students may have. Appropriate clothing is required.*

**Engage – Time Estimate – 5 minutes**

*Ask students to list and describe the environmental conditions that they require to be comfortable. They should mention a temperature range in which they are most comfortable, or perhaps whether they like lots of light or prefer a dark room. Do they like a humid place like the beach or a dry place.*

**Explore – Time Estimate – 90 minutes**

1. We will use a study plot that includes an open, grassy area, an intermittent stream area and a wooded area.
2. Students will work in groups of 3 or 4.
3. Students will chose 3 spots, one in the open area, one in the wet area and one in the woods, to measure temperature, light and soil moisture. Vernier probe ware will be used to take measurements.
4. Connect the light sensor and the temperature probe to LabQuest.
5. Measure the temperature 6” up from the ground.
6. Have one person cover the tip of the light sensor with her hand so that the ground-level light intensity will be zero. Wait approx.. 1 minute for the temp. and light readings to stabilize.
7. Record the temp. and light values in a data table.
8. Insert the soil moisture probe into the soil as far as the probe will go. Record the reading in the data table.
9. Repeat this procedure for the other locations.
10. At each location, students need to identify species of plants found in each area, and measure density of vegetation in a one meter square area around where previous measurements were taken.

**Explain -- Time Estimate – 45 minutes**

*This portion will likely take place the following day while back in the classroom.*

Vocabulary to introduce: biotic factors, abiotic factors

Collect data from each group. Create a master data table so each group can see all the results.

Ask students to begin to describe observations. Direct discussion with these questions:

1. Generally speaking, what trends did you see in temperature between the 3 locations?
2. What trends did you see in available light?
3. What trends did you see in soil moisture?
4. How did these abiotic factors impact the plant life found here?
5. What types of plants are adapted to lower levels of light?
6. What types of plants are adapted to high levels of light?
7. What types of plants are adapted to wetter areas?
8. What types of plants are adapted to drier areas?

**Extend -- Time Estimate –** could be multiple days if biomes are extensively studied.

*This activity can now relate to biomes and the types of plant and animal species found in each and how the abiotic factors impact these species.*

 **Evaluation--Time Estimate – 45 minutes**

*Students will create a pictograph to illustrate how temperature, moisture and light change from one location to another and illustrate plant varieties at each.*

**Plans for Diversity**  *Student(s): Category/Characteristics: Accommodations:*

Physically handicapped students will need assistance getting to the study plot. They may need partners who can acquire data in hard to access areas.

**Connections**

*The data collected in this activity can act as base line data. From here students can use the same study plot to design their own experiments, such as what animal life or insect life might be expected at each location.*