Home-Made Chiapets

Standards of Learning
Science: LS.4, LS.5, LS.6

Objective
The student will be able to:
- Learn what a plant needs to grow (light, water, gases, and nutrients)
- Distinguish between monocots and dicots
- Discuss energy than is transferred between sunlight and chlorophyll

Materials
- Wheat seeds
- Large pine cones
- Water
- Medicine dropper

Background Knowledge
Wheat is one of Virginia's top 20 commodities. Grown primarily in the piedmont region, this small grain is grown over 155,000 acres and yield cash receipts of 39.6 million dollars annually according to 2006 data. Wheat is a hardy crop and withstands winter temperatures. Generally it is planted in the fall following the harvest of corn and soybeans. Wheat grows throughout the winter especially as spring temperatures rise. As the plant matures the growth rate accelerates. Wheat can be used for fall or spring grazing, hay or silage. Wheat varieties range in height of maturity with the hay and silage varieties growing much taller for a greater yield. Wheat grown for grain should not be grazed. An acre of small-grain pasture can carry approximately 500 pounds of live weight per acre.

Watching the germination of a seed is interesting to observe, especially when it occurs on unusual surfaces. Grass germinating in the crack of a sidewalk and grains growing in the back of an empty wagon appear quite strange and fail to produce a full grown plant. The initial amount of growing medium, moisture, and warms are present facilitating germination. Prompt a question to your class about where seeds choose to germinate. Can a small seed such as wheat grow on a hard undesirable surface such as a pine cone? What might happen if germination occurs? This experiment leads students to hypothesize about plant growth, phototropism, and even erosion.

Procedure
1. Soak pine cone in water for 5 minutes.
2. Drop oat seeds in each rung of pine cone.
3. Set pine cone in a sunny window.
4. Water each seed daily with a medicine dropper. (Turn pine cone for a full pet, but if trying to show phototropism leave pine cone in one position)
5. Write down daily observations. (Especially note the root system)
6. Discussion questions:
   - How would this project work with other monocots?
   - Would this project work with a dicot plant? Why or why not?

- How would this help to solve the food crisis if growing space was the issue? What about seasonality?

Extension

Note: This whole process takes about two weeks. After two weeks the roots will then destroy the pine cone and you can lead the students to discover the strength of the roots. The plants will also start to die because of lack of nutrients and being root bound.

- Have the students give the pine cone liquid nutrients to see how long the oats will grow.
- Have a farmer come to the class to talk about farm life, and what they think happened inside the pine cone. (Tell the farmer ahead of time about the project)

References

http://www.ext.vt.edu/pubs/cses/424-006/424-006.html
http://www.deq.state.va.us/vanaturally/guide/agriculture.html
http://teacher.scholastic.com/dirt/erosion/whateros.htm

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