

## **Fast Plants Lesson Plan**

### **Desired Results:**

Students will create their own experiment and controls for this activity i.e. variation of light, water, fertilizer etc. As a result of this lesson, students will write qualitative observations of plant maturation, reproduction and explain how living systems interact with the biotic and abiotic environment.

### **Assessment Evidence:**

Students will keep a lab notebook of this experiment. In their notebook they will explain their experiment, state a hypothesis, record observations and data. At the end of this experiment students will present a scientific poster.

### **Agenda:**

#### **Day 1**

Introduce fast plants

Model lab notebook set-up

Students determine their controls/variables and set up experiment (teacher approval may be needed)

Plant plants and record hypothesis, materials, procedure, observation and data.

#### **Day 4-5 – Thin seedlings**

By now, seedlings should have pushed through the surface of the soil. Thin your seedlings.

#### **Days 5-14 – Maintain your plants and make observations**

By now, your plants should be growing well. Make sure the water reservoirs are full of nutrient rich water (especially before the weekend). Make sure the lights are 5-10 cm away from the plants (use books to prop them up). Make observations of your plants as they grow. Some traits that are easily measured:

Number of days to germinate

Ratio of seeds germinated to seeds planted

Plant height

Number of days to first leaf

Number of leaves

Number of hairs on leaf margins

Leaf color

Stem color

Number of days to first flower bud

Number of flower buds

Water usage

Number of seed pods

Pod length

Number of days to seed pod maturity (tips of pods will turn brown)

Total number of seeds collected per plant or per pod

### **Before day 14** – Make bee sticks

1. Distribute one dried bee and one toothpick to each student.
2. Set out glue.
3. Remove the head, legs, and abdomen of the bee, leaving only the round, fuzzy thorax region and the wings if you wish.
4. Put a drop of glue on the top of the toothpick. You do not need much glue.
5. Insert the glue covered tip into the thorax. You may wish to put the toothpick into one of the holes left when you removed the head or abdomen.
6. Set the bee stick aside for the glue to dry.

### **Day 14-20** – Fertilize flowers

By now, the flowers should have bloomed. Take the bee stick and rub it against the anthers of a blossomed flower. Move to the flowers of a different plant and rub against the pistil. Continue fertilizing until all the flowers in the classroom have been cross-fertilized

### **Day 21-40** – Collect seeds

10-20 days after the last fertilization, some of the pistils will have turned into long seed pods. When the tips of the pods turn from green to brown, the plants are ready to be dried. Remove the water from the bottom reservoir.

1. Let plants dry for 7 days. The pods should be brown and crispy.
2. Cut the stem of the plant below the bottommost pod and place the whole plant into a labeled paper bag.
3. Seal the bag with tape or staples then crush the plant inside, breaking up the pods thoroughly to release the seeds.
4. In a shallow tray, pour out the contents of the bag. Pick out the large pieces of stem, leaves and pods.

5. The smallest pieces of broken pod can be separated from the seeds by gently blowing across the surface of the tray. The pod pieces will blow away.
6. Seeds may be stored in a labeled paper envelope. To store seeds for a year or more, place the envelope in a ziplock bag with silica gel (one of those packets often found with dried foods to absorb moisture).

### **Standards addressed:**

#### **National Science Standards**

Conservation of Energy

Interactions of Energy and Matter

Biological Evolution Interdependence of organisms

Matter, Energy and Organization in Living Systems

#### **Colorado Science Standards**

Standard 2

- Analyze how various organisms grow, develop and differentiate during their lifetimes based on an interplay between genetics and their environment.
- Analyze the relationship between structure and function in living systems at a variety of organizational levels and recognize living systems' dependence on natural selection.
- Explain and illustrate how living systems interact with the biotic and abiotic environment.