

## **Schoolyard Investigation plan for Heritage Elementary, Macon, GA**

**Title:** Worm Watchers: Growing Seeds

**Grade:** 1-5

**Activity Duration:** 1 hour

**Growing time:** 1-2 weeks



### **Lesson Goals:**

- Learn how to harvest worm castings (compost) and use it to amend potting soil
- Follow a set of written instructions for a scientific investigation to test the effects of compost on plant growth and health
- Reflect on how they can help conserve natural resources by practicing the 4Rs, particularly composting, at home, at school, and in everyday life

The students will perform experiments using worm castings collected from the classroom bin and from an outdoor compost pile. Students will draw their own conclusions and record data in a log book.

### **Georgia Performance Standards covered in this investigation:**

First Grade: S1CS1, S1CS3, S1CS5, S1CS6, S1CS7

Second Grade: S2CS1, S2CS3, S2CS5b, S2CS6, S2CS7

Third Grade: S3CS1, S3CS3, S3CS5, S3CS7, S3CS8, S3L2b2

Fourth Grade: S4CS1, S4CS3, S4CS4, S4CS5, S4CS7, S4CS8

Fifth Grade: S5CS1, S5CS3, S5CS5, S5CS6, S5CS7

### **Materials:**

**2-606 Recycled flat of flower pots or 72 small plastic pots**

**1 box of plastic wrap (clear)**

**Spray Bottle**

**Clear tape or rubber bands**

**Large sink (big enough to place flat on bottom)**

**Warm water from tap**

**Worm Castings from vermicomposting bin**

**Composted soil from garden or compost pile**

**2-4 Packs of the same seed**

## **II. Engaging the Students, “The Hook” (1 hour)**

The instructor will lead the students to an outdoor classroom with picnic table.

Ask the following questions:

1. What is needed to grow a seed?
2. What are some different types of soil?
3. What are the components of soil?

**Comparative question:**

1. Will a flower or vegetable seed grow and flower better in worm castings from a vermicomposting bin or from composted garden soil?

**Hypothesis:** Pure castings from a vermicomposting bin will grow healthier plants than soil from an outdoor compost pile.

**III. Experiment Design (1 hour)**

Plant seeds in the two different mediums:

**Put composted garden soil in one flat and worm castings in the other flat or pots**

Fill the flat of cell packs with soil. Fill them to within a quarter to half inch of the rim, rapping the container on the table to settle the soil. It should be firmly in place but do not pack it down.

**Moisten the soil**

Fill the sink about 1" deep with warm water. Gently place the filled soil flats, one at a time, into the water. Allow the soil to soak up the warm water from the bottom.

**How Deep to Plant Seeds**

Plant your seeds. Plant shallow, do not shove them down deep. Tiny seeds can be sprinkled on the surface.

**Water Newly Planted Seeds Once**

Use the spray bottle to spritz the soil surface with water. Dampen it enough to settle the soil firmly over the seeds, but do not saturate it. The soil should be damp like a wrung out sponge, not sopping wet.

**Plastic Wrap Keeps Soil Moist**

Cover your pots or cell pack with plastic wrap. Fold it loosely down all around or secure it over the top with a rubber band. This will keep the soil evenly moist while the seeds germinate. Once the seeds begin to sprout, immediately remove the plastic wrap. Do not water the seeds unless the soil begins to dry out.

**Temperature for Starting Seeds**

Place the plastic covered seeds in a bright location but out of direct sun. A 70 to 75 degree room is a good temperature for starting most seeds. If your room is cooler, place the seeds up high near the ceiling where warm air rises – on top of the refrigerator or on a high shelf. Do not place your seeds above a fireplace or radiator as that will be too hot.

**When the Seeds Come Up**

Check every day for germination. When they start to come up or sprout, remove the plastic, move into very bright direct light or under fluorescent light and water as needed to keep the soil slightly damp.

## **Conclusion**

**Predictions:** If the same seeds are planted in pure castings from a vermicomposting bin and in soil from an outdoor compost pile, then the plants will grow and bloom better in the castings.

## **Analysis and Communication**

1. At the conclusion of this investigation, after two weeks each class will share their findings.
2. Record all of the data from each group on the board.
3. Discuss the results as a class. Answer questions.
4. Write a conclusion as a class.
5. Take notes of any other ideas for investigations with worms.

## **Bibliography:**

1. Earthworms by John Mertus, 1993
2. National Agricultural Library document, NRI Competitive grant program 950.2870
3. Using Manure as a Nitrogen Fertilizer, J.Gerwing & R.Gelderman, 8/97, South Dakota State University
4. Earthworm Castings as Plant Growing Media, R.Sherman, 6/97, North Carolina State University
5. National Agricultural Library document # S592.7.A1S6, T.B. Parkin & E.C. Berry
6. Suppressive effects of a commercial earthworm compost on some root infecting pathogens of cabbage & tomato, M. Szczech, Biological Agriculture & Horticulture, 1993, v10 (1)

## **Other Resources:**

1. Earthworm Enemies - <http://www2.ag.ohio-state.edu/~ohioline/hyg-fact/2000/2134.html>
2. Composting with Redworms - <http://whatcom.wsu.edu/ag/compost/Redwormsedit.htm>
3. Build a Worm Compost Bin - <http://www.whatcom.wsu.edu/ag/compost/wormbins.htm>
4. Harvesting Your Wormbin - <http://whatcom.wsu.edu/ag/compost/Wormsdivide.pdf>
5. U.C. Davis Earthworm Information Page - <http://www.sarep.ucdavis.edu/worms/>