

# INTERMEDIATE SCIENTIFIC INVESTIGATION PLANNING TEMPLATE

Our **question** is: **Which soil produces the healthiest plant?**

Our **prediction** is: **The plant that is grown in the soil with the highest and most complete presence of nitrogen, phosphorus, and potassium in it.**

The **materials** we will use are  
(include measuring tool):

- 3 or 4 different soils (can use sandy, clay-y, wood chip-y, compost)
- water
- pots
- seeds (all of the same variety)
- measuring tape

The **variable** we are **changing** is:  
**The type of soil**

The **measured** (responding)  
**variable** is:  
**The condition of the plants grown in different soils.**

These are the **controlled variables** (things kept the same):

- **water plants are given**
- **same kind of plant (do this to all lettuce, for example)**
- **sunlight**
- **location in classroom**

The step-by-step **procedure** is:

1. **Split class into groups. Have each group get pots filled with the different soils. Have them describe the differences in the soil as well as the similarities. Talk about the importance of soil in providing, water, minerals, and anchorage for the roots.**
2. **Next have the class decide what factors they will look for to determine plant health. Will they measure height? Take note of color? Size?**
3. **Have them make predictions of which soil will grow the strongest plant.**
4. **Over the course of a few weeks have the students make observations of their plants. Have them give the same amount of water to each pot each day (decide based on your room conditions an appropriate amount).**
5. **Once plants have been growing for a month, make final measurements and observations and determine which soil grew the healthiest plant.**
6. **Wrap-up with a conversation about soil nutrients and the nutrient needs of plants.**



Grade(s) : 3

Subject Area: Science

**Soil Composition Experiment** (adapted from Healthy Foods from Healthy Soils Lesson Book by Elizabeth Patten and Kathy Lyons)

EALR/Standard:

2-3 Inquiry A-D

2-3 Life Science 2B

2-3 Physical Science 2A

2-3: Application A-E

**Activity: What effect does different soil compositions have on plant development? Use this lesson to discuss what elements plants need to be healthy and how some plants like more of certain elements than others.**

Lesson created by Robin Lewis, Environmental Studies Intern, Whitman College Spring 2010

**Goals:**

- Students come to understand that not all soils are the same and this means different things for different plants.
- Carefully and accurately complete the experiment.

**Brief description:**

Students grow a fast-growing seedling in different soils (sandy, clay-y, compost, etc) and observe which one the seeds grow best in. This experiment is used to discuss what plants need from soil in order to be healthy, how different plants might require more or less of these elements, and to determine which soil is the best for the plant that we chose to grow.

## **Materials**

Students need an Investigation Planning Template and 3 or 4 different soils. Getting sand from the playground, dirt from outside, compost, and perhaps store-bought peat would be good options, but any will work.

## **Procedure**

(See above in worksheet)

## **Additional Activity**

This experiment will close with a discussion of basic plant fertility needs. After students identify the 'best' soil, help them understand why this is so by explaining the nutrient needs of plant (much like how we need nutrients, so do plants). Talk about this generally and then very briefly, if the class seems to be understanding this, bring up how different plants like more or less of certain nutrients (corn likes more nitrogen, for example).

New vocabulary

\_\_\_ fertility \_\_\_ nitrogen \_\_\_ phosphorous \_\_\_ potassium \_\_\_

Work cited/adapted

Healthy Foods from Healthy Soils by Elizabeth Patten and Kathy Lyons