**NGSS Lesson Planning Template**

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| **Grade:** Fifth | **Topic:** Gardens | **Lesson (number/title): 2**  “Seed to Earth, Seed to Earth, Do You Read Me? |
| **Brief Lesson Description: *Introduction/Foundational Lesson***  Students plant seeds in five different types of soil and measure the rates of germination and growth | | |
| **Performance Expectation(s):**  **5.LS1.1 Support an argument that plants get the materials they need for growth chiefly from air and water.**  “plants are in the soil and they just need that …but they get most of their nutrients from air and water”  They need to understand that it is really coming from air and water, this is what differentiates it from the primary expectation. | | |
| **Specific Learning Outcomes:**   * Students will compare and contrast the different kinds of soil and the rate of growth that occurs when a student plants a vegetable * Students will use the steps to the scientific method to conduct the experiment on planting vegetables into different types of soil. * Apply the steps to the scientific method process | | |
| **Narrative / Background Information** | | |
| **Prior Student Knowledge:**  Students will understand different types of soil by reading an article and watching a couple of short videos that identify the different types. | | |
| **Science & Engineering Practices:**  Support an argument with evidence, data, or a model | **Disciplinary Core Ideas:**  Plants acquire their material for growth chiefly from air and water | **Crosscutting Concepts:**  Matter is transported into, out of, and within systems |
| **Possible Preconceptions/Misconceptions**  Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion. Plants acquire material for growth chiefly from air, water and they process matter and obtain energy from sunlight, which is used to maintain conditions necessary for survival. | | |
| **LESSON PLAN – 5-E Model** | | |
| **ENGAGE: Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions**  **(5 to 10 minutes)**   * What is dirt? Soil? What are some of the different kinds of soil? Would different kinds of soil affect the growth of a plant? How is water absorbed ? How much usable soil do we really have on earth? Hand out a sheet of white paper to each person. Have them fold the paper into five sections. They will be using this to predict and take notes as they learn. * The video link is four minutes. It will begin to talk about three of the five soils that the students will investigate.   [**https://www.youtube.com/watch?v=uS7zfeK4OTQ**](https://www.youtube.com/watch?v=uS7zfeK4OTQ) **(4 minutes)**  **( 2 minute)** [**https://www.youtube.com/watch?v=\_Vho8o\_ObrQ**](https://www.youtube.com/watch?v=_Vho8o_ObrQ) | | |
| **EXPLORE: Lesson Description – Materials Needed / Probing or Clarifying Questions (10 minutes)**   * Now get with a partner and read the article on this link that talks about the five different kinds of soil**.** [**http://agverra.com/blog/soil-types/**](http://agverra.com/blog/soil-types/) * Now label each section of the white paper with the different kinds of soil that is identified in the article above. * Individually pick what type of soil to experiment and study. This can be done by listing on the board or teachers can have 5 large sheets of white paper with the name of the different kinds of soil at the top. Then students will walk to each sheet and write one fact they learned about that particular kind of soil. Then after gathering all of the data, they will write down their choice on a sheet and groups will be picked. * Share a data recording method with the students. Link with a variety of chart and graphing for plant growth <http://www.enchantedlearning.com/graphicorganizers/plantgrowth/> * Share with the students that after planting they are to keep their plant in the sunlight and in the same location during the experiment, and water the same amount as everyone else in the room. This should be pre-determined as a class. The measuring instrument (inches/centimeters) should be the same as well. Stress as a teacher that the only variable that will be changed is the soil. This will allow the data to be valid. This experiment can take up to 3 to 5 weeks as germination happens. | | |
| **EXPLAIN: Concepts Explained and Vocabulary Defined**   * Get students into groups. Each group will discuss the characteristics of their soil. Each group member will have a job. The secretary will begin writing down the steps to the scientific method. The encourager will ask the group the questions. He or she will ask the group first to predict what will happen with their soil and will keep the group on task by continuing to focus on the steps to the scientific method. The gatherer will go and retrieve the supplies from the teacher. The leader will continue to ask questions of the group and will be the person to ask the teacher questions for the group. The leader will also organize the presentation. * At the end of day 1 students need to decide who is bringing in the soil sample that matches what they are studying. Students can bring it in any type of closed container.   Day 2  This part can be done in large group or possibly small group as an independent activity during guided or blended type activities   * Groups will review the task of planting. An area in the classroom should be prepared for students to get their supplies (ruler, graphing paper, water instrument (eye dropper) , seeds, cup or container for plant, label for the cup and student’s names and a pre-determined area for the plant to be grown . * Students will plant the vegetable based upon either the teacher explanation or they can watch the short video explaining how to plant. * If time permits they can plant one plant outside and one plant inside to further their discussion. This can be an extension if the season allows. * The following video can be put in a station or added to a blended site so students can visually see how to plant tomato seeds. * <https://www.youtube.com/watch?v=I71YZkm34lE> | | |
| **ELABORATE: Applications and Extensions**   * This link is much longer but it gives students a chance to explore soil samples and what the future may hold for soil and farming. Students can take this information and research the amount of fertile soil we actually have on Earth. Students can also discover the different soil profiles. They can research how the Dust Bowl happened based upon the overuse and misunderstanding of soil and farming. They can begin to design future farming examples. * <https://www.youtube.com/watch?v=Ego6LI-IjbY> this video is 30 minute in link. This might be a nice connection during Blended to extend the lesson. | | |
| **EVALUATE:**  **Formative Monitoring (Questioning / Discussion):**   * Collect groups scientific method sheet * Collect each 5 section soil characteristic page   **Summative Assessment (Quiz / Project / Report):**   * After 3 to 5 weeks for growth, students will write a paragraph describing the hypothesis, experiment, and the results. | | |
| **Elaborate Further / Reflect:**  Hopefully take the cups with the tomatoes outside to the raised bed or garden area at your school to plant the tomatoes | | |

**Materials Required for This Lesson/Activity**

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| **Quantity** | **Description** | **Potential Supplier (item #)** | **Estimated Price** |
| **5 to 7** | **Container for plants** | **Nursery here in town** | **Recycled** |
| **Packets** | **Packets of Tomato Seeds** | **Garden Science Kit** | **$3.00** |
| **10-15** | **Eyedroppers for Watering** | **Garden Science Kit** |  |
| **10 - 15** | **Rulers or Measuring Tool** | **Classroom Supplies** | **0** |
| **10 -20** | **Graphs Printed from Link** | **Copy Machine** | **0** |