

**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Grade 1 and Grade 3 Science:**

**The Characteristics, Growth and Changes in Plants**

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| **BIG IDEAS:**Plants have distinct characteristics.Living things have basic needs (air, water, food, and shelter) that are met from the environment.**Science and Technology Curriculum Strands -****Grade 1 - UNDERSTANDING LIFE SYSTEMS - NEEDS AND CHARACTERISTICS OF LIVING THINGS****Grade 3 - UNDERSTANDING LIFE SYSTEMS - Growth and Changes in Plants** **Science and Technology Overall Curriculum Expectations:****Grade One****Investigate needs and characteristics of plants;****Demonstrate an understanding of the basic needs and characteristics of plants .****Grade Three****Investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow;** **Demonstrate an understanding that plants grow and change and have distinct characteristics.** **Science and Technology Specific Curriculum Expectations:****Grade One****2.1** follow established safety procedures and humane practices during science and technology investigations**2.4** investigate the physical characteristics of plants ***(e.g., basic parts, size, shape, colour)*** and explain how they help the plant meet its basic needs**2.6** use appropriate science and technology vocabulary, including ***investigation, explore, needs, space,*** and ***food***, in oral and written communication**Grade Three****2.1** follow established safety procedures during science and technology investigations**2.2** observe and compare the parts of a variety of Plants**2.3** germinate seeds and record similarities and differences as seedlings develop**2.5** use scientific inquiry/experimentation skills (see page 12), and knowledge acquired from previous investigations, to investigate a variety of ways in which plants meet their basic Needs **2.6** use appropriate science and technology vocabulary, including ***stem***, ***leaf***, ***root***, ***pistil***, ***stamen***, ***flower***, ***adaptation***, and ***germination***, in oral and written communication**3.1** describe the basic needs of plants, including air, water, light, warmth, and space |
| **Learning Goals:**“We are learning to observe and understand the growth of plants. Look more closely at the different parts of the plants and the changes in the plants over time. We are also learning how changes in environmental conditions affects the growth of plants” | **Success Criteria:** “We will be successful when we can observe, measure and document the changes in our plant over time and be able to explain the factors affecting the growth of the plants”Create a stop motion video of the changes in the growth of the plant over time. |
| **Lesson Overview:****This lesson focuses on the basic needs and characteristics of plants. Students will demonstrate an awareness that plants depend on their environment to meet their needs. They will be able to describe the changes over time of plant growth**Students will create simple plant terrariums using CD cases. Different types of plant seeds will be used to understand that all plants undergo the same life cycle, specific environmental conditions are needed for growth, and they can observe and document their growth over time. |
| **Materials and Technology:** CD cases for each studentDifferent kinds of seeds: bean, sunflower, other vegetable and flower seedsPotting soilwatereye dropperStop Motion apps or software-digital microscope (rainbow easi microscope)rulerJournal or booklet for recording observation of the growth of the plantipad(Instead of CD cases, use clear plastic cups, wet paper towel put into cup. Insert several seeds around the cup and keep paper towel moist) |
| **Student Accommodations/Modifications:** --partners-google read/ write app-provide additional time | **Lesson will be differentiated by:*** **Content, specifically:** Resource person will scribe for student to complete growth chart
* **Process, specifically:** detailed explanation and support in creating terrarium
* **Environment, specifically:** quiet working space
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| **MINDS ON: Getting Started** |
| During this phase, the teacher may: • activate students’ prior knowledge; • engage students by posing thought-provoking questions; • gather diagnostic and/or formative assessment data through observation and questioning; • discuss and clarify the task(s).  | During this phase, students may: • participate in discussions; • propose strategies; • question the teacher and their classmates; • make connections to and reflect on prior learning.  |
| Describe how you will introduce the learning activity to your students. What key questions will you ask? How will you gather diagnostic or formative data about the students’ current levels of understanding? How will students be grouped? How will materials be distributed? **Minds On:****Science****Have several live plants available for the students to examine. See if students can identify the plants and name the parts and describe their characteristics.****Questions: How are these plants the same? Different? How do you know they are alive? What do plants need to live? How do plants get food and water. If we were to grow plants in our classroom, what do we have to make sure they get to grow?****Record the students’ ideas on a KWL chart.****Read a picture book about growing flowers or plants such as:****“One Bean” by Anne Rockwell****“Bean” Life Cycles Series by David M. Schwartz****“The Tiny Seed” by Eric Carle****see other books listed in amazon.ca:**[**https://www.amazon.com/Best-Sellers-Books-Childrens-Flower-Plant/zgbs/books/3267**](https://www.amazon.com/Best-Sellers-Books-Childrens-Flower-Plant/zgbs/books/3267)**Videos - Brainpop Jr.****Parts of a Plant, Plant Life Cycle, Plant adaptations****Have the students add more information to the KWL chart****What is a Terrarium? Discuss**[**https://climatekids.nasa.gov/mini-garden/**](https://climatekids.nasa.gov/mini-garden/)[**https://www.kidsgardening.org/garden-activities-building-a-terrarium/**](https://www.kidsgardening.org/garden-activities-building-a-terrarium/)[**http://kids.nationalgeographic.com/kids/activities/crafts/miniature-garden/**](http://kids.nationalgeographic.com/kids/activities/crafts/miniature-garden/)**The teacher will need to prepare some kind of record keeping journal or booklet for recording their observations for pictures and descriptions of the growth of their seeds.****Some resources for plant journals are:****Hands on Science and technology Grades 1 and 3, Portage and Main Press**[**http://worldforlearning.com/wp-content/uploads/2014/06/WFL\_SwissFamilyRobinson\_FREEBIE\_PlantJournal.pdf**](http://worldforlearning.com/wp-content/uploads/2014/06/WFL_SwissFamilyRobinson_FREEBIE_PlantJournal.pdf)[**https://drive.google.com/file/d/0B-cVjZBMBNNXWFNQMXhNV2RWY0U/view**](https://drive.google.com/file/d/0B-cVjZBMBNNXWFNQMXhNV2RWY0U/view)**Music/Poetry****Sing songs and read poetry about seeds:**[**http://www.canteach.ca/elementary/songspoems22.html**](http://www.canteach.ca/elementary/songspoems22.html)**Math****Bring in different kinds of seeds (Lima beans, black beans, navy beans, kidney beans. Students are given a handful of each kind of bean. Have the students sort the bean, count how many of each,colour, size, and graph their beans on a bar graph.****Categorize - Split the class into groups of four. Give each group a large number of seeds and ask them to draw two circles on a piece of paper. Organize the seeds into two distinctive groups (i.e. smooth/bumpy, Long/round, fruits/vegetables. Have each group share their categorization technique. Do a Venn Diagram. How are seeds different? How are seeds the same?****Art** **Create mosaic seed pictures****http://www.visuallearningsys.com/guides/High\_School/Investigating\_Plant\_Structure\_and\_Function\_Guide.pdf** |
| **ACTION: Working on it** |
| During this phase, the teacher may: • ask probing questions; • clarify misconceptions, as needed, by redirecting students through questioning; • answer students’ questions (but avoid providing a solution to the problem); • observe and assess; • encourage students to represent their thinking concretely and/or pictorially; • encourage students to clarify ideas and to pose questions to other students. | During this phase, students may: • represent their thinking (using numbers, pictures, words, manipulatives, actions, etc.); • participate actively in whole group, small group, or independent settings; • explain their thinking to the teacher and their classmates; • explore and develop strategies and concepts.  |
| Describe the task(s) in which your students will be engaged. What misconceptions or difficulties do you think they might experience? How will they demonstrate their understanding of the concept? How will you gather your assessment data (e.g., checklist, anecdotal records)? What extension activities will you provide? Discuss with the students that they will be growing their own plants in the classroom. They will be given several seeds.Create a potting station where students have access to seeds, potting soil, eye droppers and water.1. Give each student a clear CD case
2. Tape the side that opens of the CD, the hinged side should be at the top. This way the CD cas can stand up. and dirt won’t fall out. The CD case can be opened at the hinges for watering.
3. Add a small amount of potting soil - up ⅓ - ½ the CD case
4. Plant seed high in the soil so the roots have room to grow. Tape the bottom. Put names on the cases with permanent marker on the top.
5. Open CD case from hinge and water using a eyedropper until soil is moistened.
6. Place in a window or area that receives natural light.
7. Also place one bean in a dark area. Continue to water so students can see what happens to a seed and plant when it does not receive sunlight. Have another case that does not receive water. Investigate to see what happens when plants are deprived of their basic needs.
8. Some seeds will start to crack and show the first tap root within 24-48 hours after the germination process. Some seeds may take up to 7 days or more to germinate.
9. Once the bean shows its first tap root, students can start recording the changes taking place in their plant on a daily basis or several times during the day. Measure various components of the plant, roots, stem, leaves, root hairs.
10. Students can use a digital microscope (rainbow easi microscope) to observe minute changes in growth or patterns on the plant and record them.
11. Students should also take pictures using an ipad of their plant on a daily basis. Please remind them they need to take the picture in the same place every time. Students can use the pictures to make a stop motion video of their plants growth. Students can also take pictures of their views under the digital microscope to see the changes over time. Stop motion or time lapse photography shows the story of growth overtime not readily seen in real time. It allows the students to watch the whole process of growth in a short period of time.

**Great ipad apps for creating stop motion videos**[**http://www.educatorstechnology.com/2013/03/8-great-ipad-apps-for-creating-stop.html**](http://www.educatorstechnology.com/2013/03/8-great-ipad-apps-for-creating-stop.html)**stop motion recorder, Animation creator HD, Flipbook, flipagram, imovie, My Stop Action, Smoovie, Draw and Show, Animation Creator, or Windows Movie Maker. You might want to take several pictures over the day to record small differences in growth.** |
| **CONSOLIDATION: Reflecting and Connecting** |
| During this phase, the teacher may: • bring students back together to share and analyse strategies; • encourage students to explain a variety of learning strategies; • ask students to defend their procedures and justify their answers; • clarify misunderstandings; • relate strategies and solutions to similar types of problems in order to help students generalize concepts; • summarize the discussion and emphasize key points or concepts.  | During this phase, students may: • share their findings; • use a variety of concrete, pictorial, and numerical representations to demonstrate their understandings; • justify and explain their thinking; • reflect on their learning. |
| How will you select the individual students or groups of students who are to share their work with the class (i.e., to demonstrate a variety of strategies, to show different types of representations, to illustrate a key concept)? What key questions will you ask during the debriefing? Students will be able to demonstrates their learning through:1. Completion of journal or plant booklet showing the changes in the plant over time and appropriately labelled.
2. Anecdotal records and responses to interview questions.
3. Show timelapse or stop motion video. Video may be assessed using a rubric or checklist.

Describe in your own words how a plant grows. Did you meet the needs of your plant. Do all plants grow the same way ( research strange plants and plants/fruits/vegetables that grow in strange ways.) What are the differences and similarities of growing plants in different areas, with or without sun, water or soil.Watching your stop motion video, do all parts of the plant grow at the same rate. What parts of the plant grow fast, slow, etc. |