Life Cycle of Plants

Grade Level: 1-4 Subject: Science

Topic: Plants

Goals and Objectives:

The goal for this unit is to provide an environment for the students that will allow them to learn and explore about the life cycle of plants, and to continue to foster a love of learning in the students. They will begin with the germination phase, then move onto plant parts and photosynthesis, and end with decomposition. An alternate ending or addition lesson could be taught about seed dispersal, but that is not included in this unit. Pollination would be another option for the unit as well.

The students will strengthen their inquiry and observation skills through the activities provided.

The teacher will access their prior knowledge through questions, such as, “What do you think is happening?” and “Can you tell me what you know about this?”

You could assess the students throughout and/or at the end.

Rationale:

Students learn best by doing, so hands on learning experiences are at the heart of each lesson. When students are engaged in figuring things out for themselves instead of being spoon fed information, they will retain information better and develop a love of learning that will last a lifetime.

The teacher “should not rest satisfied with the presentation of any subject until the student understands the principle involved, perceives its truth, and is able to state clearly what he has learned.” ~Education pg. 234

Note:

The words in italics are a sample script, but please adapt this to your needs, your personality, your students’ needs, etc. Samples of an assessment have also been given; but again, please adapt it as you see fit. There are many more resources out there on this topic, particularly online. Environmental programs are also a good resource. This unit would also be a good introduction to starting a school garden, which is a great learning tool. School gardens are a part of the NAD initiative Adventists InStep for Life (www.AdventistsInStepforLife.org). There are many ways to tie this unit in with the Bible, and some suggestions have been given throughout.
Lesson Title: Germination and the Life Cycle of Plants

Lesson Target:
Students are expected to describe the life cycle of a common type of plant (e.g., the growth of a fast-growing plant from seed to sprout, to adult, to fruits, flowers, and seeds).

Grouping students for Instruction:
Groups of 4-5 Students

Learning Experiences:
Engage: Show a video of time-lapse seed germination. A good example of one: http://www.youtube.com/watch?v=G2RuVxdr0mA

Plants are essential to our life here on earth. Almost every plant begins with a seed. We are going to plant some seeds today, and over time, we will watch them grow. There are four things that almost all plants need. Do you know what they are? Plants need water, sun, soil, and air.

Explore: Split the class into small groups. At each group/station, there should be the materials for planting the seeds. It may be a little messy, particularly if the students are younger, so you may want to spread newspaper under the workstation. Little Dixie type cups are great for this. The students should fill their cup with dirt; plant the seed according to the package directions, and then water. Find a sunny spot to put the cup in, and that part is completed. That is option 1.

Option 2 involves introducing the concept of a control and variable to your students. If you are going to do that, then you should explain what a control and variable is before you begin the planting. The students can then choose one variable for their seed, such as putting it in a dark place, instead of giving it light. They can then plant a control seed, which gets all the necessary components (adequate water, sun, and soil). You may want to plant a control as well.

Explain: We are going to observe the growth of our plants over a period of time. To record our observations, we are going to make a chart. (See note about younger students.) Then, explain how you want them to make and fill out the chart. If you are doing Option 2, then they will need to observe both the control and the variable. You may also want to explain that they should water the plant the same amount each day. They can measure the water, or a line drawn on a clear plastic cup works well, too. Below is a sample of what a chart might look like:
**Sample chart**

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Today I planted the seed. Now, it looks like there is just dirt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 2</td>
<td>I watered the plant today. Still looks like dirt.</td>
</tr>
<tr>
<td>...Day 7</td>
<td>The seed is beginning to sprout! It looks like it is pushing the dirt up.</td>
</tr>
</tbody>
</table>

Expand and Evaluate: Share in your group what you think will happen with your plant(s).

**Instructional materials, Resources, and technologies:**

- Cups
- Seeds- Bean seeds work particularly well
- Dirt
- Computer (for viewing the time lapse video)
- Plant part worksheet with fill in the blanks
- Coloring materials
- Paper to make a chart with

**Additional thoughts:**

Small schools may not need to break up into groups- just share as a class, or with a partner.

There are many quality books about seed germination that could be used at the beginning or end of the lesson to bring a literary link into science, and provide additional information to the students.

For younger students, it may be best to make the observation chart for them, so they can focus filling it out. You can also encourage them to draw pictures of their observations instead or, or in addition to, writing observations.

The parable of the sower and the creation account would work well with this lesson.
Lesson Title: Plant Parts

Learning Target: Students are expected to identify the parts of plants.

Grouping students for Instruction:
No Groups, Direct Instruction

Learning Experiences:

Pre-Lesson

*Please take a few minutes to check on your seeds and write down your observations for the day on your sheet. While they do that, you will need to draw or put up a drawing of a flower/plant on the board.*

Lesson:

Engage: *Today we will continue our exploration of plants. We are going to talk about the different parts of plants. To begin, I am going to read this book, entitled: *Watch it Grow: Bean* by Barrie Watts. Read book. As we saw in the book, plants have many different parts. Can you name them? (Refer to drawing of a flower on the board, and label as students answer). Good!*

Explore: *Which part of the plant is edible? Wait for responses. It depends on the plant! We are going to look at some vegetables that include different parts of plants. Students will name which part of the plant that we traditionally eat.*

Ingredients:

Celery-stem
Bok Choy- leaf
Pumpkin Seed- Seed
Carrot- root
Tomato- fruit
Avocado-fruit
Radish-root
Rhubarb- stem

There are a lot more options to pick from- the above is just what I had available. If you can, try to pick seasonal fruits and vegetables. Also, many flowers (such as broccoli) are edible (as long as they were grown organically) and taste good in
salad, so you may want to find an edible flower to include. Some nuts are actually fruits, some are seeds, some are legumes, so those could be interesting to include.

Explain: Almost all plants have these parts to them- that is what makes them a plant! We have parts, too, but they are different, which is why we are not a plant. However, sometimes we only eat one part of the plant. There are some plants that we can eat more than one part- can you think of any? (Beets are one example).

Expand: Students can color a worksheet of a plant (there are many options online) and label the specific parts. You could also go into more parts such as the parts of the flower.

End: Students can try the different plants that you went over earlier.

Instructional materials, Resources, and technologies:

Vegetables listed above (or the ones you choose to use)

Coloring page (example found at: http://www.learningtreasures.com/science/plants(parts_of_a_plant.pdf) for each student- you could also find another, make your own, or have the students make their own.

Coloring materials for each student

Whiteboard and markers

Book: Watch It Grow: Bean by Barrie Watts. Published in United States by Smart Apple Media in 2005.

Additional Notes:

You may want to consider bringing in a whole plant, such as a tomato plant with a tomato on it, so students could see more clearly that the tomato is the fruit of the plant, and what the rest of a tomato (or other kind of plant) plant looks like. Food is also a great cultural study. You could talk about the cultures that use certain plants more, or where the plants originated from, geographically. For instance, I had one student who is originally from China, and she was the only student who knew what bok choy was. She then got to share how she eats it at home.
Grade Level: 1-4  
Subject: Science

Lesson Title: Photosynthesis

Learning Targets: Students are expected to define photosynthesis and name the components of photosynthesis (chlorophyll, sun, CO₂)

Grouping students for Instruction:
No Groups, Direct Instruction

Learning Experiences:

Pre-Lesson

*Please take a few minutes to check on your seeds and write down your observations for the day on your sheet.*

Lesson

Engage: Can anyone tell me what we talked about last science class? Wait for responses. Yes, good, we talked about the different parts of plants and what parts are edible. Today we are going to cover two more things about plants- their life cycle and how they make food. To begin, we will watch a short video about the life cycle of wheat. They life cycle of a plant is what happens from when it is a seed to when it makes seed. In other words, from when is begins to grow until it dies. Let’s watch the video and then we will talk about it. Watch Little Red Hen video or read the book. Can someone raise their hand and tell me what the life cycle of wheat is? Wait for responses. Right, it starts as a seed, grows until it produces a head of grain, and then it is harvested. We can then use to make things with. We make flour and flour products with the grain on the top of the wheat, and we make straw with the stalk of the wheat.

Explore: We are going to make some bread today. Bread baking is a good model for the other thing we are going to talk about today- photosynthesis. Photosynthesis is the process by which plants make their food. Do you remember what plants need to survive? Yes, plants need water, air, soil, and sunlight. Plants take carbon dioxide from the air, and energy from the sun to make their food.

*Here we have some flour in a bowl. It will represent our plant. We will add some water (with oil mixed in) and yeast. The yeast will represent the carbon dioxide. When we mix it all up, the chlorophyll in the plant’s leaves make it all look green! Green food coloring was put in bowl, before the flour, so the students would not see it go in, but so that it would be a surprise. We will also add salt, which represents the minerals the plant soaks up from the water in the ground. Now we need to put it in a warm spot in the sun, and we will be able to watch it grow. We will check on it later.*
Explain: *Photosynthesis is a process that actually happens within the plant, and we can’t really see the process take place, we can only see the result- living plants! That is why we used the bread process to help us understand what is happening inside the plant. We are going to watch a video that has a song to help us remember the process of photosynthesis.*

Expand: Check on the bread as it rises, and explain how that represents the plant growing.

End: Eat the bread after it is baked and cooled!

**Instructional materials, Resources, and technologies:**

Baking Ingredients

Photosynthesis song video

Observation Chart

*The Little Red Hen* book or video

**Additional Notes:**

If you would like to incorporate poetry, this would be a good time to discuss metaphors, as we used the bread process to describe the photosynthesis process. There are many Biblical references and stories about wheat and yeast, so those could be included.

If you have older students, you could talk about how there is natural yeast in the air, and how we can capture it to make sourdough bread, and the fermentation process.
Lesson Title: Decompositions and Worms

Learning Targets:

Students are expected to ask questions about objects, organism, and events in their environment.

Follow up a question by looking for an answer through students’ own activities rather than only asking an adult to answer the question.

Observe patterns and relationships in the natural world, and record observations in a table or picture graph.

Explain how observations can lead to new knowledge and new questions about the natural world.

Grouping Students for Instruction:

Students will work in science group of four students. Consider diversity and the special needs of certain students when creating groups.

Learning Experiences

Pre-Lesson

*Please take a few minutes to check on your seeds and write down you observations for the day on your sheet.*

Lesson

Optional Intro: Play game http://www.sheppardsoftware.com/content/animals/kidscorner/games/producerconsumersgame.htm It is about producers, consumers, and decomposers. You could talk about those three categories (it could even be a lesson in itself). You can then say that today we are going to focus on a particular decomposer-worms!

Engage: *Now we are going to learn about worms! (Show a handful of worms around). Worms are a very important part of our ecosystem, which we’ve been talking about. We are going to observe our worms for a period of weeks, and learn how they will help in a garden, but today we’re just going to get to know our worms.*

Explore: Have students get in groups and then go to one of stations that are set up around the classroom. Let students know that they will begin at that station, and follow the directions there, making all their notes and observations in a science journal or on a piece of paper, labeled with each station number. When it
is time, they will rotate clockwise to the next station. If they have not finished at one station when it is time to move one, you could make time at the end for them to go back.

Explain: Stations:

First, make sure your worms will not be harmed. Wash hands to remove toxins that could make our worms sick. Make sure surfaces that the worms will crawl on are clean. Teach students how to gently handle the worms to keep them from being injured or from drying out. 

(Taken from: http://www.calrecycle.ca.gov/Education/curriculum/worms/)

There are more resources and stations listed at the above site. The 5 stations below are the ones I thought would work best for my class.

#1- Does a worm like water? Have a wet paper towel and a dry paper towel sitting next to one another. Students will place the worm in-between, and watch where the worm migrates to.

#2- What is the average length of a red worm? Students will measure several worms with a ruler, and find the average. Or, you could find the average as a class after they have all rotated through. This requires very gentle handling.

#3- Does a worm move forwards, backwards, or both? Students will watch a worm to see which way it moves.

#4- Will two worms move together or apart? Place two worms beside one another, and see if they stay or move away. Then, place two worms apart, and see if they stay or move together.

#5- Can a worm feel? Gently touch a worm with a feather, and see if it reacts.

Expand: What else are you curious about when it comes to worms? Share in your group.

End: Treat of “Worms and Dirt” dessert- chocolate pudding, crushed Oreos, and gummy worms.

At this point, you can set up a worm compost bin in the classroom, which will provide more learning opportunities, and great compost for your plants/garden. If you choose to do so, the students can continue to interact with the worms over a period of weeks, and learn how the worms compost materials.
Instructional Materials, Resources, and Technology:

For each group:

Worms (red- if setting up compost bin)

Soil- to keep worms in before and after stations

Paper towels

Water

Container- for the apart/together station and which way it moves station

Ruler

Feather

Compost bin materials

Additional Notes:

Make sure that the students are gentle with the worms otherwise things can get very messy. Each group needs a moist paper towel that they can put their worm on to keep it moist.