Name _____

FARMING
THE FUTURE

SCIENCE PACKET

Take Pictures with a camera.

Draw pictures.

Write a story.

Make a video.

Create a song.

What is talent?

Use it.

Farming the Future

Germination, Seed to Plate, Sprouts in a Jar | Questions? Help? Call 5618892905

FARMING THE FUTURE

Name:_____ Date: May 4, 2020

Germination
From seed to sprout, let's grow!

A new plant begins its journey as an embryo, which is found inside the seed and lies in a dormant state protected by a seed coat until exposed to certain conditions. The sprouting process is called **germination**. All seeds require oxygen, water, and the proper temperature range to germinate. Oxygen and moisture, initially taken in through the seed coat and later by the root, help the seed get energy from its food supply. Seeds have their own source of nutrients to sustain them through early life, so they do not require additional nutrients. When a seed is exposed to proper conditions for germination, water is taken in through the seed coat. The embryo's cells begin to enlarge and the seed coat breaks open. The root emerges first, followed by the shoot, which contains the stem and leaves. The proteins, fats, and carbohydrates stored for the benefits of the young plant are what makes seeds such a rich and vital food source for humans and other animals.

With the materials given we are going to start a seed and observe the germination process!

Materials:	Amount:
Bean Seed	1 Seed in bag
Paper Towel	2 blocks
Plastic Bag	1 bag
Tape	2 inches

To begin, take your seed out of the brown paper bag to fill out the description chart to record the properties of the seed.

Size	Shape	Color	Texture

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Germination Instructions:

1. Soak the given seeds in ½ cup of warm water for 24 hours.

What do you predict will happen to the seeds while they are soaking?

_____

_____

_____

2. Check seeds after 24 hours.

How did your seeds change while they soaked in water? Did this match your prediction?

_____

_____

_____

3. Remove seed from water.

Do you think the seed is alive? Why or why not?

_____

_____

_____

Name:_____ Date:_____

4. To sprout your beans, moisten a double layer of paper towels in water and squeeze out excess liquid. Lay the paper towel flat on a surface and fold it up until you have made a square that you can fit into your plastic bag.

5. Place the seed in the damp paper towel and fold it gently.

6. Put the paper towel in a partially zipped plastic bag and tape it to a window. If no window is available, place bag on top of the refrigerator.

7. Check on seed every other day and record your observation in the table below.

What do you predict will happen to the seed during the week?

_____

_____

_____

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Name:_____ Date:_____

Observation Table: Make an observation of your bean sprout every other day for 1-2 weeks. Use your five senses, sight, smell, touch, sound and taste, to make descriptive observations. Once its big enough, you can plant it outside! You can use an extra sheet of Paper.

Date	Observation:

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Name:_____ Date:_____

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Name:_____ Date: May 5, 2020

From Seed to Plate

Let's grow a plant! Using the given materials listed below and this packet we are going to grow an agricultural plant right at home!

Item	Amount
Potting Cup	**1 Styrofoam cup**
Soil	**1 cup**
Seed (type)	**3-5 seeds**

Plants grow and reproduce to give us the clothes and food we need to live. The **roots** anchor the plant into the ground while absorbing water and nutrients from the nutrient source. These nutrients are then transported via the **stem** to the leaves and flower. Unlike humans, plants make their own food using energy from the Sun, carbon dioxide from the air, and minerals and water from the ground to grow. The process by which plants make their own food by converting energy from the sunlight into sugar is knowns as ***photosynthesis***. The prefix, photo, means "light" while "synthesis means "to put together." Photosynthesis uses energy from light to convert water and carbon dioxide molecules into glucose (sugar molecule) and oxygen. The oxygen is released from the leaves while the energy within glucose molecules are distributed throughout the plant for growth, flower formation, and fruit development. The male (**stamen**) and female (**pistil**) parts of the **flower** make up the plants reproductive structure. The flower's job is to attract animals, such as birds and bees. These animals act as pollinators, carrying and spreading the pollen in plant reproductive structures and to other plants. Some plants form seeds, the seeds form in the flowers **ovaries**. A plant's fruit may fall to the ground and start to grow or may get eaten by animals. If eaten, the seeds of the fruit are passed through the animal's digestive track. As the animal eliminates its waste, the seeds are spread around. This is called **seed dispersal**. Thanks to these animals, pollinators, the Sun, and water, we have the food and clothes that we need to live every day.

Today we are going to start our very own investigation into growing a plant to eat at our kitchen table! To do so we have seeds, soil, a potting cup, and water. Follow the instructions and guidelines below to grow your plant.

1. Complete vocabulary activity on page 9 & 10.

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To grow a plant and investigate, we must have a basic understanding the different parts of a plant, their functions, and vocabulary terms necessary to investigate. Draw a small picture.

Match the terms below to their definitions.

Absorb water and nutrients for the plant, while anchoring the plant into the ground, providing foundational support	Flower
Responsible for the reproduction of the plant.	Photosynthesis
Stores water and nutrients received from the stem and absorb sunlight	Pistil
The male part of the flower	Support
Like humans have spines, plants have stems to provide _____ for the plant.	Leaves
The female part of the flower.	Roots
Leaves make food for the plant using sunlight, a process called _____.	Stamen

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Draw a small picture.

The science or practice of farming, including growing crops or raising animals for food or other products.	Experiment
The process by which plants begin to grow from a seed or a spore.	Absorb
To take up and store energy, liquid, or other substances without reflecting or transmitting it.	Germination
To explain something based on evidence and reasoning (educated guess).	Investigation
Organized scientific study that includes making observations, asking questions, inferring, analyzing data, drawing conclusions and sharing results.	Agriculture
Measurements or observations collected and recorded in an experiment or investigation.	Infer
A scientific test or procedure done with defined and controlled conditions to answer a scientific question.	Data

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2. Take your Styrofoam cup and poke holes at the bottom of it (Unless you have a black pot). This is so your plant can absorb the water it needs to grow and release what it doesn't need. If your plant did not have holes in the bottle you can easily over water your plant and kill it.

3. Put the soil provided into your Styrofoam cup.

4. Gently use your pinky finger to bury your seeds. Make sure the seeds are covered with soil.

5. Place plant in a well-lit area, maybe a window sill or on your back porch.

6. Water plant daily or if the soil is dry, record its height (use centimeters), and make descriptive observations using the table on page 14. Cut out the ruler on page ~~12~~ 14 to measure plant periodically.

Do not cut it out. You should have a ruler in your bag.

7. Answer questions on page 13 as you grow your plant over the next two weeks.

8. Graph your data on page 14.

How do I know my plant is watered properly?

Signs of Overwatering include:

- **Wilting. If the soil is wet but the leaves look droopy and sad, stop watering.**
- **Brown leaves**
- **Yellow leaves falling off**
- **Bumpy leaves**

Signs of Under watering include:

- **Dry soil (touch it with your hands, it should feel damp not wet).**
- **Slowed growth**
- **Wilting.**

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Name:_____ Date:_____

For the next 2 weeks use the table below to track the growth of your Cut out the ruler on the final page to measure your plant height. Use your five senses- sight, smell, sound, taste, and touch- to make descriptive observations.

centimeters

	Date:	Height (cm/in)	Observation
Day 1			
Day 2			
Day3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			
Day 9			
Day 10			
Day 11			
Day 12			
Day 13			
Day 14			

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Name:_____ Date:_____

1. What day did your seed begin to sprout?

_____

2. What was the average height of your plant?

_____

_____

_____

3. How are plants helpful to people?

_____

_____

_____

4. The final instruction for this assignment is to use your plant in the kitchen! When your plant is ready to harvest it may be very small, but this small plant is densely packed with nutrition and vitamins. Use your greens on a sandwich or salad, cook it into any dish desired or eat it raw!

How did you use your greens?

_____

_____

_____

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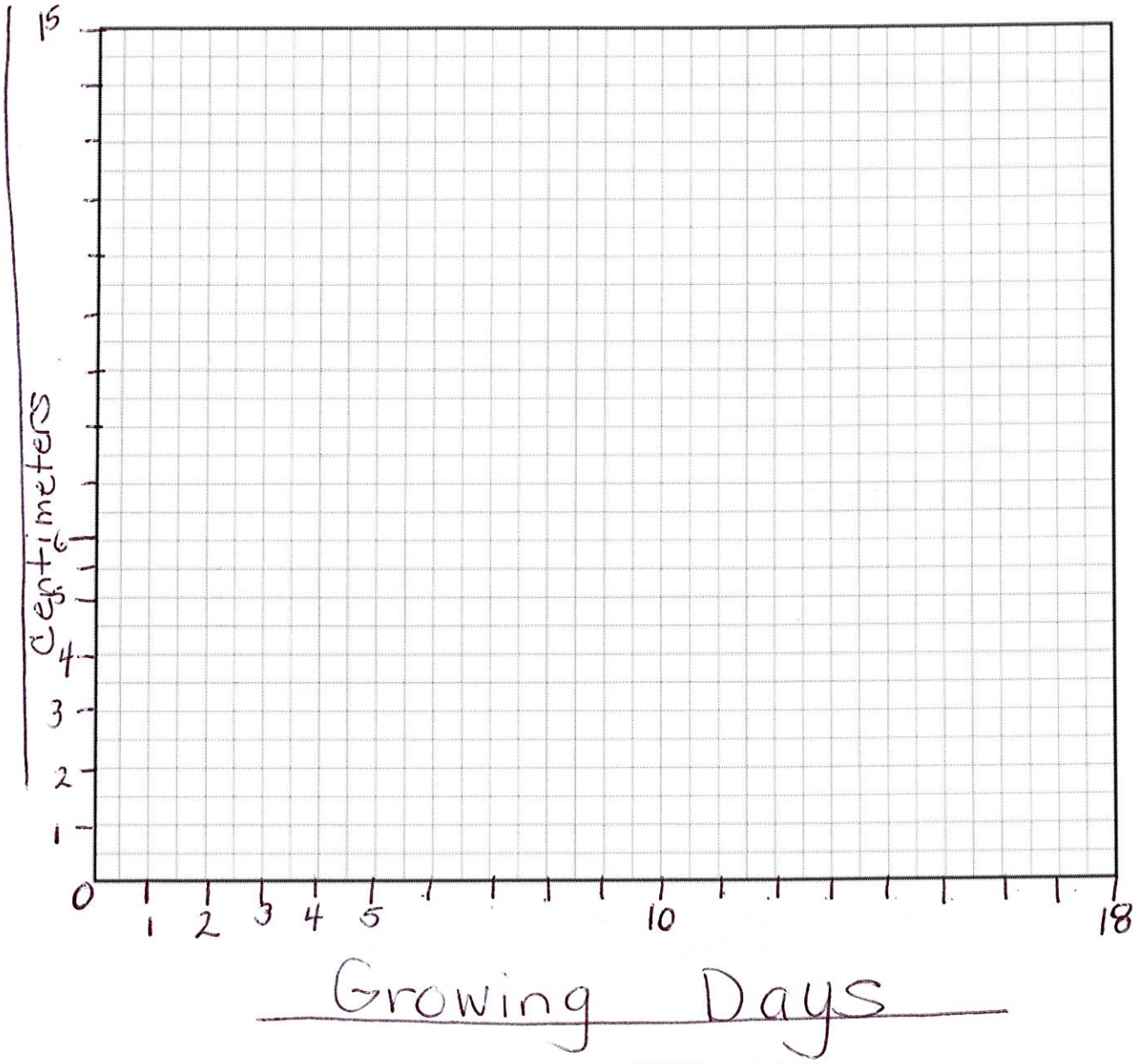
Name:_____ Date:_____

Using your data from the table plot a line graph, label the X, Y axis

Title



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Name:_____ Date:_____

Draw a picture that illustrates how you used your greens.

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Name:_____ Date: May 6, 2020

Sprouts in a Jar

DISCLAIMER:

If sprouts are not rinsed properly daily, they become at risk for hosting harmful bacteria like E-coli and Salmonella. If you plan on eating your sprouts please rinse them thoroughly and consistently to keep them uncontaminated. Do so by rinsing minimum twice a day and washing hands regularly when touching and interacting with sprouts.

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Sprouts in a Jar

Growing edible sprouts are great for adding a bit of flavor, nutrition, and crunch to any meal!

Materials Provided:

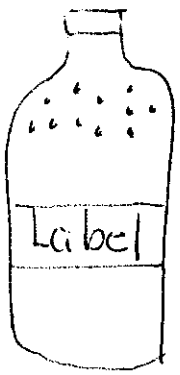
Item	Amount
Seeds	**All the seeds in the bag**
Water Bottle	**1 water bottle**
Tac	**1 tac**

Let's take all our knowledge of germination and plant growth and apply it to growing sprouts in a jar! Since we now know what germination is, we know that a seed is the start of a new plant. It contains all the food a new plant will need until its leaves reach sunlight and begin to make more food for the plant. Seeds are essential to agriculture and are the original source of most of our food, clothing, and shelter. Understanding agriculture and its role in society is extremely important, especially in times like these. This investigation with provide you with the instructions to create your very own agricultural product at home!

Instructions:

1. Take materials out of brown bag and place them in front of you.

2. Using the tac provided, poke approximately 10-20 holes in the top dome of your water bottle, below the cap and no lower than the label. (THIS IS FOR 6TH-8TH GRADE ONLY, 4TH-5TH HOLES ALREADY MADE)



Punch around the bottle.

Name:_____ Date:_____

3. Remove water bottle label.

4. Uncap the water bottle, place seeds into the bottle and fill the bottle with water from your sink until the seeds are covered.

5. Let seeds soak for 8-12 hours.

What do you predict will happen to the seeds while soaking?

_____

_____

6. After 8-12 hours. Flip the bottle over your sink so the water drains completely from the bottle through the holes you poked using the tac. (squeeze bottle if necessary)

7. Unscrew the cap to fill the bottle again about half way, put the cap back on, swirl the bottle around so the seeds are rinsed, then flip the bottle upside down and drain the water out again. Leave the bottle on a window sill or counter.

8. Rinse and drain every 8-12 hours for the next 3 days, then you will need to move the bottle outside after each rinsing so the baby sprouts receive sunlight over the next 3 days. It will be easiest to pick a time in the morning and night each day to rinse and drain your seed

9. Make an observation in the observation table on the following page (18) each time you rinse and drain your sprouts to keep track of growth.

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Name:_____ Date:_____

	Date:	Observation
Day 1		Morning: Night:
Day 2		Morning: Night:
Day3		Morning: Night
Day 4		Morning: Night:
Day 5		Morning: Night:
Day 6		Morning: Night:

10. Ready to harvest?

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How do I eat my sprouts?

Sprouts can be eaten in a variety of ways and are easily incorporated into a variety of dishes. You can eat them raw in a sandwich or tossed into a salad. Sprouts are also easy to add to warm meals such as rice dishes, stir-fries, omelets, soups or hamburgers. However, you can also eat them cooked, and this is how you will use them. You must cook them in order to eat them from this experiment!

How will you use your sprouts?

_____

_____

_____

Using your imagination create one dish recipe using your sprouts.

_____

_____

_____

_____

Want to take pictures of your projects to share? Snap a picture and send it to 561-889-2905 or email it to ftfsystemsllc@gmail.com