TEXAS FARM BUREAU®

Oh Say Can You Seed

Audience: 3-5

Activity Length: Length and duration depend on which activities are chosen

TEKS:

- ELA:
  - 3rd Grade: 3.1A, 3.1D, 3.6C, 3.7F, 3.10A, 3.12B
  - 4th Grade: 4.1A, 4.1D, 4.7F, 4.10A, 4.12B
  - 5th Grade: 5.1A, 5.1D, 5.7F, 5.10A, 5.12B
- Math:
  - 3rd Grade: 3.1D
  - 4th Grade: 4.8C
  - 5th Grade: 5.1D, 5.7, 5.9A
- Science:
  - 3rd Grade: 3.1B, 3.1E, 3.2B
  - 4th Grade: 4.1B, 4.1D, 4.1E, 4.2B, 4.6C, 4.13A
  - 5th Grade: 5.1B, 5.1E, 5.2B, 5.6C

Objective:
The student will observe and become familiar with seed parts, the germination process, parts of plants, parts of a flower, the process of pollination and seed dispersal.

Background:
Plants help the environment and us in many ways! Plants make food. Plants are the only organisms that can convert light energy from the sun into food. Plants produce ALL the food that animals, including humans, eat, including meat. The animals that give us meat, such as cattle or chickens, eat grass, oats, corn, or other plants.

Other ways plants are essential to life:
Plants make oxygen.
Plants provide habitats for animals.
Plants help make and preserve the soil.
Plants provide useful products for people.
Plants beautify our surroundings.

Those involved in Texas agriculture work hard to care for the soil, water, plants, animals, and other natural resources that provide what we need every day.

Source: MGBnet

Materials Needed:

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NOTE: The material needs within this unit are unique to each lesson. When appropriate, a master copy and answer key is provided.

- TFB Videos: Videos can be used to introduce plant part concepts. These can be found at www.texasfarmbureau.org Vimeo or https://vimeo.com/channels/txfbaitc.

Procedure:
Use the book, *Oh Say Can You Seed?* by Bonnie Worth as a framework. The suggested activities are aligned to page numbers and vocabulary within the text. This text has been used with various grade levels and contains various activities for grades K-5.

Activities within this section:

- Pre/Post Test (p. 4-5)
- Bean Dissection (p. 6-7)
- Bean Book (p. 8-12)
- Seed Sort Activity (p. 13-15)
- Design Your Own Seed Packet (p. 16-17)
- Weekly Observations (p.18-21)
- Plant Parts (p. 22)
- Career Match Up (p. 23-25)

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Oh Say Can You Seed?
By Bonnie Worth
Pages 6-15
Section A

The following activities can be used with Bonnie Worth's book, *Oh Say Can You Seed?.* The page numbers are suggestions and align activities within the text.

Begin pre-reading and purpose setting activities by using questions such as:

- What do you think this book is about?
- What do you know about plants, seeds, flowering plants?
- What might the author's purpose be in writing this book?
- Is this text fiction or nonfiction?
    - Is it reference, biography, autobiography, or informational?
    - Is it science fiction, fantasy, or poetry?
- What do we know about books written in the *Cat in the Hat* style?

Read pages 6 through 15. Display vocabulary now.

- Embryo: tiny young plant within the seed
- Cotyledon: the tiny young plant's food source before germination
- Seed Coat: protection for the seed

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Name: _____

Pre/Post Test

"*Oh Say Can You Seed*?" By Bonnie Worth

Directions: See how many of these questions you can answer before hearing the story and then see how much you have learned after hearing the story! Circle the "T" if you think the answer is true and circle the "F" if you think the answer is false. Don't change your "Before Hearing Story" answers but be sure and answer the "After Hearing Story" answers correctly.

	Before Hearing Story		**After Hearing Story**	
Every flowering plant starts out as a seed.	T	F	T	F
Bean seeds have 2 parts.	T	F	T	F
The baby plant inside of a seed is called the embryo.	T	F	T	F
The cotyledon is where food is stored in the bean seed.	T	F	T	F
The part of the plant growing above the ground is called the root system.	T	F	T	F
Food making is done in the roots of the plants.	T	F	T	F
Photosynthesis is the food-making process done by plants.	T	F	T	F
Plants give off carbon dioxide.	T	F	T	F
Bees help carry pollen from plant to plant.	T	F	T	F
Nuts are fruits.	T	F	T	F
Bur seeds are "hitchhikers."	T	F	T	T
Plants are the only living things on Earth that make their own food.	T	F	T	F

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Pre/Post Test Answer Sheet

"*Oh Say Can You Seed*?" By Bonnie Worth

NOTE: Page numbers where text evidence can be found is provided.

1. T: p. 7
2. F: p. 13 (seeds have 3 parts)
3. T: p. 14
4. T: p. 15
5. F: p. 19 (shoot system)
6. F: p. 28 (leaves)
7. T: p. 25
8. F: p. 29 (oxygen)
9. T: p. 31
10. T: p. 35
11. T: p. 36
12. T: p. 26

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Bean Dissection

Materials Needed:

- Large bag of lima beans
- Bowl of water or wet paper towels
- Parts of a Seed worksheet

Preparation:

Count out 2 to 4 beans for each student who will participate in the Bean Dissection activity. Place counted beans in a bowl and cover with water. Wet paper towels may also be used. Soak beans overnight or at least several hours.

Directions:

Introduce the book *Oh Say Can You Seed*? by Bonnie Worth to the class. Read aloud pages 6-15 and discuss. Use the following activities to help your students explore the parts of a seed.

Distribute 2 to 4 beans to each student. Place beans on dry paper towels.

Discuss seed parts with students as they investigate the beans.

Ask students to take beans apart and identify the seed coat, cotyledons, and embryo. Explain to students that seeds have three basic parts: the seed coat, the outer covering that protects the seed, the embryo, the part of the seed from which the plant grows, and the cotyledon or stored food for the seed. Seeds may also have more than one cotyledon depending on the type of seed. Have each student carefully remove the seed coat, separate the two cotyledons, and then carefully remove the embryo.

Students can observe and record findings as they locate seed parts. On the following page, you will find the *Parts of a Seed* worksheet. Students will glue each seed part in the correct boxes.

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Name: _____

Parts of a Seed

Draw a picture of what you see as you dissect your bean.

Glue each seed part in the correct box.

Seed Coat	Embryo	Cotyledon

Using the word bank below, fill in the blanks to make the following sentences true.

plant	protection	food

The **seed coat** gives _____ for the seed.

The **embryo** is the tiny _____ inside the seed.

The **cotyledon** provides _____ for the seed.

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Bean Book

Before class begins, make enough copies of the Bean Book (found on the following page) so each student has an instruction sheet, seed coat sheet, seed leaves (cotyledon sheet) and one embryo. (There are six embryos per page.) Distribute the Bean Book handouts.

Read the directions and model to the students what they should do to assemble the book. Assist students in creating their own Bean Book. After the Bean Books are assembled, show students how to use them to read about the seed and illustrate the parts.

The Bean Book

By:

_____

1

Where can you find soybeans? Almost everywhere! Soybeans can be found in all of these products...

plastic	car wax
paint	tofu
chocolate	soap
crayons	insulation
body lotion	glue
cooking oil	makeup
candles	candy
printing ink	cereal
biodiesel fuel	livestock feed

...and so much more! Check out the ingredients listed on packages around the house or school and see what else you can find!

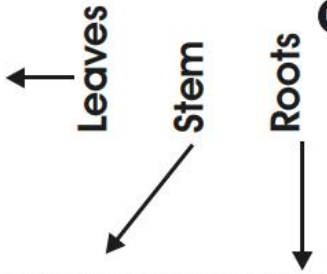
7

The bean has a cover called the **seed coat**. It protects the seed. 2

Inside the seed coat are two **seed leaves (cotyledon)**. They hold the food the new plant needs to grow. 3

A baby plant is hiding between the seed leaves. It is called an **embryo**. 4

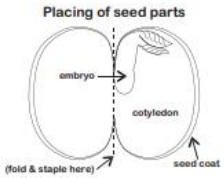
5



Every kind of seed has three parts. They are the **embryo**, **stored food (cotyledon)**, and a **seed coat**. 6

Bean Book Instructions:

- Cut out the seed coat, seed leaves, and embryo.
- Cut apart blocks of text, following the dotted lines.
- Fold the seed leaves (yellow) into the seed coat (tan) and tuck the embryo (green) into upper center of seed leaves.
- Attach seed parts by stapling along fold.
- Using the numbers as reference (see below), glue text onto the pages of your Bean Book.
- Write your name on the cover of your book.



Place Bean Book text in the following order:

1. Front cover
2. Inside front cover
3. Page after inside front cover (first cotyledon)
4. Inside of first cotyledon, next to embryo
5. Inside of second cotyledon, with arrows pointing to parts of embryo
6. Inside back cover
7. Outside back cover

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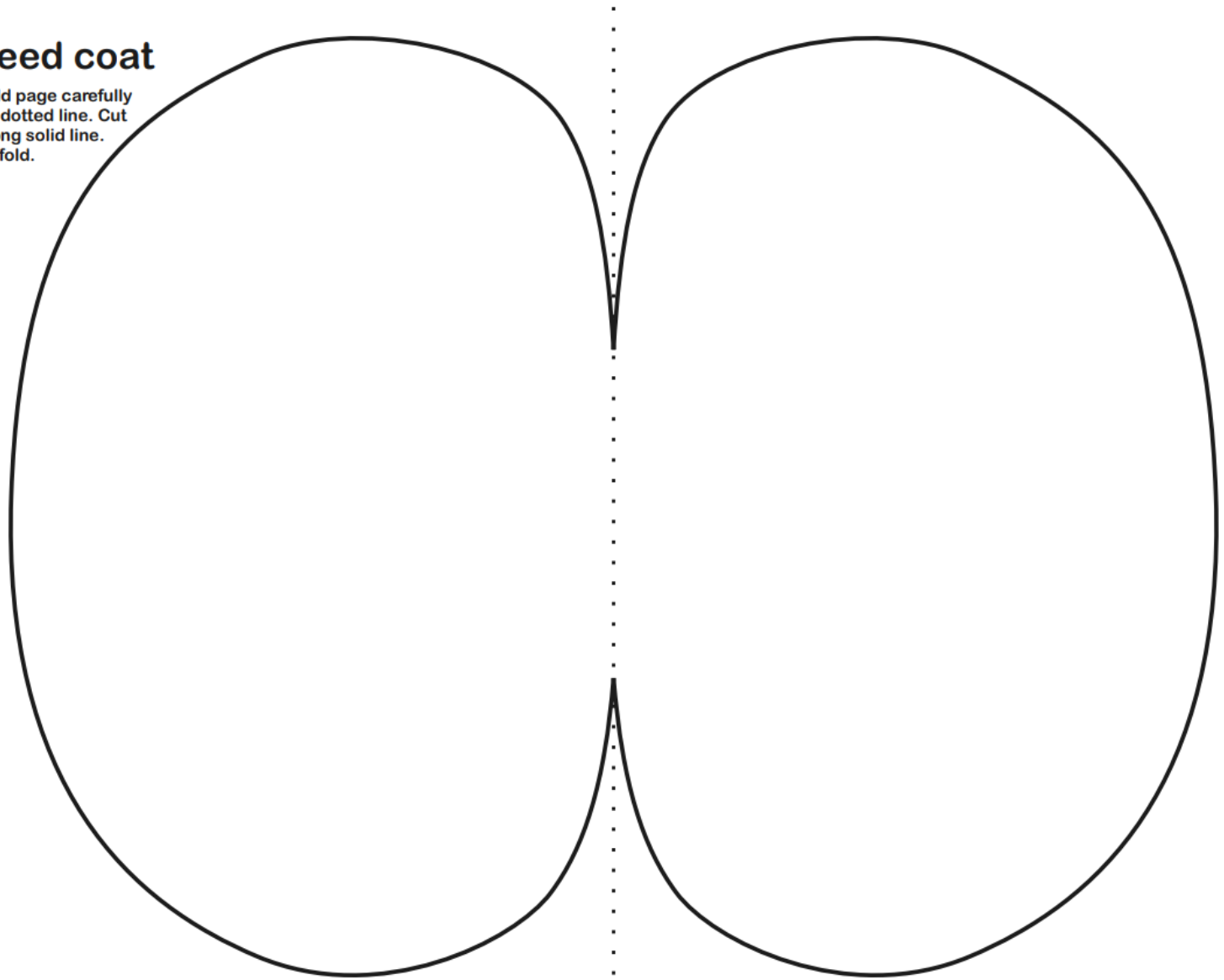
seed coat

Fold page carefully on dotted line. Cut along solid line. Unfold.



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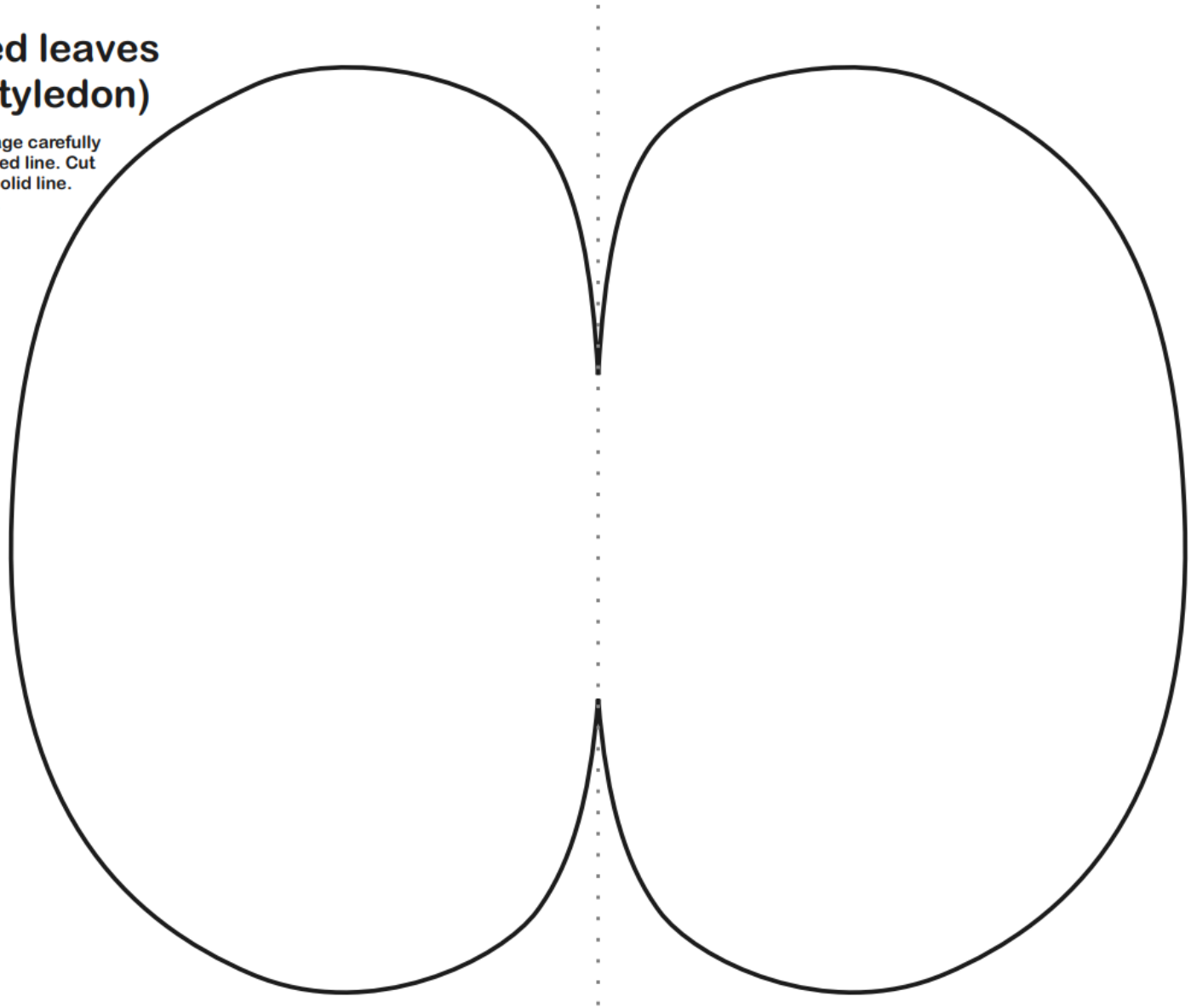
seed leaves (cotyledon)

Fold page carefully on dotted line. Cut along solid line. Unfold.



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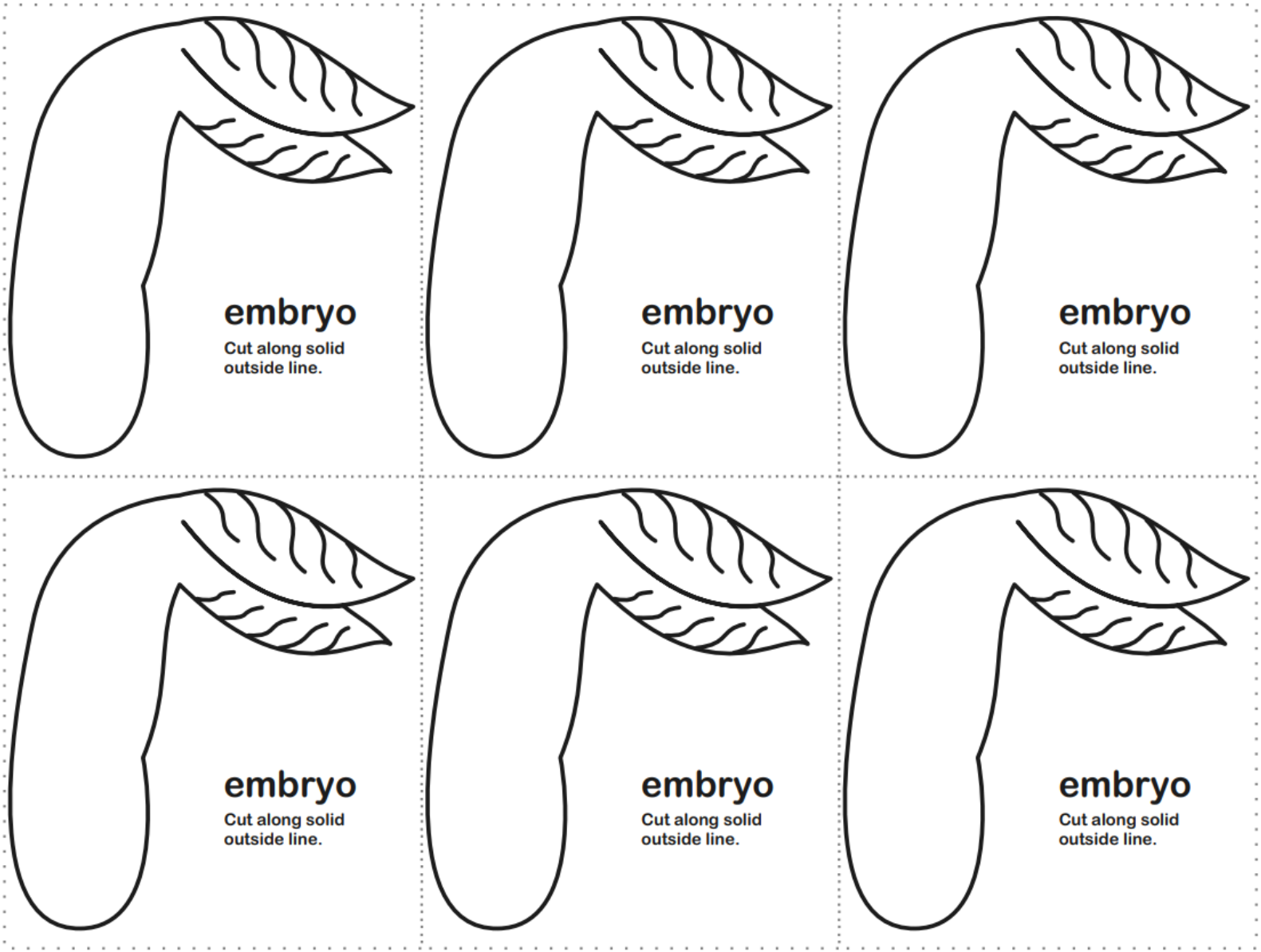

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Seed Sort Activity

Materials Needed:

- Several types of seeds
    - Cantaloupe, soybeans, watermelon, garden peas, peanut (not roasted or salted), cucumber, string bean, squash, black-eyed peas, butterbean, corn, pumpkin, and sunflowers, etc.
- Page with selected seeds written on it
- Seed Sorting Diagram

Preparation:
Before class, put one of each seed variety in a baggie or small cup. Make as many groups as you need per table, per science group, or per student.

Directions:
Activity 1:

1. Take the list of seed names and tell students they will be given these seeds. Have them predict what they know about seeds they have seen.
    i. What does a _____ seed look like?
    ii. Which seed has the toughest seed coat?
    iii. Which one is the _____ seed? Why do you think that?
    iv. Take the diagram page and sort the seeds. Label and add categories as needed.
        1. By color?
        2. By size?
        3. By favorite food?
2. After the activity, seeds may be planted in the school garden or classroom.

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Name: _____

Seed Sort Activity

Watermelon

Garden Pea

Peanut

Cucumber

String Bean

Squash

Black-eyed pea

Butter bean

Corn

Sunflower

Cantaloupe

Soybean

Pumpkin

Pinto beans

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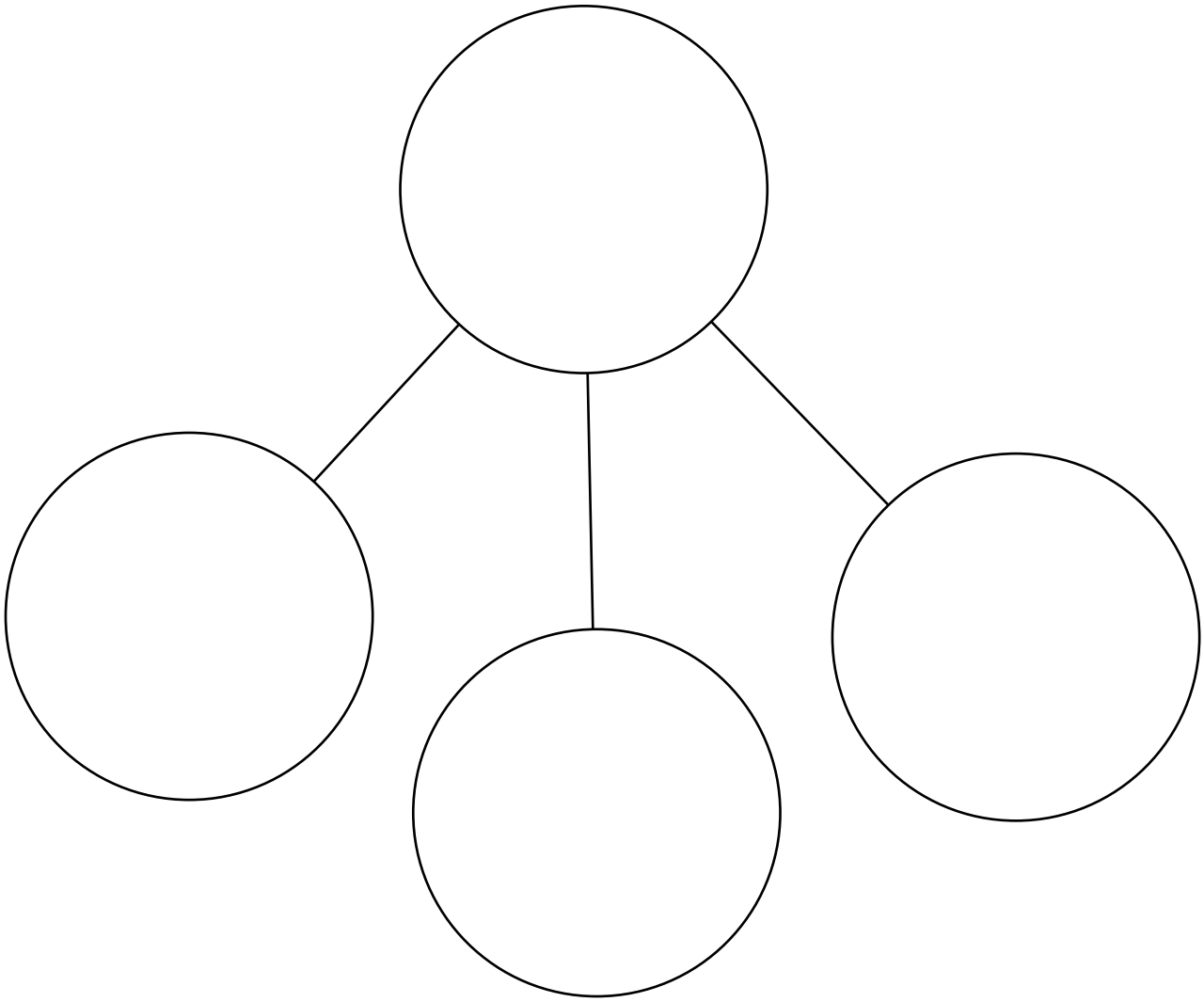
Name: _____

Sorting Seeds

Directions: Place all your seeds in the top center circle. Sort seeds into at least three main groups by moving them to the other circles. Add more circles if you want more categories. Label each circle.



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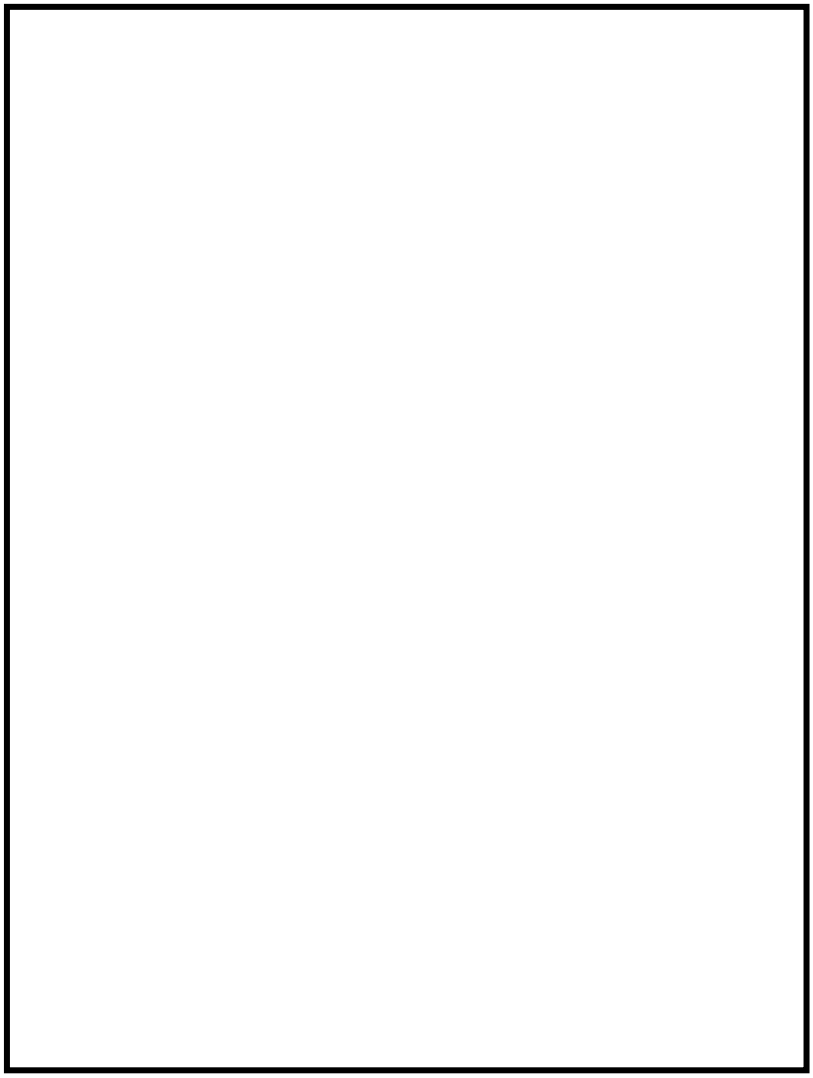
Name: _____

Design Your Own Seed Packet!

Directions: Draw your own seed packet. Don't forget to include the back. Include a creative name for your seeds and decorate your packet so people will want to buy and plant your seeds.

Front of Your Seed Packet



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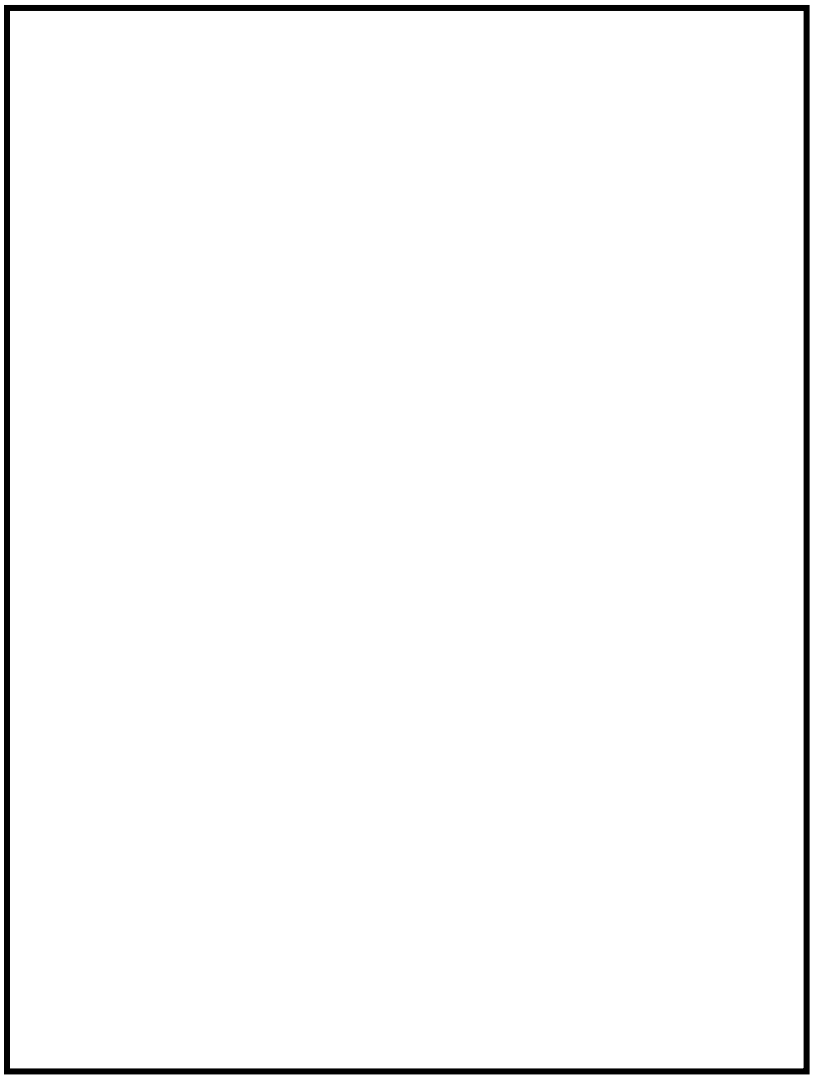
Don’t forget to include the important information on the back of your seed packet!

Back of Your Seed Packet



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Weekly Observations

Prior to this lesson, plant a seed in a clear container clearly visible. This can be done in a baggie with a wet paper towel or a clear plastic cup. Ask students what they notice about the germinating seed.

- Do the roots or stem appear first?
- Why would it be necessary for the root to appear first?

Reread pages 16 and 17. Display vocabulary.
Germination: the process when a seed begins to grow or sprout
Stem: the part of the plant that is above ground. It supports the plant and helps transport water and nutrients.
Roots: the part of the plant below ground that anchors the plant and pulls in the water and nutrients.

Provide the *Weekly Observation Sheet* to students. You may choose the time frame of this activity. It can span a few days or a few weeks. Have students record their findings, make predictions, and drawings. Students may measure their plant's growth. For example, they may measure the roots and when the plant touches the top of the mini greenhouse. They may measure the plant's height or even the diameter of the root structure.

- What term did you find that describes the sprouting of a seed? (germinate/germination)
- What are the names of the three parts of a seed? (seed coat, cotyledon, embryo)
- What is the function of each seed part? (the seed coat protects the seed, the cotyledon provides food for the baby plant, the embryo is the baby plant that will grow)
- What does a seed need to germinate? (water, soil or other growing medium, warm temperature, air)
- Once a seed germinates, what does the young plant need to grow? (water, soil or other growing medium, appropriate temperature, sunlight)
- Why did you not need to water the seeds and seedlings inside the mini greenhouse? (the greenhouse was able to sustain its own water cycle)
- What are the stages of the water cycle? (evaporation, condensation, precipitation)

Allow students to continue to care for, observe and journal the activities associated with their plants. They should remove the tops of the mini greenhouses when the first leaf touches the top of the upper cup, or replant when the plant has leaves. When using the mini-greenhouses, students may condition the plants to be transplanted outdoors by placing the greenhouses outdoors briefly, adding a few minutes each day.

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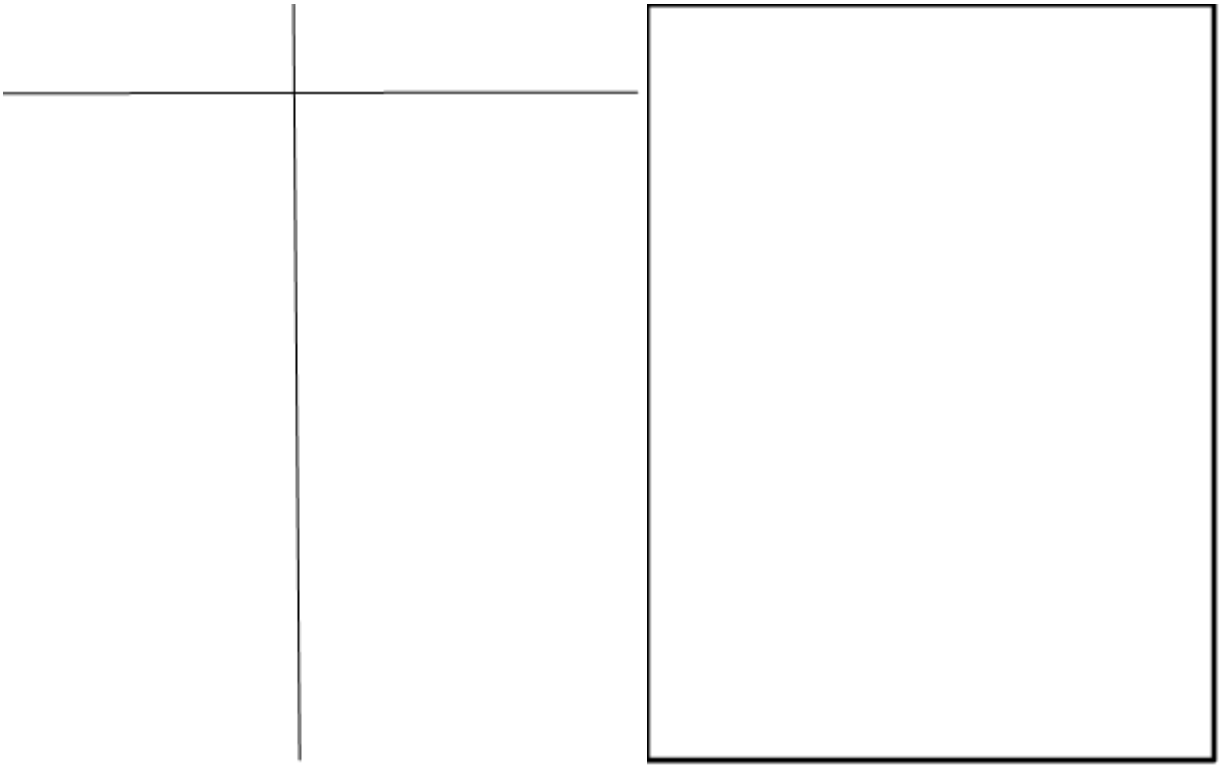
Name: _____ Seed Type: _____

Weekly Observation Sheet



Date: _____

Age: _____

Height (in cm.): _____

Diameter (in cm.): _____

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Name: _____

Growth Patterns Chart

Use this chart to monitor the different growth patterns of your seeds.

Record when: You planted the seeds. Your seeds first germinate. Roots appear.

Seedling first appears.

Date _____	Seed #1 _____	Seed #2 _____	Seed #3 _____

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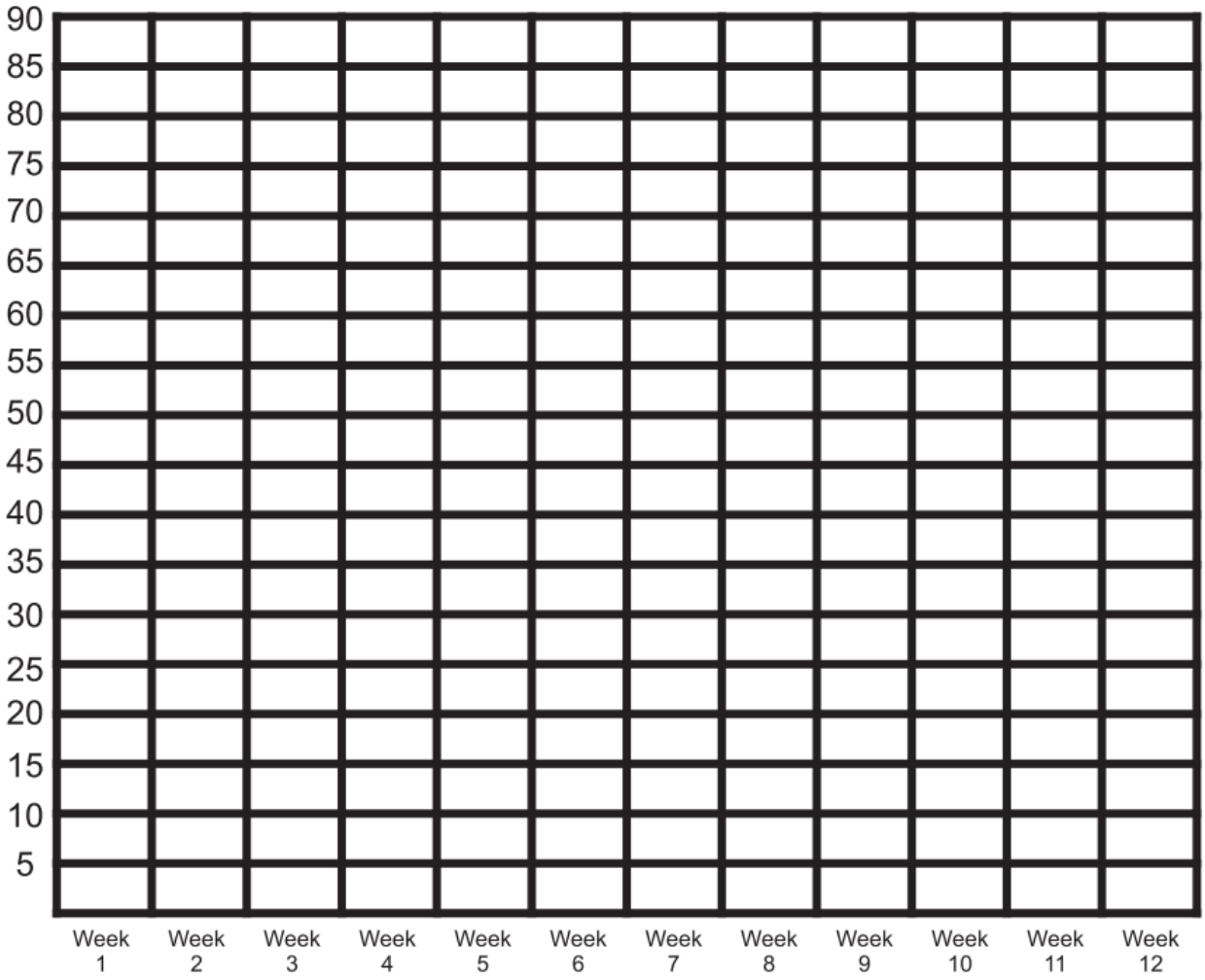
Name: _____

Plant Growth Bar Graph



NOTE: Measurements should be taken in centimeters.

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Name _____

Oh Say Can You Seed? Plant Parts

Directions: Use the phrases about plant parts on the bottom of the page to fill in the following table. Write the phrases under the correct headings.

Roots	Stem	Leaves	Flowers

anchors the plant

acts like a pipe to carry water up the plant

gives the plant support

photosynthesis occurs

petals

pollen is found

oxygen is released

food-making for the plant is done here

have different "edges"

absorbs minerals from the ground

stamen look twisty and hairy

stoma is found

where the leaves are attached

NOTE: This resource is Courtesy of Florida Agriculture in the Classroom.

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Name: _____

Career Match Up

Match each person below with a reason photosynthesis is important to their work. Add reasons of your own to describe the importance of photosynthesis to each person.

Botanist ( )

_____

_____

_____

Air Quality Specialist ( )

_____

_____

_____

Farmer ( )

_____

_____

_____

Rancher ( )

_____

_____

_____

Greenhouse/Nursery Operator ( )

_____

_____

_____

Forester ( )

_____

_____

_____

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1. I depend on photosynthesis to feed my growing crops once the seeds I plant have germinated. Without photosynthesis, I could not produce the fruits, vegetables, and grains you love to eat!

2. Without photosynthesis, the trees I produce would not grow tall and strong. They would also not be able to return the oxygen to the air that people and animals need to survive.

3. My whole job is growing plants for your home, lawn, and public landscapes. Without photosynthesis I would not have any work to do at all!

4. I am a scientist who studies plants. I want to know everything there is to know about them. I know the process of photosynthesis inside and out. Where would I be without photosynthesis?

5. My work would be sad work indeed without photosynthesis. Just think of all the dangerous air reports I would have to issue if photosynthesis did not exist.

6. The cattle and other livestock I raise depend on good grass to eat to thrive and grow. What if that grass did not make food for itself and my animals?

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Career Match Up Answer Key

Botanist: 4

Air Quality Specialist: 5

Farmer: 1

Rancher: 6

Greenhouse/Nursery Operator: 3

Forester: 2

Challenge:

Writing Prompt 1: Tell students that all the careers above are agricultural careers. Challenge students to make a statement about the connection of each career with farming.

Writing Prompt 2: Imagine that you are a Texas farmer. You awaken one summer morning, turn on the news, and learn that for the next two weeks the process of photosynthesis will be stopped. No house plants, trees, or crops will use photosynthesis to make their own food. Write a story about what happens when farmers learn that there will be no photosynthesis for two weeks.