

The Sunny Sunflower Story

Grades 3-5

Science, Visual Arts, English Language Arts



Objectives

Students will create models of sunflowers and use them to demonstrate how plants grow in relation to light while learning about phototropism. Students will create sunflower paintings similar to Vincent van Gogh's famous *Sunflowers* painting. Students will practice recognizing similes while reading poetry. Students will learn what plants need to grow by listening and responding to the story of a sunflower. Students will write facts about the life cycle of a sunflower.

Vocabulary

droop— to sink, bend, or hang down

flower—the part of a plant that is often brightly colored, that usually lasts a short time, and from which the seed or fruit develops

food—substances taken in by plants and used for growth

potassium—a mineral that your body needs to work properly

protein—a substance found in foods (such as meat, milk, eggs, and beans) which is an important part of the human diet

Background

Most of the sunflowers grown in Oklahoma are used as garden **flowers** or as birdseed. Birds love to eat sunflower seeds. They cause problems for sunflower growers by eating the seeds while the plants are still flowering. Blackbirds are the peskiest.

Sunflowers grow to be very tall, as tall or taller than most adults. Some can grow to be as tall as 15 feet. The face of the sunflower always turns toward the sun when it is growing. Usually the heads will start to **droop** by the end of the growing season. That's because the hundreds of seeds growing in the flower get heavier as they develop and cause the head to fall over.

Sunflower seeds taste good and are a good source of **potassium** and **protein**. They are fast becoming the favorite snack of baseball players and their fans. During one baseball season, fans of the Baltimore Orioles professional baseball team ate nearly 3,000 packets of sunflower seeds.

LIGHT is the energy plants use to make food. The green color in leaves, called chlorophyll, takes up light. With the help of water, nutrients and carbon dioxide from the air, leaves change light energy to sugars and starches. This is called photosynthesis. These sugars and starches are then changed to fat and protein. In addition to light, most plants also need a dark period each day. There are many flowers that will not bloom until fall, when nights get longer and days get shorter.

WATER dissolves and transports minerals to the different plant parts. The plant also uses water to make food and regulate temperature. Water circulates through the plant and evaporates from the leaves. This protects the plant from rapid changes in temperature.

The Sunny Sunflower Story (continued)

AIR contains oxygen, carbon dioxide and nitrogen. All are very important to plant growth. Plant roots cannot grow in soil that has no oxygen. Oxygen helps the plant use the nitrogen present in the soil. Leaves need air to manufacture food. Through photosynthesis, plants convert water and carbon dioxide into nutrients to feed the plant and oxygen for us to breathe.

Plants need a regular supply of **FOOD**. The nutrients a plant needs are found in the soil. **SOIL** supplies nutrients and minerals, stores water for plants to use and holds plants in place. As the plant uses up the nutrients in the soil, additional nutrients are added to replace them. These nutrients can come from parts of the plant that remain in the soil when it dies, from insects that die and remain in the soil, from the droppings of birds and animals and from other sources.

Some plants like cool **TEMPERATURES**, while others like it warm. Some plants will not live in areas where winter temperatures get below freezing, while others must have cool weather to grow well. At cooler temperatures, chemical reactions in the soil become slower, and the plant may rest until temperatures get warmer. This rest period is called dormancy. Some plants will not grow the next year unless they get a dormancy period.

In order to grow their best, plants need **PROTECTION** from insects, disease and injury from humans and animals. They must also be protected from other plants that compete with them for water and nutrients. To protect plants from cold weather, the grower sometimes waits for warm weather before planting. To get an early start, the grower will sometimes leave young plants in a greenhouse and set them outdoors after the weather is warm enough.

Additional Reading

Anholt, Laurence, *van Gogh and the Sunflowers*, B.E.S., 2007

Barry, Frances, *Big Yellow Sunflower*, Candlewick, 2009

Bunting, Eve, *Sunflower House*, HMH Books for Young Readers, 1999

Burnie, David, *Plant*, Eyewitness Books, DK, 2011

Frances, Barry, *Big Yellow Sunflower*, Candlewick, 2008

Peterson, Cris, and David R. Lundquist, *Seed, Soil Sun: Earth's Recipe for Food*, Boyds Mills, 2010

Tagliaferro, Linda, *The Life Cycle of a Sunflower*, Capstone, 2007

Websites

<https://ucsdguardian.org/2020/05/25/sunflower-industry-without-mlb/>

<https://www.davidseeds.com/baseball>

The Sunny Sunflower Story

Activity 1: Sunflower Models, (Science) 1 50 minute class period

Students will create models of sunflowers as they learn about the life cycle of the sunflower.

Oklahoma Academic Standards

Activity 1: Sunflower Models (Science)

- 3.LS.1.1 Develop and use models to describe that organisms have unique and diverse life cycles but all have a common pattern of birth, growth, reproduction, and death.
- 4.LS.1.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Materials:

- 2 sheets yellow construction paper (For each student)
- 1 sheet green construction paper (For each student)
- brown construction paper (For each student)
- saucer size paper plate (For each student)
- sunflower seeds
- white crayons or white yarn
- glue

Procedures

1. Students will follow these directions to make models of sunflowers while learning about the life cycle of a sunflower.
2. Ask students what the first step in the life cycle of a sunflower is. Discuss the seed and point out in order for a sunflower to grow, a seed must be planted. Have students glue one sunflower seed onto the brown construction paper, as if they were planting a seed in the soil.
3. Discuss how the seed sprouts roots. Talk with them about what is needed for a seed to germinate. Have students draw roots on the construction paper below the seed with the white crayon or cut white yarn to glue on for the roots.
4. Discuss how the stem and leaves grow. Have students cut out a stem and leaves from the green paper and glue the stem above the seed and then add leaves on the sides of the stem.
5. Discuss the flower and what a sunflower looks like. Have them color the white plate brown or black for the center of the sunflower. Then have them cut out yellow oval shaped petals to glue all around the plate.
6. Discuss what the fruit of a sunflower looks like and lead students to decide the seeds are the fruit. Have students glue sunflower seeds to the center of the plate.
7. Discuss how sunflowers are harvested. What happens to the seeds after harvest? Discuss how seeds are eaten by animals and people. Also discuss the life cycle continues when these seeds are planted.

The Sunny Sunflower Story

Activity 2

Grades 3-5 Teacher Resources and Standards

Activity 2: Phototropism, (Science) 1-7 50 minute class periods

Students will use the sunflower paper plates from Activity 1 to demonstrate phototropism in sunflowers. Then students will conduct an experiment to illustrate phototropism in plants as they grow.

Oklahoma Academic Standards

Activity 2: Phototropism (Science)

- 3.LS3.1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- 4.LS.1.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 5.LS2.1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Materials:

- paper plate sunflower created in Activity 1
- sunflower seeds or birdseed mix with sunflowers in it
- music
- video: <https://youtu.be/g8mr0R3ibPU>
- 3 small cups with small drainage holes (or small flower pots)
- soil to fill cups
- tape, a marker, and 3 sticky notes
- medium-sized box (such as a shoebox) with one side cut away
- aluminum foil
- water
- Activity 2 Worksheet 1 “**Phototropism**”

Procedures

1. Read and discuss background information.
2. Have students echo the word Phototropism.
—Explain what phototropism means: the movement of a plant in response to light, either toward the source of light (*positive phototropism*) or away from it (*negative phototropism*).
3. Show the video and determine if sunflowers exhibit positive or negative phototropism:
<https://youtu.be/g8mr0R3ibPU>
4. Students will pretend you (the teacher) are the sun.
—Play cheerful music, and move around the room.
—As you move around the room, students will move their sunflowers to face you. Explain sunflowers typically demonstrate positive phototropism and turn their heads towards the sun.
—Students take turns being the sun.
5. Bring a birdseed mix to class.
—Students will separate the seeds in the mixture.

The Sunny Sunflower Story (Activity 2 continued)

Procedures (continued)

6. Plant four sunflower seeds in each of the soil cups. Make sure they're evenly spaced, and plant them about $\frac{1}{2}$ inch under the soil.
7. Create labels for each soil cup, so you have one cup with each label:
 - a. Control
 - b. Tip
 - c. Base
8. Moisten the soil.
9. Line the bottom of the box with aluminum foil and place the cups in the box. The foil is used to keep water from seeping into the box.
10. Place the box in a windowsill, with the open side facing the sun. (You might need to stack some books underneath it to support it, if your windowsill isn't very wide.). Note: if you have access to grow lights you can use a table rather than windowsill. You can also change the position of the lamp throughout the day (simulating the sun's path across the sky) and watch the plants response to the light. Grow lights are a good alternative if your classroom's location doesn't provide much sunlight.
11. Make four of each type of devices to block the light from part of the plants:
 - a. **Shoot cap:** Cut a small 2" x 3" rectangle of aluminum foil. Wrap it around the eraser end of a pencil to create a small, closed-ended metal cap, and slide it off. Repeat three more times. This will be slipped over the tip of the growing plant to cover any light coming in to the tip.
 - b. **Base sleeve:** Cut a small $\frac{1}{2}$ " x 3" rectangle of aluminum foil. Wrap it around the middle of a pencil so it creates a small open-ended $\frac{1}{2}$ " tall tube, and slide it off. Repeat three more times. This will be placed around the growing shoot so that it can grow through it. Check the cups each day.
12. Once the plant is about $\frac{1}{2}$ inch high, have students place a shoot cap on each of plants in the "Tip" cup and a base sleeve around the plant near the soil on each of the plants in the "Base" cup.
13. The control cup will get neither of the light blocking devices. The seedlings might grow at different rates, so be sure to check each day to put the caps/sleeves on as needed.
14. Use Activity 2 Worksheet 1 "**Phototropism**" to record plant growth and directions.
15. Continue to water the seedlings as needed.
16. Check the seedlings after a week. What has happened? Compare the seedlings with the caps and the sleeves to the control seedlings. Are any of them growing in certain directions?
17. Is there any difference in the growth rate of the plants in the three pots? Are the plants in one pot taller or shorter than the others?
18. As sunflowers grow, determine if the plants demonstrate positive or negative phototropism.
 - Move the plants away from the light and see if they will bend to grow towards the light.
 - As the heads grow, have students monitor the heads and determine if they move towards the light, or away from it.

The Sunny Sunflower Story

Activity 2 Worksheet 1: Phototropism



Name: _____ Date: _____

Sunflowers can be seen turning to follow the path of the sun from sunrise to sunset. This is an example of phototropism. Although plants do not have eyes or muscles, they do have special cells that tell the plant to reach out and grow longer.

In the flower pots below, draw what each plant looked like after the foil tips and sleeves were put on the plants



Based on your observations, where do you think the special cells that can “see” light are located on a plant? (tip or stem)

Can you think of other examples of phototropism in plants? Look for plants around the school, at a local park, or at your home to answer.

The Sunny Sunflower Story

Activity 3

Grades 3-5 Teacher Resources and Standards

Activity 3: van Gogh Sunflowers, (Visual Art) 1-2 50 minute class periods

Students will create a replica of Vincent van Gogh's sunflowers.

Oklahoma Academic Standards

Activity 3: van Gogh Sunflowers (Visual Art)

- | | |
|------------------------------|--|
| 3.VA.P.4.1
4.VA.P.4.1 | Demonstrate thoughtfulness and care in the process of revising and refining original artwork. |
| 5.VA.P.4.1 | Discuss processes of personal artistic choices during creating and revising original works of art. |
| 3.VA.CHP.1.2
4.VA.CHP.1.2 | Explore ways that people have created artwork using accessible resources. |
| 5.VA.CHP.1.2 | Explore how artists and cultures used media (materials) to express themselves. |

Materials:

- white cardstock
- pencil
- sharpie
- pastels, paint, markers or chalk

Procedures

1. Discuss the artist Vincent van Gogh and show students his sunflower art found here: <https://www.vangoghgallery.com/painting/sunflowerindex.html>
2. Read the book: "*van Gogh and the Sunflowers*," by Laurence Anholt. If you do not have the book, you can listen to it being read here: <https://youtu.be/uONNDtr4UPc>
3. Students will follow these directions to draw and then paint a replica of Vincent van Gogh's Sunflowers: https://youtu.be/rU_-LTH2Qts
4. If you do not think your students are ready to draw sunflowers, you can print a replica here and allow students to paint or color: <https://www.vangoghgallery.com/coloring-pages/sunflowers.pdf>

The Sunny Sunflower Story

Activity 4

Grades 3-5 Teacher Resources and Standards

Activity 4: Sunflowers Similes, (ELA) 1 50 minute class periods

Students will practice recognizing similes while reading poetry.

Oklahoma Academic Standards

Activity 4: Sunflower Similes (ELA)

- 3.3.R.4 Students will evaluate literary devices to support interpretations of literary texts:
4.3.R.4 ● simile
5.3.R.4

Materials:

- Activity 4 Worksheet 1 “Sunflower Similes”

Procedures

1. Read the poem on Activity 4 Worksheet 1 “Sunflower Similes”
2. Students will identify the similes in the poem.
3. Students will create their own similes using sunflowers.

The Sunny Sunflower Story

Activity 4 Worksheet 1: Sunflower Similes



Name: _____ Date: _____

A simile is a figure of speech. It compares two things which normally are not alike. Often similes use “as” or “like.”

THE BIG SUNFLOWER

I'm just as happy as a big sunflower
That nods and bends in the breezes,
My heart's as light as the wind that blows,
Blowing from off the trees.

I'm just as happy as a butterfly
That dips and spins in the flowers
My song's as joyous as the pretty birds
Singing to us for hours.

1. How many similes are in the poem? _____

What are the similes in the poem? Complete the blanks below to identify each simile. If there are extra lines, create your own similes using sunflowers.

2. _____ as _____ as _____

3. _____ as _____ as _____

4. _____ as _____ as _____

5. _____ as _____ as _____

6. _____ as _____ as _____

7. _____ as _____ as _____

The Sunny Sunflower Story

Activity 4 Worksheet 1: Sunflower Similes

ANSWER KEY



Name: _____ Date: _____

A simile is a figure of speech. It compares two things which normally are not alike. Often similes use “as” or “like.”

THE BIG SUNFLOWER

I'm just as happy as a big sunflower
That nods and bends in the breezes,
My heart's as light as the wind that blows,
Blowing from off the trees.

I'm just as happy as a butterfly
That dips and spins in the flowers
My song's as joyous as the pretty birds
Singing to us for hours.

1. How many similes are in the poem? 4

What are the similes in the poem? Complete the blanks below to identify each simile. If there are extra lines, create your own similes using sunflowers.

2. I'm as happy as a big sunflower

3. My heart's as light as the wind that blows

4. I'm as happy as a butterfly

5. My song's as joyous as the pretty birds

6. Answers will vary as _____ as _____

7. Answers will vary as _____ as _____

The Sunny Sunflower Story

Activity 5

Grades 3-5 Teacher Resources and Standards

Activity 5: Sunflower Story, (Science) 1 50 minute class period

Students will create models of sunflowers as they learn about the life cycle of the sunflower.

Oklahoma Academic Standards

Activity 5: Sunflower Story (Science)

- 3.LS.1.1 Develop and use models to describe that organisms have unique and diverse life cycles but all have a common pattern of birth, growth, reproduction, and death.
- 4.LS.1.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 5.LS.1.1 Support an argument that plants get the materials they need for growth chiefly from air and water.

Materials:

- Activity 5 Reading Page 1 “**The Sunflower Story**”
- Activity 5 Response Page 2 “**Plant Chants**”
- sunflower life cycle models from Activity 1

Procedures

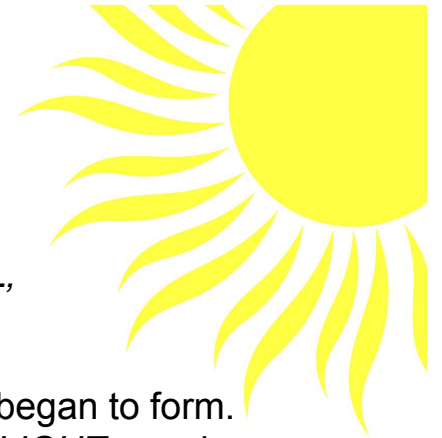
1. Read and discuss background and vocabulary. Discuss what plants need to grow.
2. Read “**The Sunflower Story**” as a class before continuing with the activity.
 - Divide students into seven groups, and assign each group one of the petals of the sunflower on the “**Plant Chants**” response page.
 - Explain that each petal represents one of the elements a plant needs for healthy growth.
 - Coach groups to say their chants every time you read any variation of the word in “**The Sunflower Story.**”
 - The teacher will read the story out loud. The groups will say their chants as the teacher reads the story.
3. Read the story a second time.
 - As you read, students will underline the stages of the life cycle.
 - Refer back to the sunflower life cycle models the students made in Activity 1.



There once was a cold and lonely sunflower SEED. The SEED was buried just beneath the garden SOIL. It was *PROTECTED* from the cold winter AIR. The SEED was patient. It waited for the summer SUNLIGHT. Before the summer SUNLIGHT came, spring rains WATERED the SOIL which *PROTECTED* the SEED. Then the SUNLIGHT began to shine. As the SOIL began to warm up, the SEED'S TEMPERATURE began to rise.

One day the SEED burst open. A shoot shot up toward the SUNLIGHT. The roots grew deeper into the SOIL to search for FOOD. As the shoot began to reach the surface, it could feel the warm TEMPERATURE of the sun. It could also feel the cool AIR. The SEED became a sunflower plant. It began to grow taller and stronger as it enjoyed the SUNLIGHT, WATER, AIR, FOOD, perfect TEMPERATURE and SOIL.

The gardener did her best to *PROTECT* the sunflower from insects, disease, and weeds. As the sunflower plant grew, it began to sprout leaves. These leaves enjoyed the SUNLIGHT, WATER, fresh AIR, and warm TEMPERATURE. The leaves produced chlorophyll. The plant changed carbon dioxide from the AIR, and nutrients and WATER from the SOIL, into FOOD to make the sunflower plant grow.



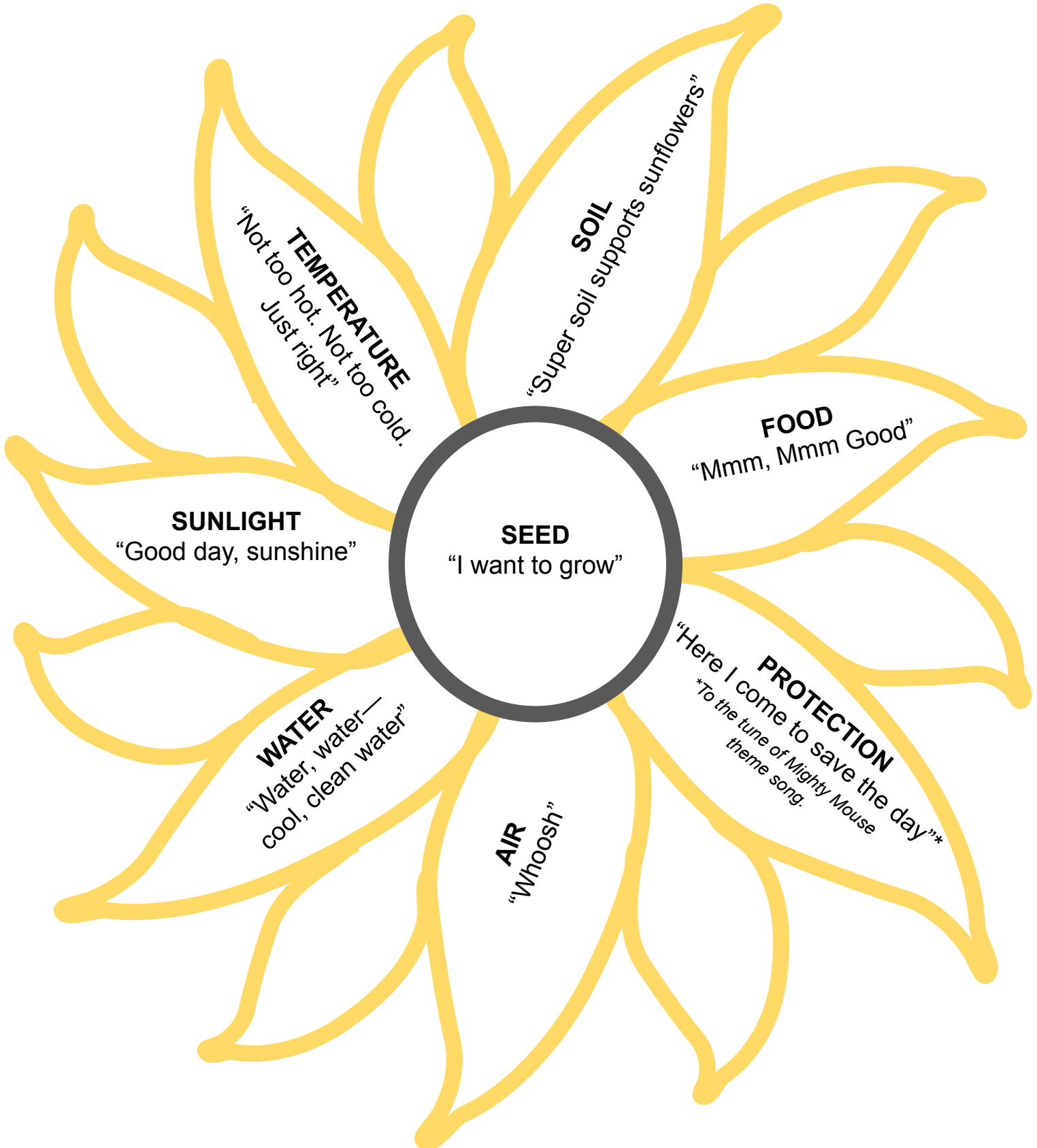
The plant grew and grew until one day a bright, yellow, flower began to form. The sunflower needed FOOD, WATER, SOIL, fresh AIR, SUNLIGHT, good TEMPERATURE, and PROTECTION to grow. As the flower grew, it began to produce sunflower SEEDS for the gardener, the birds, and the squirrels to enjoy. As summer turned to fall, the TEMPERATURE of the AIR began to cool. The days grew shorter. The leaves didn't have enough SUNLIGHT to make FOOD.



After harvesting the SEEDS, the gardener stopped WATERING and PROTECTING the plant. The sunflower plant began to wilt and dry until finally it collapsed on the ground. The last of its SEEDS fell into the garden SOIL.

These SEEDS were patient. They were buried just beneath the SOIL. They waited for the spring rains to bring WATER. They waited for the summer to bring SUNLIGHT, AIR, FOOD, and warmer TEMPERATURES. They waited for the gardener's PROTECTION. Then the SEEDS burst open and began to grow . . . and the cycle repeated.

Follow along as your teacher reads “The Sunflower Story.” When you hear your group’s word, say your group’s chant.



The Sunny Sunflower Story

Activity 6

Grades 3-5 Teacher Resources and Standards

Activity 6: Sunflower Fact Wheel, (ELA, Fine Arts) 1 50 minute class period

Students will summarize and/or paraphrase the Sunflower Story reading page and then create a dramatic presentation based on the story

Oklahoma Academic Standards

Activity 6: Sunflower Fact Wheel (ELA, Fine Arts)

- | | |
|---|--|
| 3.3.W.2
4.3.W.2 | Students will write facts about a subject, including a clear main idea with supporting details, and use transitional and signal words. |
| 5.3.W.2 | Students will introduce and develop a topic, incorporating evidence (e.g., specific facts, examples, details) and maintaining an organized structure. |
| 4.2.R.4
5.2.R.3 | Students will begin to paraphrase main ideas with supporting details in a text. |
| 3.DT.CR.1.2
4.DT.CR.1.2
5.DT.CR.1.2 | Imagine and collaborate with peers to conceptualize production elements for a unified drama/theater concept; use non-representational materials to create props, puppets, masks, costume pieces and/or other production elements and describe, illustrate and/or physically arrange playing spaces for drama/theater experiences |

Materials:

- Activity 5 Reading Page 1 “**The Sunflower Story**”
- Activity 6 Worksheet 1 “**Sunflower Fact Wheel**”
- Activity 6 Worksheet 2 “**Sunflower Illustrated Life Cycle**”

Procedures

1. Students will re-read “**The Sunflower Story**” and use Activity 6 Worksheet 1 “**Sunflower Fact Wheel**” to write facts about the sunflower life cycle.
2. Students will use these facts to rewrite the story in their own words on another paper. Students should paraphrase the main idea.
3. Students will work together to use their new story to create a play for students in a lower grade.
4. Students will create appropriate props and reenact the story as a play for students in lower grades.
5. Each group will design a logo and advertising campaign (commercials, flyers, posters) for its assigned portion of the life cycle to show why it is important for plant growth.

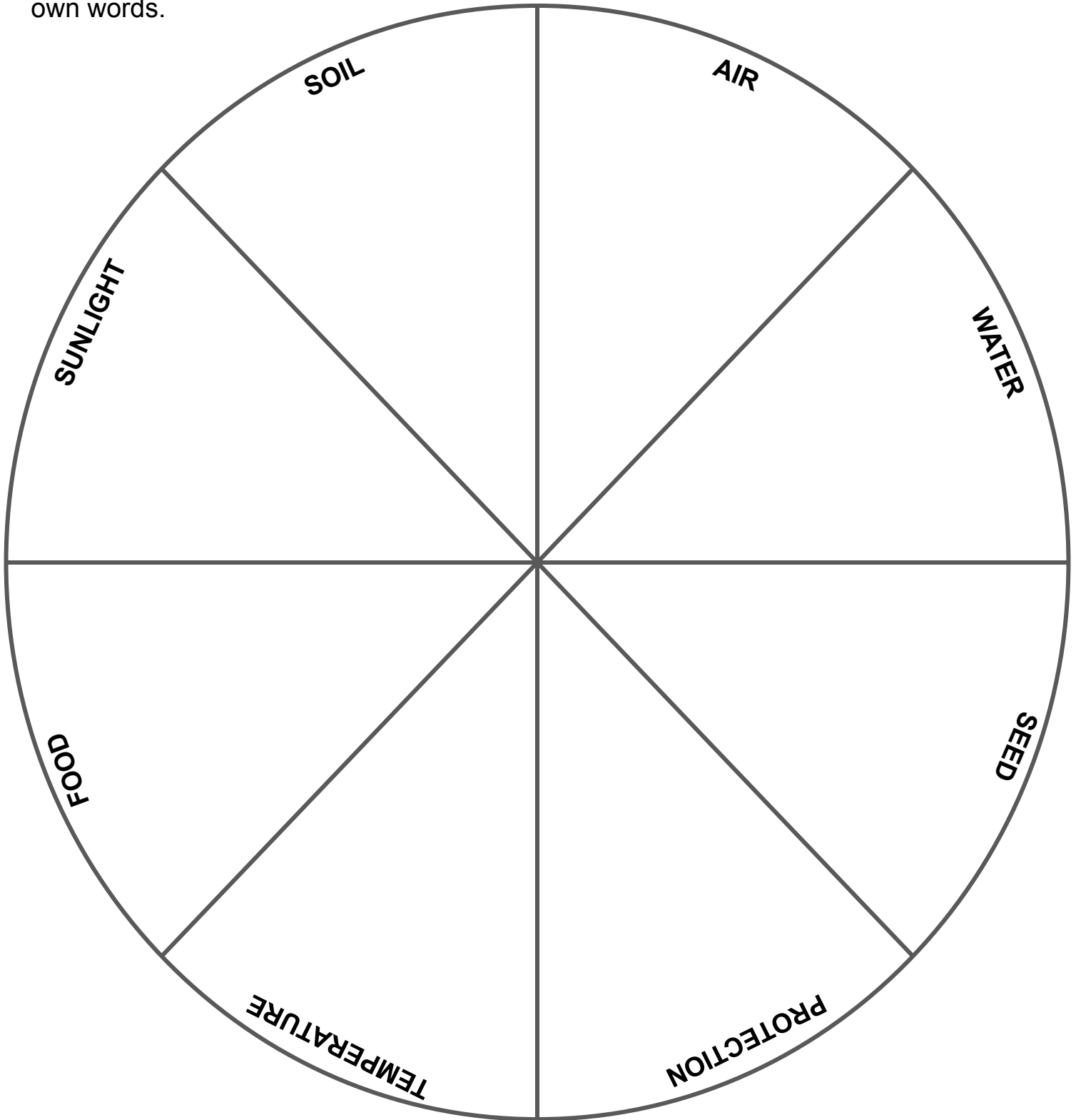
The Sunny Sunflower Story

Activity 6 Worksheet 1: Sunflower Fact Wheel



Name: _____ Date: _____

Based on the information in the **Sunflower Story**, explain why each of the words are important to the growth and life cycle of a sunflower. Write facts from the story in your own words.



The Sunny Sunflower Story

Activity 6 Worksheet 2: Sunflower Illustrated Life Cycle



Name: _____ Date: _____

Draw the sunflower life cycle on the wheel. Cut out the wheel and remove the triangle. Attach it to the sunflower fact wheel using a brad so your facts are covered. Explain the life cycle as you turn the wheel.

