



# Pacifica's Mobile Nature & Horticulture Center

## "Cycles"

### Four and Five Grade Program Outline

---

**Introduction:** All of life is enmeshed in cycles, small and large. The students will explore this with a Moebius strip and a large spinning circle (with a variety of cycles: water, plants, mammals, insects, frogs, seasons, etc.) that students can spin. How cycles inter-relate with each other and with our lives will be discussed.

#### NATURE CENTER STATION OBJECTIVES:

1. To explore the cycle of water and discuss its importance in our lives.
2. To determine the land to water ratio.
3. To determine the total water to drinkable water ratio.

#### ACTIVITIES:

##### YELLOW:

1. Students will make a mini water cycle of their own to study in the classroom.

##### BLUE:

2. Students will help manipulate a model of a water cycle to help them understand the cycle and its importance.

#### HORTICULTURE CENTER STATION OBJECTIVES:

1. To explore the rotation of the earth and seasons.
2. To examine the different life cycles of plants.
3. To explore worms and discuss the importance of decomposers.
4. To set up a simple experiment to discover the preferences of worms.
5. To plant sees for school/home vegetable garden. \*

#### ACTIVITIES:

**Pacifica's Mobile Nature and Horticultural Center Curriculum**

**RED:**

1. Students will observe worms and their role(s) from the discussion. In groups of six (6), an experiment will be set up to discover the preferences of worms. Each group will discuss their finds with the class.

**GREEN:**

1. Students will plant vegetable seeds and discuss the various cycles of plants.
2. Students will explore the seasons with a globe and model "sun".
3. Students will examine and classify which plants are found during each season.

\*Note: Use of the planting station in the mobile classroom will be used for these experiments.

Connections to the Certificate of Initial Mastery (CIM) Standards:  
Nature Center Objectives –

Unifying Concepts and Processes: Understand and apply major concepts and processes common to all sciences.

Common Curriculum Goal: Apply foundation concepts of change, cycle, cause, and effect, energy and matter, evolution, perception, and fundamental entities.

Content Standards: Use concepts and processes of – change, constancy, and measurement.

Leads to or meets Benchmark at Grade 5:

Describe and explain the different rates of change-

1. Student will be able to identify and describe varying rates of change in organisms, i.e. in childhood versus in adulthood.
2. Describe and explain the different rates of change.

Identify interactions among parts of a system—

3. Student will be able to describe the relationships among organisms in food chains and simple food webs.

Unifying Concepts and Processes: Understand and apply major concepts and processes common to all sciences.

Common Curriculum Goal: Apply foundation concepts of change, cycle, cause, and effect, energy and matter, evolution, perception, and fundamental entities.

Content Standards: Use the concepts and processes of - Evidence, models, and explanation.

Leads to or meets Benchmark at Grade 5:

Use models to explain how objects, events, and/or processes work in the real world.

**Pacifica's Mobile Nature and Horticultural Center Curriculum**

1. Student will use pictorial and physical models to explain the relationships within systems such as food chains, food webs, chains of events, and their community.

Horticulture Center Objectives –

Unifying Concepts and Processes: Understand and apply major concepts and processes common to all sciences.

Common Curriculum Goal: Apply foundation concepts of change, cycle, cause, and effect, energy and matter, evolution, perception, and fundamental entities.

Content Standards: Use concepts and processes of – change, constancy, and measurement.

Leads to or meets Benchmark at Grade 5:

Describe and explain the different rates of change-

1. Student will be able to identify and describe varying rates of change in organisms, i.e. in childhood versus in adulthood.
2. Describe and explain the different rates of change.

Identify interactions among parts of a system—

3. Student will be able to describe the relationships among organisms in food chains and simple food webs.

Content Standards: Use the concepts and processes of - Evidence, models, and explanation.

Leads to or meets Benchmark at Grade 5:

Use models to explain how objects, events, and/or processes work in the real world.

1. Student will use pictorial and physical models to explain the relationships within systems such as food chains, food webs, chains of events, and their community.

Life Science: Understanding structures, functions, and interactions of living organisms and the environment.

Common Curriculum Goal: HEREDITY- understanding the transmission of traits in living things.

Content Standards: Describe the transmission of traits in living things.

Leads to or meets Benchmark at Grade 5:

Describe the life cycle of an organism.

1. Student will identify, from a series of drawings, the life cycle of common organisms such as seed plants, butterflies, or frogs.
2. Student will describe the life cycle of an organism.

Life Science: Understanding structures, functions, and interactions of living organisms and the environment.

Common Curriculum Goal: DIVERSITY/INTERDEPENDENCE- understanding relationships among living things and between living things and their environment.

Content Standards: Explain the interdependence of organisms in their natural environment.

Leads to or meets Benchmark at Grade 5:

Describe the relationship between characteristics of specific habitats and the organisms that live there.

1. Student will draw a series of food chains for specific habitats.
2. Identify the producers, consumers, and decomposers, and predator-prey relationships in a given habitat.

**These benchmark standards can be used for both the Nature Center and Horticulture Center Objectives.**

Scientific Inquiry: Use interrelated processes to pose questions and investigate the physical and living world.

Common Curriculum Goal: Formulate and express scientific questions and hypotheses to be investigated.

Content Standards: Formulate and express scientific questions and hypotheses to be investigated.

Leads to or meets Benchmark at Grade 5:

Ask questions and make predictions that are based on observations and can be explored through simple investigations—

1. Student will be able to ask questions about objects and events in the world.
2. Student will be able to identify questions that can be explored through scientific investigation.

Scientific Inquiry: Use interrelated processes to pose questions and investigate the physical and living world.

Common Curriculum Goal: Design scientific investigations to address and explain questions and hypotheses.

Content Standards: Design scientific investigations to address and explain questions and hypotheses.

Leads to or meets Benchmark at Grade 5:

Design an investigation to answer questions or check predictions.

1. Student will be able to identify which tools to use for the investigation.
2. Student will be able to use appropriate units of measure for the investigation.
3. Student will be able to recognize reasons for controlling variables.

Scientific Inquiry: Use interrelated processes to pose questions and investigate the physical and living world.

Common Curriculum Goal: Conduct procedures to collect, organize, and display scientific data.

Content Standards: Conduct procedures to collect, organize, and display scientific data. Leads to or meets Benchmark at Grade 5:

Collect, organize, and summarize data from investigations—

1. Student will be able to select and use an appropriate organization for data summary.
2. Student will be able to select and use familiar tools, such as magnifiers, thermometers, and rulers, to gather data.
3. Student will be able to recognize how to measure and record simple properties such as temperature, time, distance, volume, and mass.

Scientific Inquiry: Use interrelated processes to pose questions and investigate the physical and living world.

Common Curriculum Goal: Analyze scientific information to develop and present conclusions.

Content Standards: Analyze interpret, and summarize the data from investigation.

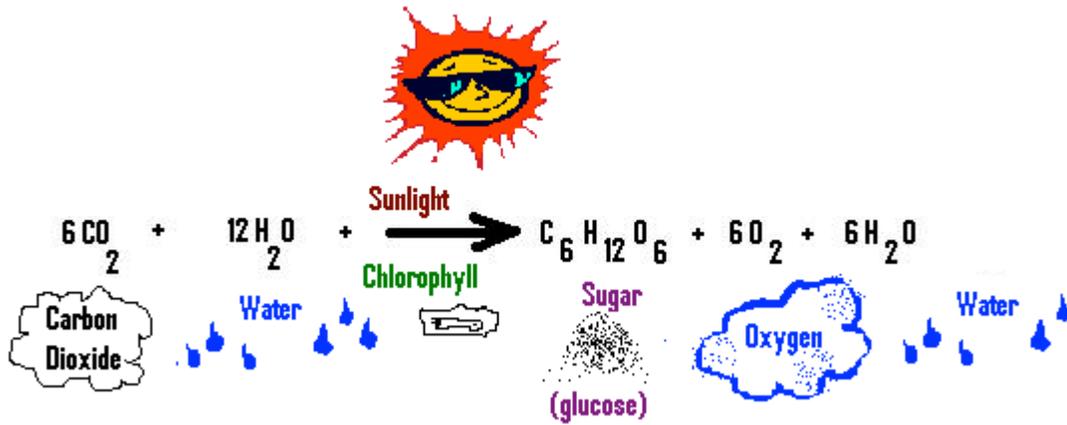
Leads to or meets Benchmark at Grade 5:

1. Student will be able to analyze and interpret data related to the question or hypothesis.
2. Explain why the data from one person's investigation might differ from the data of others performing the same investigation.
3. Analyze data to determine possible questions for further investigation.

## Cycles: Plants and Seasons

**PHOTOSYNTHESIS**, turning sunlight into food:

This amazing trick is sort of the Rumpelstiltskin turning straw into gold but without it none of us would eat!

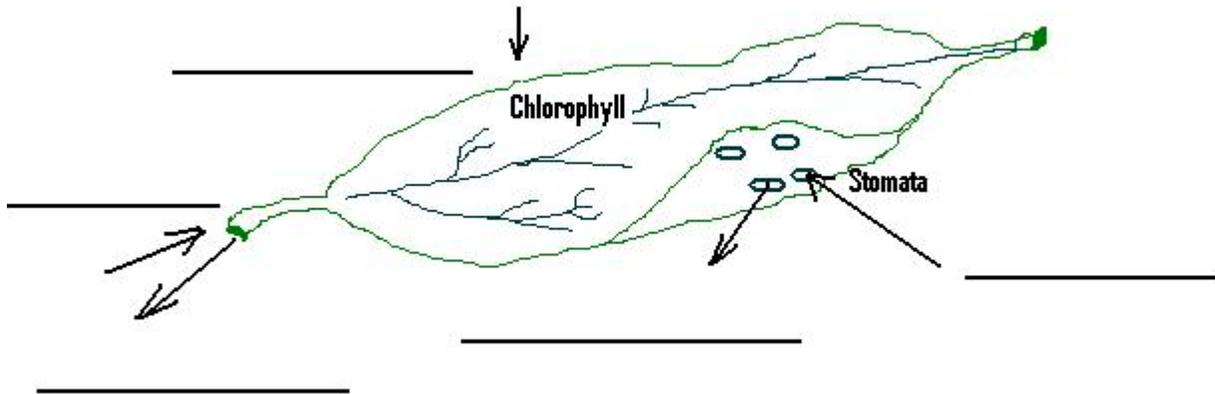


How much gas has the green plant "breathed" out since the experiment began? \_\_\_\_\_

What gas is it?  
\_\_\_\_\_

**DRAW A PICTURE OF PHOTOSYNTHESIS:**

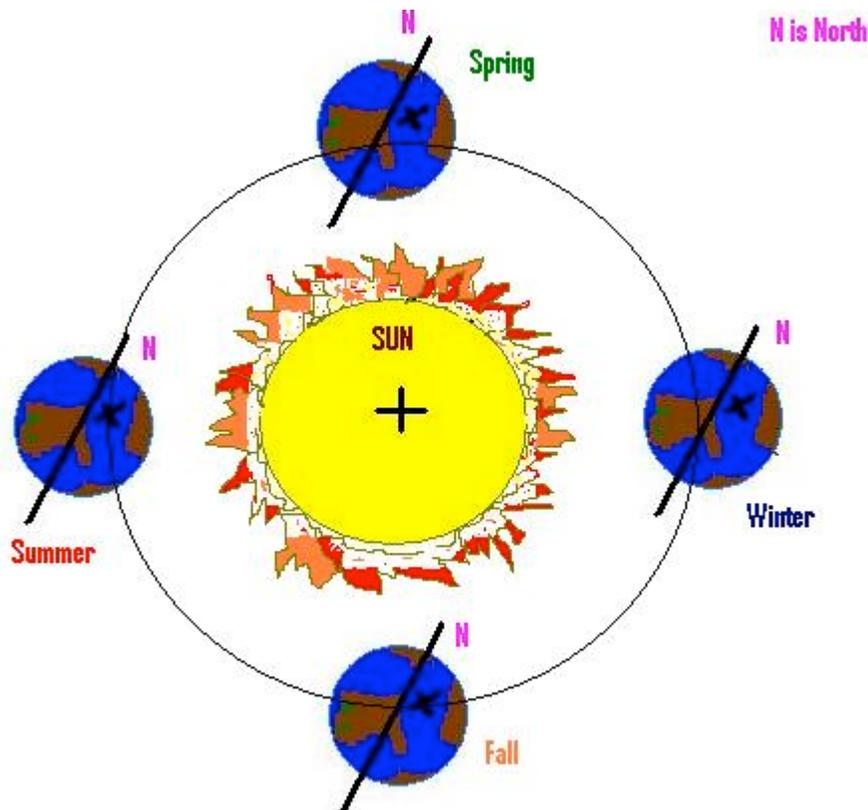
Show where the plant gets its energy, where the gases come from and go and where the water comes from ---



**Cycles: Plants and Seasons  
(con't)**

**SEASONS: Spring, Summer, Fall (Autumn), Winter . . . WHY?**

**Measure how far the pretend sun's ray needs to travel to reach Oregon in each season.**



**Spring:**

\_\_\_\_\_

**Summer:**

\_\_\_\_\_

**Fall (Autumn):**

\_\_\_\_\_

**Winter:**

\_\_\_\_\_

Is your hand warmer or cooler as it gets closer to the light?

ARE THE SUN'S RAYS WARMEST WHEN THEY ARE

SHORTER or LONGER

(Circle One)

Why do plants grow most in summer? \_\_\_\_\_

---

### STATION GREEN ACTIVITY

## Cycles: Plants and Seasons

Plant Life Cycles; they are not all the same



**WOODY** plants live for many years. Some lose their leaves in autumn (deciduous), some don't (evergreens).



**PERENNIAL** plants live for several years. They die back in winter but come up again in spring.



Plant a Vegetable Garden for you family

How many people are in your family? \_\_\_\_\_ If each person needs \_\_\_\_\_ carrots planted and \_\_\_\_\_ tomato plants, corn plants and \_\_\_\_\_ bean plants for your garden. Draw your garden plants in the rows below putting a "C" for each carrot, a "B" for each bean, a "T" for each tomato plant, and a "C" for each corn stock that you will plant:

**CARROTS**

-----

**BEANS**

-----

**TOMATOES**

-----

**CORN**

-----

Many vegetable live only one year. Are these vegetables annual or woody?

\_\_\_\_\_

## STATION GREEN ACTIVITY WORMS!

DRAW A PICTURE OF A WORM:

HOW DOES IT FEEL? \_\_\_\_\_ HOW LONG IS IT? \_\_\_\_\_

HOW DOES IT MOVE? \_\_\_\_\_

CAN YOU FIND ITS MOUTH? \_\_\_\_\_ "FEET" \_\_\_\_\_ (Look at the chart to see where they are).

WHAT DO WORMS AND OTHER DECOMPOSERS DO IN A GARDEN AND IN THE FOREST? \_\_\_\_\_

---



**STATION RED ACTIVITY  
WORMS!  
AN EXPERIMENT: What does your worm like?**

**THE QUESTION:** \_\_\_\_\_  
\_\_\_\_\_

**THE HYPOTHESIS (what you think the answer is):** \_\_\_\_\_  
\_\_\_\_\_

**THE METHOD (how you will test to see if your educated guess is correct):** \_\_\_\_\_  
\_\_\_\_\_

**THE DATA:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

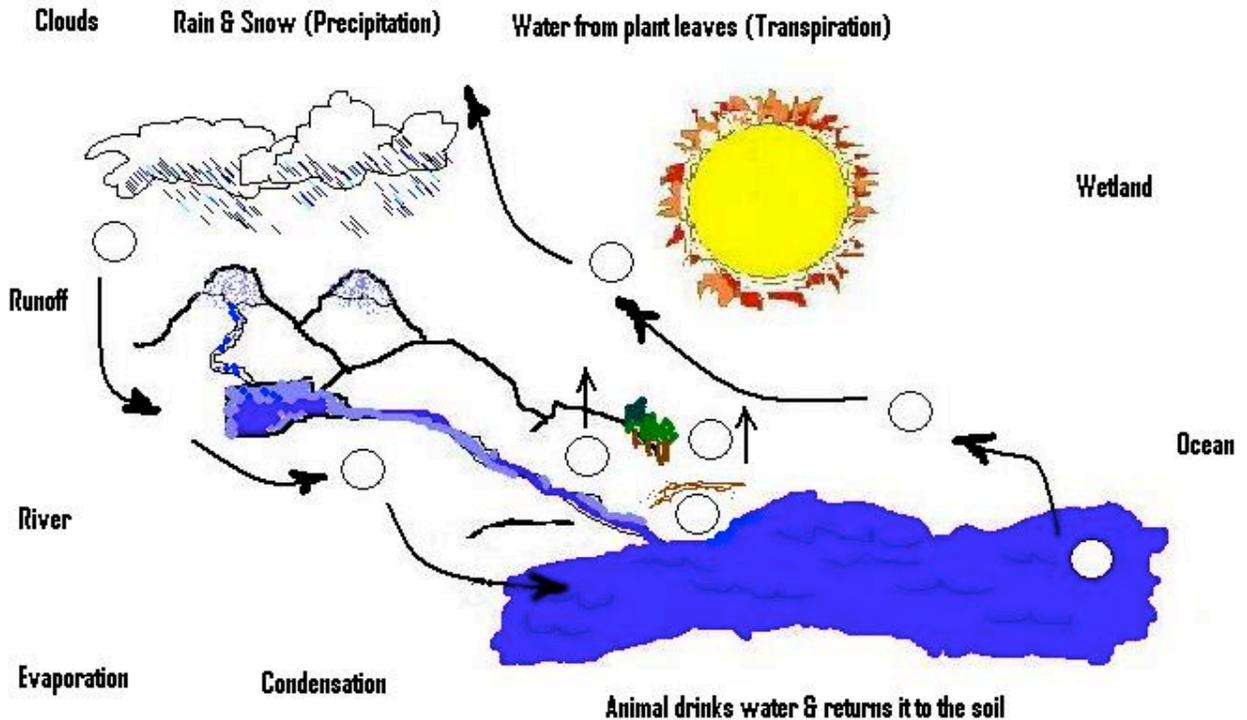
**THE CONCLUSION (what you found):** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## STATION RED ACTIVITY

### Water Cycle: Follow-up Activity Sheet

The water we drink could be the same water a dinosaur drank because our precious water goes around and round in a never-ending cycle . . . if we protect it.

Pretend you are a raindrop. Draw a line from each of the words below to name a step in the water cycle you'll travel to get back home including some of the side trips you might take.



How much of the earth is covered in water? (circle one)



How much of that water is drinkable? (Circle one)



**STATION BLUE FOLLOW-UP ACTIVITY**  
**Water Cycle**  
**(con't)**

What happens when the sun shines on your miniature water cycle? \_\_\_\_\_

---

---

---

What happens when it is cold? \_\_\_\_\_

---

---

---

Why? \_\_\_\_\_

---

---

---

**STATION BLUE FOLLOW-UP ACTIVITY  
Appendix A**

**Post Activities**

**These activities are suggested to complete the visit of the mobile greenhouse and nature center – “The Caterpillar” to your school**

**Post-Visit Activities:**

- 1. Complete the activities begun in the “Caterpillar”:**
  - a. Observe the mini water-cycle and complete the follow-up worksheet.**
  - b. Take the four groups of worm experimenters and have them compare notes and form some composite information about worms and decomposers.**
  - c. Continue to care for the vegetable seeds planted in pots:**
    - i. Send them home for the students to care for the plants.**
    - ii. Create and maintain a school or classroom garden.**
- 2. There is information about several possible post-visit activities are in the back pocket of each grade level's folder.**

**Appendix B  
Change  
Resources**

**Background Material:**

1. There is additional information on plants, life cycles, and worms included in the front pocket of your grade level folder.

**Additional Resources:**

**Books:**

1. **A Seed Grows: My first look at a Plant's Life Cycle; Pamela Hickman; Kids Can Press, LTD., 1997. ISBN: 1550742000.**
2. **Planets in Transit: Life Cycles for Living (The Planet Series); Robert Hand and Charles A Jayne; Schiffer Publishing, LTD., 1980. ISBN: 0914918249.**
3. **Pumpkin Cycle: The Story of a Garden; George Levenson and Schmuell Thaler; Tricycle Press, 1999. ISBN: 1582460043.**
4. **From Tadpole to Frog; Jan Kottke; Children's Press, 2000. ISBN: 0516235117**
5. **Tree is a Plant; Clyde Robert, Robert Bulla, and Stacey Schuett; Harper Collins Children's Books, 2001. ISBN: 0064451968.**
6. **Cycles of Life: Exploring Biology; Cecie Starr and Gerald L. (Ed) Kellogg; Thomson Learning, 1999. ISBN: 0534372724.**

**Websites:**

1. U.S. Environmental Protection Agency: [www.epa.gov/kids/](http://www.epa.gov/kids/)
2. The Global Habitat Project Green Screen: [www.greenscreen.org](http://www.greenscreen.org)
3. Project Learning Tree: [www.plt.org](http://www.plt.org)

## Appendix C

### Glossary

**Decomposers:** An important step in many cycles, which connects the beginning with the end by breaking down dead plants and animals into material that is used again.

**Worms and Worm parts:**

**Setae** – bristles on the underside (made of chitin, like fingernails) which help worms dig a burrow and cling to their burrow when predators try to pull them out.

**Clitellum** – a long swollen segment located about 1/3 of the way from the front, which indicates a worm is old enough to mate and lay eggs.

**Rotation:** Going around the earth, facing the sun rotates once a day, bringing night and day. The earth rotates around the sun once a year, bringing the seasons.

**Butterfly Cycle:** A complete metamorphosis; incomplete is equal to an egg, nymph, and adult. Stages – 1) Egg, 2) larva (caterpillar), 3) pupa (chrysalis), 4) adult (butterfly).

**Frog Cycle:** Stages – 1) Egg (in water), 2) tadpole (in water), and 3) grow legs and becomes a frog (on land and water).

**Plant Cycles:** Stages – 1) Seed, 2) root, 3) leaves, 4) flowers, 5) pollination, 6) new seed formed, 7) plant dies – after a variety of periods 8) decomposers break down leaves to make new soil for seeds.

**Annual plants:** They live only one year, produce seed to reproduce and then die.

**Perennials:** They live more than two years, die back to the ground in winter.

**Woodies:** They live a long life (length varies); have a woody structure above ground all year; can be deciduous (lose their leaves in fall) or evergreen.

**Photosynthesis:** Plants use sun, CO<sub>2</sub>, chlorophyll, water to make food (glucose), oxygen and water.

**Water Cycle:**

- 1) **Evaporation** – to change from liquid to vapor; in warm temperatures air can hold more water particles.
- 2) **Condensation** – to change from vapor to liquid; in cold temperatures air can't hold as much water.
- 3) **Clouds** – a mass of condensed water or ice droplets.

- 4) Precipitation – rain and snow.**
- 5) Transpiration – plants release oxygen and water in the air.**