

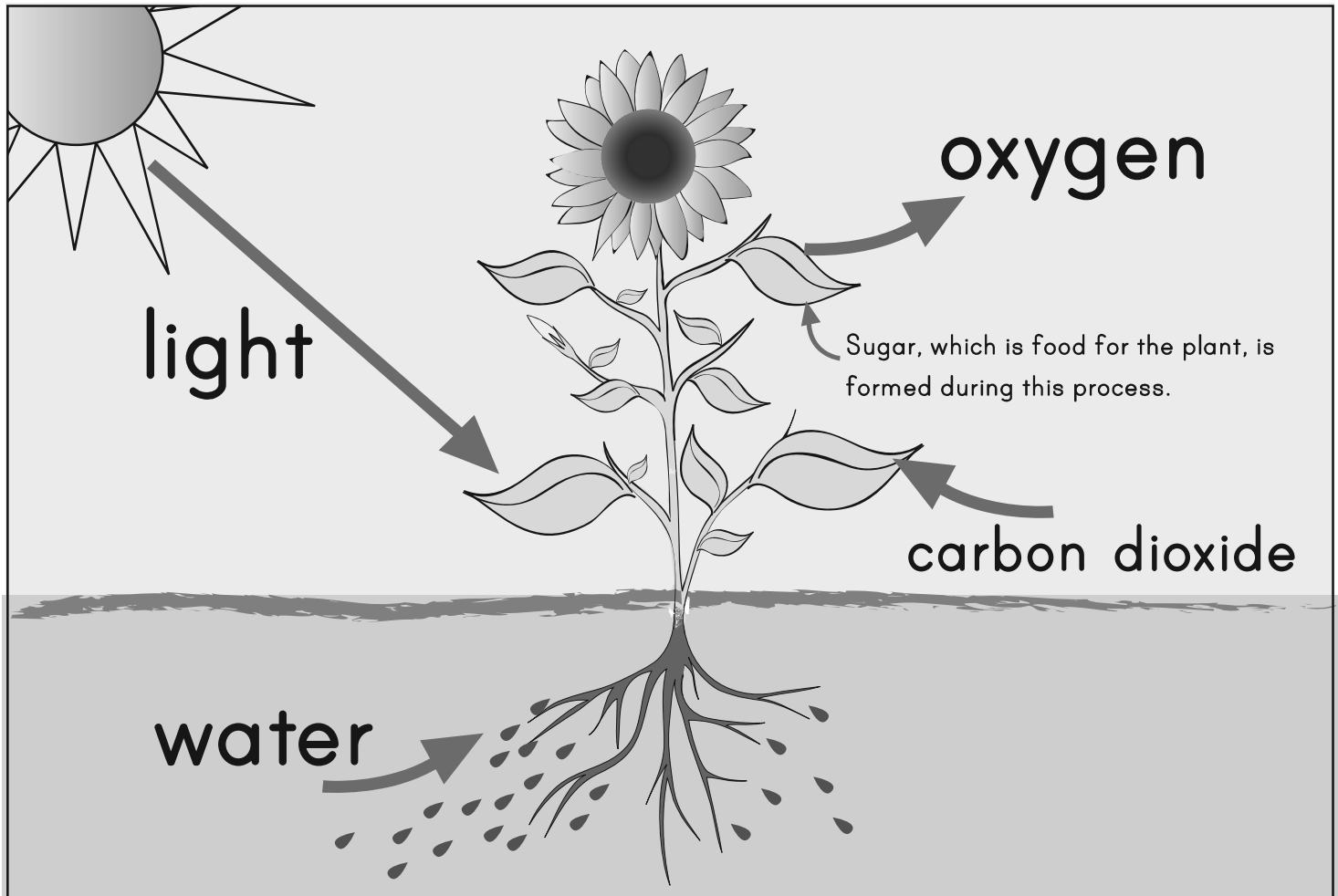
Shelby County Schools  
Extended Learning Packet



Science  
Grade 4

# what is Photosynthesis

Look at the picture and fill in the blanks using the words at the bottom of the page.



Photosynthesis is a process where plants use \_\_\_\_\_ from the sun to convert \_\_\_\_\_ from the air and \_\_\_\_\_ from the soil into \_\_\_\_\_ to feed the plant and \_\_\_\_\_ is given out in the air.

water, sugar, carbon dioxide, light, oxygen

# Living it up with plants



## Background knowledge

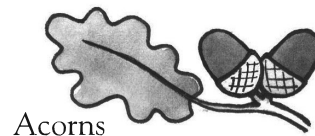
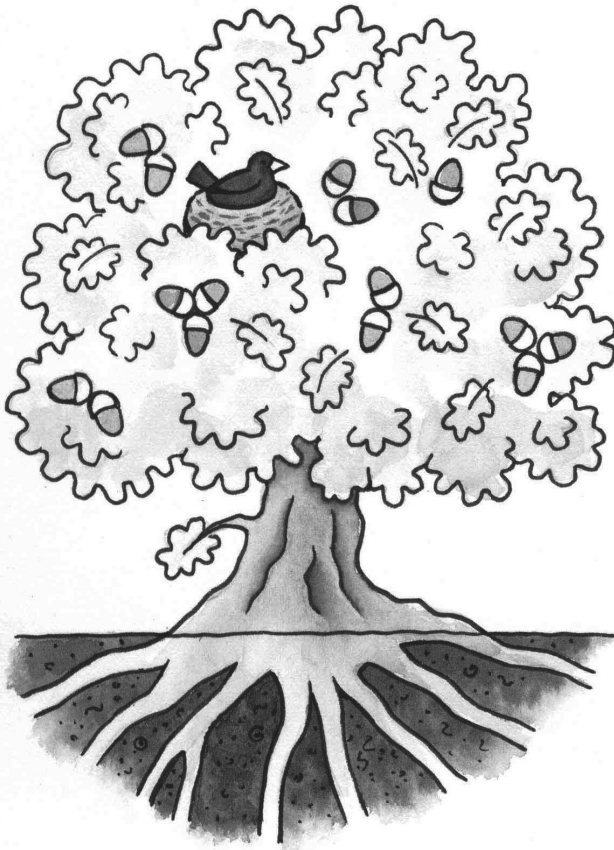
Plants are living things, but they are different from animals. Plants can make their own food inside their leaves. In order to make food, they need sunlight, gas from the air, and water from the soil. Plants use this food to grow and to carry out other life activities. They reproduce to make more plants like themselves. Unlike animals, plants do not move from place to place on their own. Plants are sensitive to light and grow toward it.

## Science activity

Here are some observations about an oak tree. Put a check mark (✓) beside any fact that tells you the oak tree is alive.

- |   |  |
|---|--|
| <input type="checkbox"/> The tree uses its leaves to make food. | <input type="checkbox"/> It produces acorns in the autumn. |
| <input type="checkbox"/> Birds nest in the branches.            | <input type="checkbox"/> Squirrels eat the acorns.         |
| <input type="checkbox"/> It takes in water through its roots.   | <input type="checkbox"/> It grows 300 mm each year.        |
| <input type="checkbox"/> The branches move in the wind.         |  |

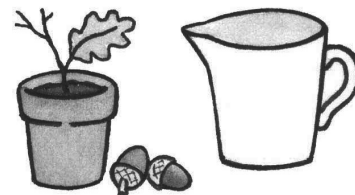
Oak tree



Acorns

## Science investigation

Design and conduct an experiment to learn about a plant's life activities. How does it respond to its environment? How do you know it grows? Create your own questions to test.



NAME: \_\_\_\_\_ PERIOD: \_\_\_\_\_

### Potential & Kinetic Energy

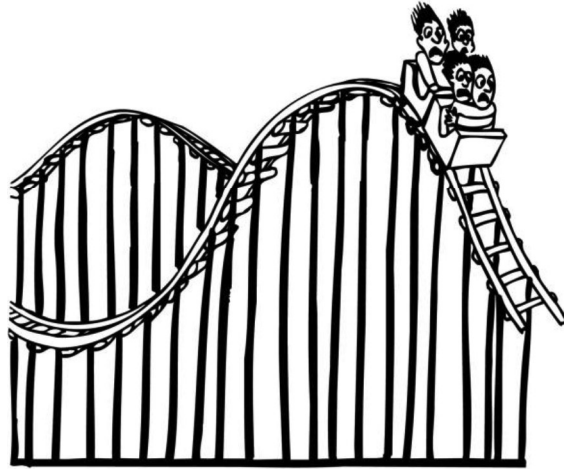
DIRECTIONS: Think about which type of mechanical energy the following contain. Place an X in the appropriate box.

DESCRIPTION	KINETIC ENERGY	POTENTIAL ENERGY
A car traveling 100 mph along a flat road		
A rubber band that has been stretched		
A bowling ball rolling down a lane		
A piano lifted to a second story window		
A snowboarder jumping off a ramp		
An airplane traveling at a speed of 450 mph		

DIRECTIONS: Look carefully at each picture. Tell whether each picture shows an example of POTENTIAL ENERGY or KINETIC ENERGY. Give evidence to support your thinking.



1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Up to Speed



Cedar Point

*Top Thrill Dragster is the world's second fastest roller coaster. It is topped only by Kingda Ka.*

## Thrill Ride

Kingda Ka is one wild ride.

As you wait in line, you hear the screams of people riding the roller coaster. Part of you can't wait to ride it; another part of you wants to bolt in the opposite direction. Before you know it, it's your turn to board. You brace yourself.

*Whoosh!* With a roaring blast, the thrill ride rockets from 0 to 128 miles per hour in 3.5 seconds. Before you can catch your breath, the train whisks you straight up 456 feet. When it can go no farther, gravity plummets the coaster downward into a dizzying spiral twist. The train then whips you through another valley and zooms up another hill.

Congratulations! You have just experienced one of the fastest-and tallest-roller coasters on Earth.

## King of Coasters

Kingda Ka, or the "King of Coasters," opened in the spring of 2005 at the Six Flags Great

Adventure theme park in Jackson, New Jersey. The jaw-dropping thrill ride shattered the world's record for roller coaster speed and height when it opened. Of the more than 1,000 roller coasters in the United States, it was the latest "extreme" coaster to be built.

Six Flags roller coaster designer Larry Chickola said that building Kingda Ka wasn't easy. "We considered the wind strength, the possibility of earthquakes, the weight of Kingda Ka itself, as well as the forces caused by launching a [coaster faster than one] has ever gone," he told *Weekly Reader*.

## How Coasters Work

Changes in **energy** enable roller coasters like Kingda Ka to move for most of the ride. According to scientists, energy is the ability to cause change. At the beginning of the ride, Kingda Ka blasts passengers to a speed of 128 miles an hour with technology similar to the kind that launches Navy jets from aircraft carriers. Each train on Kingda Ka is hooked up to a hydraulic cable. Liquid under high pressure is pushed through the cable. Along with motors, the hydraulic power rockets the coaster skyward.

After reaching the top of the first hill, the coaster works in the same way your bike does when you roll, pedal-free, down a slope. When a roller coaster is stopped, it has **potential energy**, or stored energy. At any moment, the coaster can move, so it has the potential for motion.

As the roller coaster starts cruising, gravity takes over and converts the potential energy into **kinetic energy**, which is the energy of motion. The repeated changes of potential energy to kinetic energy and then back again drive the roller coaster.

## It's a Scream!

Kingda Ka covers 3,118 feet of track and lasts less than a minute. To roller coaster buff Steve Urbanowicz from New Jersey, the ride is a scream! "The ride seems like it's over really quickly, but Kingda Ka packs eight high moments of drama into those 50 seconds," he told *Weekly Reader*.

Urbanowicz speaks from experience. He has ridden more than 800 roller coasters around the world. In fact, he has taken more than 5,000 rides on one in particular—the wooden Cyclone at Coney Island in Brooklyn, New York, where the first true American coaster opened in 1884.

"I loved going to amusement parks when I was a kid and never grew out of it."



Library of Congress, Prints & Photographs Division (reproduction number LC-USZ62-63945)

*This illustration from 1886 shows passengers getting a one-minute ride for 5 cents aboard Coney Island's coaster.*

## Cool Coasters

- The idea for the roller coaster was born in Russia in the 1600s when huge blocks of ice, supported by wood, were made into sleds. Straw or fur covered the icy seats.
- Coney Island in Brooklyn, New York, is credited with beginning America's amusement park history, in 1875. The nation's first coaster opened there in 1884 and cruised all of 6 miles an hour!
- Some of the best coasters of all time were built during the 1920s. That era reigns as the golden age of amusement parks. By the end of the decade, the stock market crash of 1929 and the Great Depression caused many parks to close.



Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. The author begins the passage by having the reader imagine getting on the Kingda Ka to

- A. warn the reader about the coaster.
- B. make the reader interested in the passage.
- C. challenge the reader to ride the coaster.
- D. explain the feelings people will have when riding large coasters.

2. When the author says, "You brace yourself," he means you

- A. hand over your ticket.
- B. put a special brace across your body.
- C. secure yourself for the ride.
- D. make your partner secure.

3. After the roller coaster has used potential energy, it

- A. is launched skyward.
- B. stops.
- C. is no longer safe.
- D. uses kinetic energy.

4. Steve Urbanowicz says that, "The ride is a scream." This means

- A. The ride is thrilling.
- B. The coaster cars scream when people get on.
- C. If you want to ride the coaster, you have to scream while you are on it.
- D. The ride makes everyone scream.

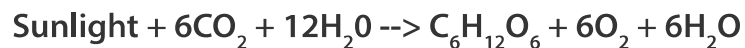
5. The author uses a lot of words that mean exciting and scary. List two words that have the same meaning as exciting and scary. Explain what they mean.

# Water's Part in Photosynthesis

Vocabulary	
photosynthesis	stomata
chlorophyll	guard cells
chloroplast	transpiration

**Photosynthesis** is the process in which plants use water, sunlight, and carbon dioxide (CO<sub>2</sub>) to make food for themselves. Plants, algae, and certain bacteria contain a compound called **chlorophyll**—it is the pigment that gives plants their green color. This compound is located in the **chloroplast** of plant cells. Chlorophyll absorbs sunlight and uses its energy to make food carbohydrates from CO<sub>2</sub> and water. This food is called **glucose**. In the process of making food, plants give off or release oxygen (O<sub>2</sub>) to the atmosphere.

The equation for the process of photosynthesis is:



Humans breathe out CO<sub>2</sub> during respiration, and plants use this in the process of making food for themselves. In turn, plants give off O<sub>2</sub> during this process, and the O<sub>2</sub> is breathed in by humans.

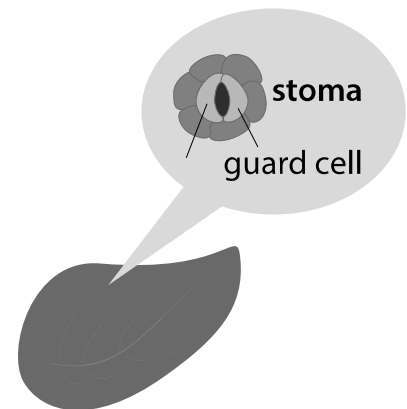
## Water's Involvement

Water (H<sub>2</sub>O) enters the plant through its roots via a special plant tissue called **xylem**. The xylem carries the water up to the leaves. The leaves have specialized structures called **stomata** that allow CO<sub>2</sub> to pass into the leaf. A pair of **guard cells** surrounds the stoma (the singular term for stomata). The guard cells control the opening and closing of the stoma. The stomata also allow O<sub>2</sub> to pass out. While these gases are moving in and out of the leaf, a great deal of water is also lost. This loss of water is called transpiration.

**Transpiration** is the process in which water travels from the roots of the plant, through the plant, and to the leaves. Water is lost through the stomata of the leaves. The guard cells contract and expand depending on the circumstances of the plant.

During the night, the stomata close because without the sun, there's no demand for CO<sub>2</sub> for photosynthesis. Transpiration rates vary depending on weather conditions. The more humid it is, the less a plant will transpire. The drier the atmosphere, the greater the transpiration rate will be. It's easier for water to evaporate into drier air than into humid air. Warmer air holds less moisture so the transpiration rate will increase in higher temperatures. When stomata are open, transpiration rates increase; when they are closed, transpiration rates decrease.

Since animals and humans obtain their food by eating plants, photosynthesis is also the source of our lives.



## Questions

1. Draw a picture on the back of this paper of photosynthesis and label the parts: plant, sunlight, CO<sub>2</sub>, O<sub>2</sub>, transpiration, xylem, stomata, and guard cell. Use arrows to indicate whether a gas and/or water vapor is entering or leaving the plant leaf.

2. What are the ingredients used to make glucose for plants?

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3. What is the name of the pigment that absorbs sunlight in plant cells?

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4. What is the function of xylem?

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5. What causes stomata to open?

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6. What causes the rate of transpiration to increase in a plant?

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7. Fill in the definitions for these vocabulary words.

<b>Vocabulary</b>	
<b>photosynthesis</b>	
<b>chloroplast</b>	
<b>chlorophyll</b>	
<b>glucose</b>	
<b>xylem</b>	
<b>stomata</b>	
<b>guard cells</b>	
<b>transpiration</b>	

# Weathering, Erosion, Deposition Worksheet

**Matching: Put the letter of the correct term in the blank.**

- |                  |                |               |
|------------------|----------------|---------------|
| A. roots         | D. ice wedging | G. tropical   |
| B. chemical      | E. oxidation   | H. mechanical |
| C. carbonic acid | F. desert      |               |

- \_\_\_\_\_ 1. The type of weathering that is the physical break down of rocks.
- \_\_\_\_\_ 2. When water enters cracks in rocks and freezes, it expands and breaks the rock apart.
- \_\_\_\_\_ 3. The part of plants that seek water and nutrients, often breaking rock apart
- \_\_\_\_\_ 4. The type of weathering that occurs when chemicals react with minerals.
- \_\_\_\_\_ 5. An acid that forms from the result of water mixing with carbon dioxide gas in the air or soil.
- \_\_\_\_\_ 6. The process when water and oxygen combine to form rust
- \_\_\_\_\_ 7. The type of climate where chemical weathering will occur more quickly due to the warm, moist environment
- \_\_\_\_\_ 8. The type of climate where chemical weathering will occur more slowly due to lack of moisture.

**Identify each statement below as an example of mechanical or chemical weathering. Write M for mechanical or C for chemical in the blank.**

- \_\_\_\_\_ 9. The wedging of tree roots along sidewalks, breaking apart rocks and cement
- \_\_\_\_\_ 10. Limestone reacting with carbonic acid
- \_\_\_\_\_ 11. The oxidation of minerals that contain iron
- \_\_\_\_\_ 12. Animals burrowing and digging in rock
- \_\_\_\_\_ 13. Repeated freezing and thawing of water that cracks rock
- \_\_\_\_\_ 14. The action of water, salt, and air on car fenders, creating rust
- \_\_\_\_\_ 15. The formation of potholes in streets during severe winters
- \_\_\_\_\_ 16. Halite (a mineral in rocks) reacting in water
- \_\_\_\_\_ 17. Substances from decaying plants reacting with minerals in rocks

**Short Answer:**

18. Explain the difference between weathering, erosion, and deposition.

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**Fill in the blank:**

- \_\_\_\_\_ 19. This type of erosion picks up materials and transports them in the air, often causing the abrasion of surfaces.
- \_\_\_\_\_ 20. This type of erosion includes slumps, creeps, rockfalls, and mudflows.
- \_\_\_\_\_ 21. When water erodes an area, is more damage done when the water moves slowly or when it moves fast?
- \_\_\_\_\_ 22. What types of objects might one see as a result of wave deposition?
- \_\_\_\_\_ 23. What type of deposition would create sand dunes?
- \_\_\_\_\_ 24. What is the area called when water deposits sediments at the mouth of a river?
- \_\_\_\_\_ 25. What type of erosion and deposition is not a major force in Texas?