

PHASES AND ECLIPSES



VOCABULARY

crescent ('kre.sənt) the moon phase in which less than half of the moon's sunlit side is visible

gibbous ('ji.bəs) the moon phase in which more than half, but not all, of the moon's sunlit side is visible

wax ('waks) to grow

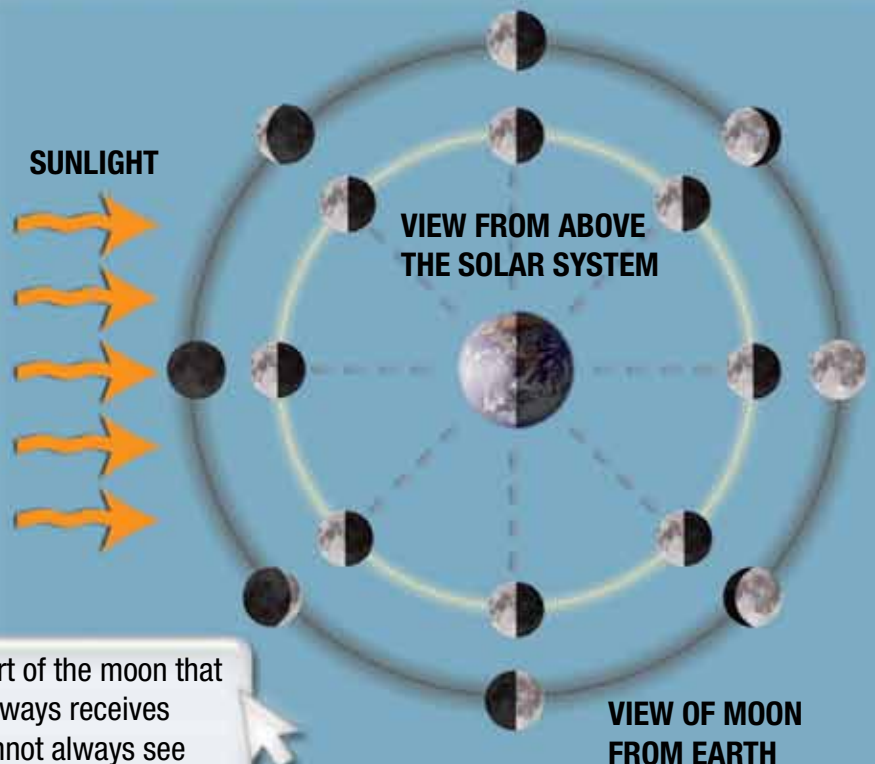
wane ('wān) to shrink

lunar eclipse ('lōō.nər i.'klips) an event that occurs when Earth passes directly between the sun and the moon, causing Earth's shadow to block the sun's light from the moon

solar eclipse ('sō.lər i.'klips) an event that occurs when the moon passes directly between the sun and Earth, causing the moon's shadow to block the sun's light from a portion of Earth

As the moon revolves around Earth and rotates on its axis, people see portions of its sunlit side. The shapes indicate which phase the moon is in. Each phase results from the positions of the earth, the moon, and the sun. Eight main phases are the new, first quarter, full, and third quarter moons, as well as two crescent and two gibbous moons. A **crescent** moon is similar in shape to the letter C. A **gibbous** moon is larger than a semi-circle but is not a complete circle of light. When the moon is directly between Earth and the sun, it is called *a new moon*, which cannot be seen. As the moon travels counterclockwise around Earth, it appears to grow, or **wax**. When all of the near side is illuminated, it is called *a full moon*. After a full moon occurs, it appears to shrink, or **wane**, as it returns to a new moon. The moon's near side always faces Earth while most of its far side faces away from Earth.

When can the moon be seen on Earth?



Although the part of the moon that faces the sun always receives sunlight, we cannot always see the sunlit side from Earth.

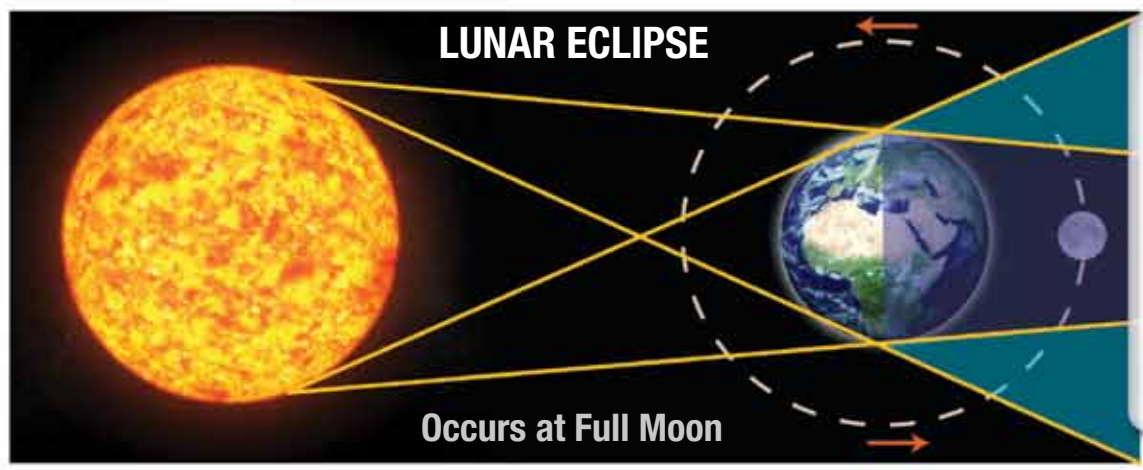
When the earth and moon are in line with the sun, they occasionally block sunlight from each other. These events are called *eclipses*. There are two types of eclipses—lunar and solar. A **lunar eclipse** occurs when Earth blocks the sun's light from the full moon. For this to happen, Earth must be between the sun and the moon. A **solar eclipse** blocks sunlight from a portion of the earth. This takes place when the moon passes directly between the sun and the earth during a new moon phase. The moon's color and brightness during an eclipse varies because of the amount of light refracted or bent by the earth's atmosphere.

 **QUICK FACT**

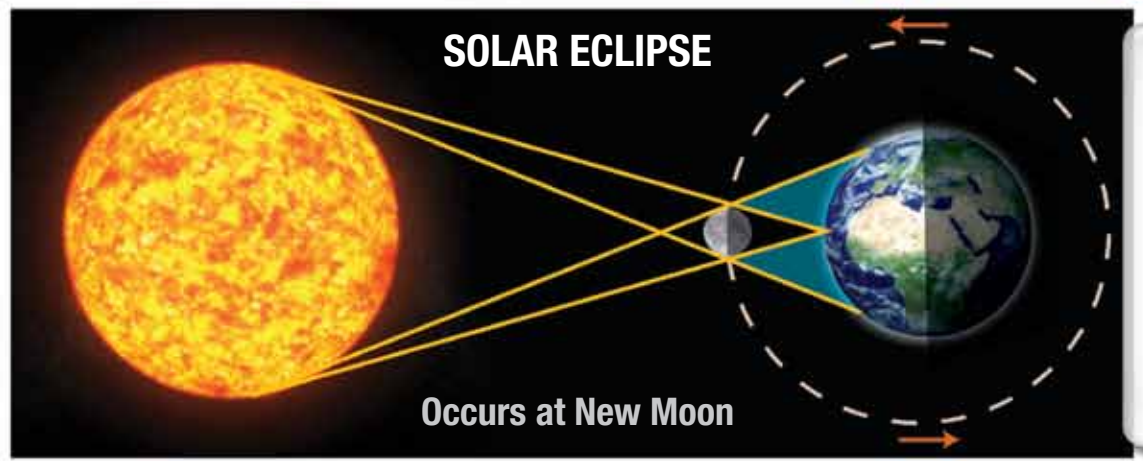


During a total lunar eclipse, the earth blocks sunlight from the moon. However, some light from Earth's atmosphere is reflected by the moon, causing the moon's color to range from gray to a copper color.

During a total solar eclipse, the moon blocks sunlight from the Earth.



Viewing the moon from Earth, people can experience a partial lunar eclipse when the moon passes through the lighter part of Earth's shadow. A total lunar eclipse occurs when the moon passes through the darker part of the shadow.



Viewing the sun from Earth, people can experience a partial solar eclipse when the earth passes through the lighter part of the moon's shadow. A total solar eclipse occurs when the earth passes through the darker part of the shadow.

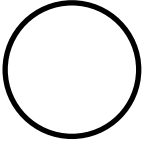
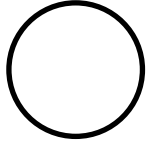
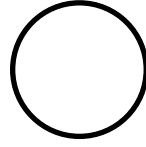
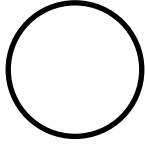
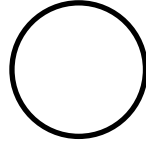
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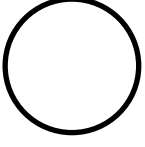
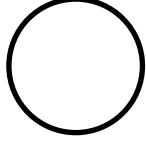
More Moon Observations

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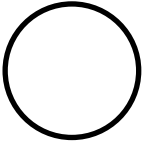
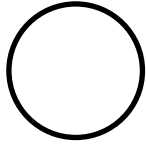
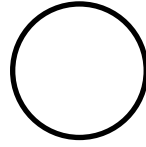
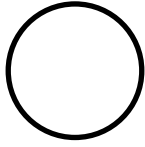
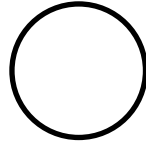
Darken the part of the moon you cannot see. Be careful to show how the moon's shape is tilted in the sky. Write the direction in which you saw the moon, such as N, S, E, W, NW, SW, NE, or SE. Determine the angle of the moon above the closest horizon using the astrolabe or your fists if you do not have your astrolabe with you. Indicate the exact time you observed the moon and also use AM or PM.

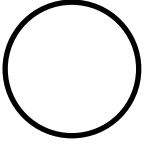
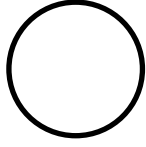
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1. How has the shape of the moon changed this week? Where in the sky have you seen the moon? Did you ever observe the moon twice in one day? If so, what did you notice?

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2. Compare the shape of the moon this week to last week. How has it changed? Has the time you observed the moon changed?

3. After observing the moon the last two weeks, what have you learned about the moon's movement in the sky? Direction? Angle in the sky?



VOCABULARY

wisdom teeth ('wiz-dəm 'tēth) the third molars, usually the last teeth to appear

cavity ('ka-və-tē) an area of tooth decay caused by prolonged exposure to bacteria

Just as your body goes through a transitional time, so do your teeth. Teeth are part of the skeletal system as well as the digestive system. Humans possess two sets of teeth during their lifetimes. The first to develop are the primary teeth. The permanent, or secondary, teeth replace the primary ones that fall out. This usually happens between the ages of 6 and 14. The last to break through the gums are typically the third molars, or **wisdom teeth**. They often appear during or after late adolescence—between 17 and 21 years of age.

A sticky coating on teeth is known as *plaque* and forms when food particles mix with bacteria. Bacteria digest the carbohydrates in food. This chemical process produces acids, which often dissolve tooth enamel and form **cavities**. If not treated, the decay can reach the dentin layer of the tooth. Fortunately, saliva helps protect the exposed tooth surfaces.

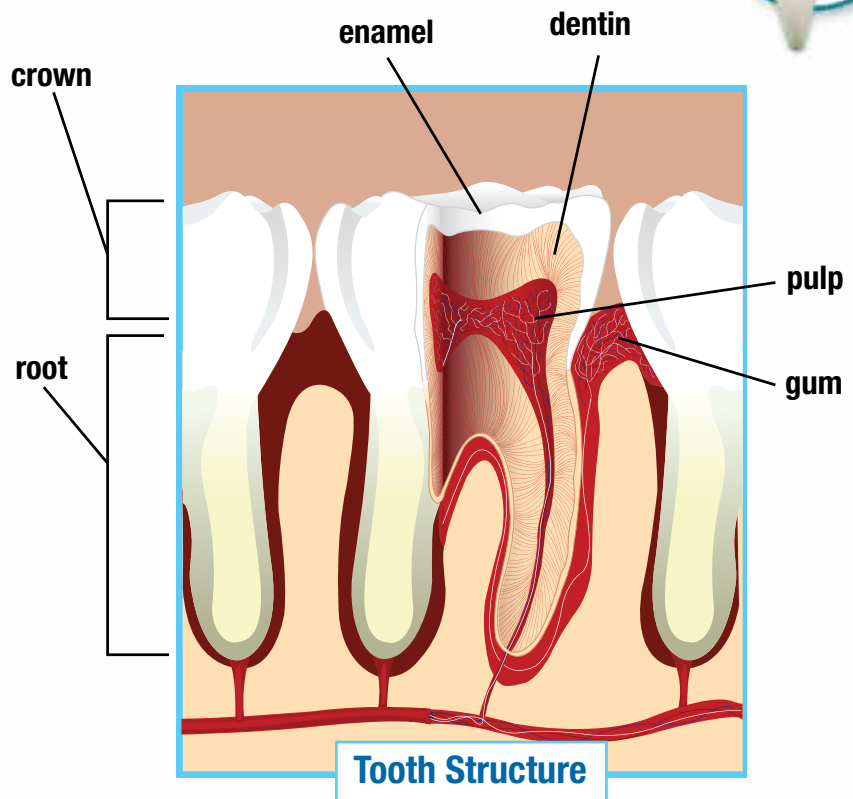


QUICK FACT

There are 53 facial muscles. It takes more muscles to form a frown than a simple smile. Five pairs of facial muscles play the largest role in smiling. Almost all of the muscles are involved in an exaggerated smile. Smiling and laughing have been scientifically proven to stimulate the immune system. These activities help restore homeostasis to the body by keeping the amount of a hormone called *cortisol* at a proper level. So, smile and laugh—it is good for you!



Why are the third molars called *wisdom teeth*?

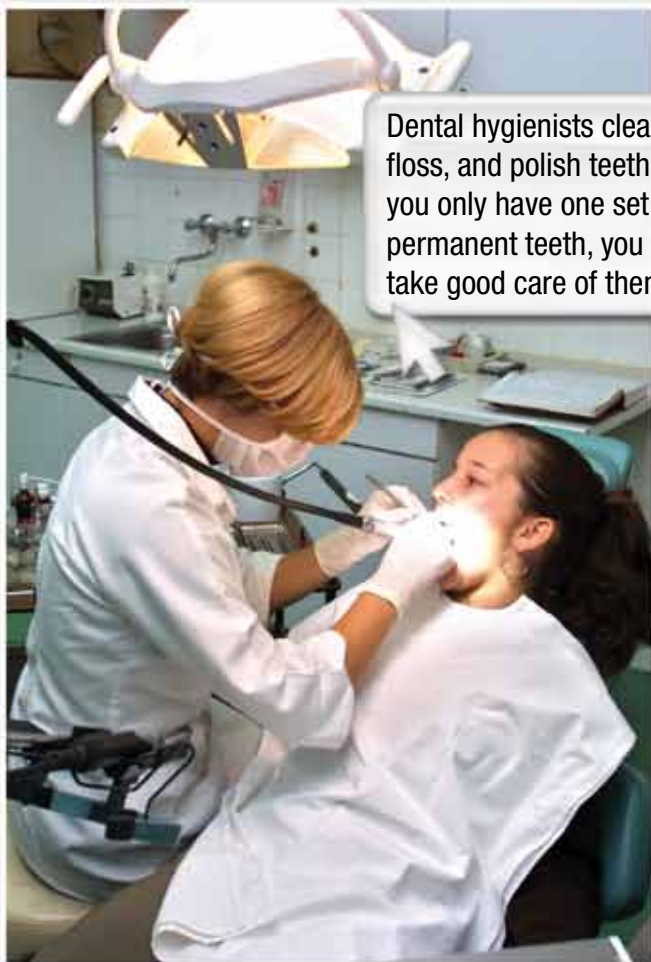



Bacteria in the mouth can also cause bad breath. The scientific word for bad breath is *halitosis*. Brushing at least two times a day and flossing nightly often cures this odor. Many toothpastes and treated water contain fluoride, a mineral that helps make teeth strong and prevents cavities from forming.

Teeth serve several purposes. They allow you to chew and speak. They also greatly affect your appearance by adding shape and form to your face. Taking care of your teeth during adolescence may prevent serious problems later in life. It is important to see a dentist regularly for a thorough checkup. In addition, avoiding too many sugary snacks or starchy foods and brushing after meals is important. Teeth can also be knocked out accidentally. It is wise to wear a mouth guard when playing sports.

IN THE FIELD

Orthodontists are dental specialists who receive two more years of training after four years of dental school. Orthodontics is the branch of dentistry involving the correction of teeth and jaw alignment through the use of braces. Crooked teeth are more difficult to keep clean and, therefore, more likely to develop cavities. They may also interfere with proper chewing and facial development.



Dental hygienists clean, floss, and polish teeth. Since you only have one set of permanent teeth, you should take good care of them.

A knocked-out permanent tooth is a dental emergency. The tooth should be picked up by the crown and then placed in a cup of milk or back in the person's mouth. Going to a dentist or hospital immediately is crucial. A tooth has the best chance of surviving if it can be returned to its socket within 30 min after coming out.

