



Summer Reading Program Entering Grade 4



Name: _____
Parent Signature: _____

The Article-A-Day summer reading is designed for each student to read engaging, informative articles while improving their reading accuracy, fluency and comprehension. Each article is paired with a 3-2-1 page that students should complete after reading that article.

Write three sentences each with a different fact that you discovered by reading the article.

Write two new words from the article with their meanings.

Write one question you have using information from the article.

Name _____ Date _____

Article Title: " _____ "

3 Facts
2 New Words
1 Question

Natural Wonders Around the World

6 Articles

Check articles you have read:

A Grand Old Canyon
190 words

Mexico's Natural Wonder: Paricutin Volcano
245 words

Australia's Natural Wonder: The Great Barrier Reef
293 words

Harbor of Rio de Janeiro
232 words

The Northern Lights
275 words

Victoria Falls: The Smoke That Thunders
253 words

A Waterfall in Iceland
139 words

The Rocky Mountains
202 words

El Salvador: The Land of Volcanoes
224 words

Inside and Outside Carlsbad Caverns
699 words

A Grand Old Canyon

by Linda Ruggieri



Canyons are deep valleys surrounded by rocky cliffs. One of the most famous canyons in the world is in the Arizona desert in the United States. It is called the Grand Canyon.

The Grand Canyon stretches for 277 miles. That is a long distance! If you were in a car traveling at highway speed, it would take you about five hours to go that far.

The cliffs of the Grand Canyon are made of brown, red, and yellow rocks and sand. It is one mile from the top of the cliffs to the floor of the canyon. The Colorado River flows along the canyon floor.

Nature has shaped the Grand Canyon. For millions of years, scientists say, wind and water hit the canyon's rocks and sand. Strong winds blew on the cliffs. Rain and river water wore down the rocks. Together, the wind and water created the canyon we see today.

Even today, wind and water continue to change the canyon by reshaping the rocks and battering the cliffs. The change is very slow, but it never stops. A million years from now, the Grand Canyon will look very different.

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3 Facts

2 New Words

1 Question

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Mexico's Natural Wonder: Paricutin Volcano



U.S. National Oceanic and Atmospheric Administration

Paricutin Volcano erupting

The Paricutin Volcano in Mexico earned its title as one of the seven natural wonders of the world in an explosive way.

In 1943, this volcano emerged from a cornfield in a village about 200 miles west of Mexico City. People living in the area had been feeling the ground shake and hearing it rumble for weeks. Then one day, the earth in the cornfield rose up about six feet! Ash and vapor exploded from the ground. By later that day, a small cone shape had formed. The volcano had begun erupting, sending lava and pieces of molten rock into the air. As these rock pieces landed around the new volcano, the cone shape grew bigger and bigger.

As Paricutin continued erupting, the surrounding area was covered in smoke and ash. People were forced to leave.

The eruption was most intense during the first year. By the end of the first year, the volcano was over 1000 feet high! Within two years, only the top of a church was visible above all the lava.

Paricutin continued exploding for about nine years before stopping. It is now about 1,391 feet high!

Now, Paricutin is considered extinct. But during the nine years it was active, scientists studied the volcano closely. Paricutin is the first volcano that scientists were able to study and document from birth to death. Thanks to this natural wonder, scientists learned a lot about volcanoes.

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Australia's Natural Wonder: The Great Barrier Reef



The Great Barrier Reef

In the Coral Sea in Australia, there is a reef. A reef is a ridge of rock, coral, or sand near the surface of a sea. But this reef isn't just any old reef. It's the Great Barrier Reef, the world's largest coral reef system. It covers over 2300 kilometers, reaching from shallow areas to deep ocean waters. It is so big that it can be seen from outer space!

The Great Barrier Reef is home to many types of living things. It has thousands of types of mollusks and over 1500 kinds of fish. It's also home to many species of sharks and dolphins, not to mention sea turtles, sea cows, and other creatures. Humpback whales even find their way to the reef to breed!

Although it's home to many creatures, the reef might be best known for its coral. The Great Barrier Reef has over 400 different kinds of coral. It includes both soft and hard coral. The reef's corals are many different colors, shape, and sizes. This is partly what makes the reef so beautiful.

The Great Barrier Reef is known as one of the most diverse and beautiful places in the world. But today, warmer ocean temperatures are putting great stress on the coral. Large areas of the reef have died or are in danger because of the warmer seawater. Pollution also affects the reef, as sediments or litter often find their way into the water. This is bad for the health of the reef and its plants and animals. People are working hard to protect the Great Barrier Reef and the species that live there. With people's help, there may be a way to save this beautiful reef and the living things it supports!

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Harbor of Rio de Janeiro

by ReadWorks



Harbor of Rio de Janeiro

On January 1, 1502, an explorer from Portugal named Goncalo Coelho and his crew sailed into a huge bay by what is now Brazil. A bay is a body of water that is partly surrounded by land. The explorers thought they had found the mouth of a large river. So they named the place "Rio de Janeiro," or "River of January." The bay they found is known today as the Harbor of Rio de Janeiro.

The Harbor of Rio de Janeiro is the world's largest natural bay, containing more water than any other bay in the world! Because of its size, the Harbor of Rio de Janeiro is considered one of the world's seven natural wonders.

The bay is surrounded by mountains made from granite. The mountains are huge and steep, with odd shapes. One of these mountains was named after a sugar loaf, because it looks like a type of bread made on an island near Portugal. Another one was named Corcovado, or "The Hunchback," because of its mound-like shape. Together, the water and mountains create a beautiful harbor.

The beauty of the harbor attracts people to this day. Tourists from all over the world come to see the gorgeous harbor and the city of Rio de Janeiro. People have even built cable cars and trains to accommodate tourists and show them around the area.

Name _____

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3 Facts

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The Northern Lights

by ReadWorks



Imagine you are somewhere far north on Earth. It's nighttime, but the sky is not dark, like you might expect it to be. Instead, it's filled with colorful lights. Some lights look like moving curtains. Others look like a steady glow, or bands across the sky. The lights are usually green, but you may see other colors, like yellow, red, purple, or blue. The lights are dazzling as they dance far above your head.

What you're imagining is the Aurora Borealis. It's also called the Northern Lights. This natural light display has wowed people for hundreds of years. In fact, it is one of the seven natural wonders of the world.

People can thank the sun for these incredible light shows. During a certain kind of solar

storm, energy and small particles from the sun can travel all the way to Earth. They can enter the atmosphere near the North Pole. These particles interact with the gases in our atmosphere. This causes the beautiful lights we see in the sky.

The color of the lights partly depends on the gas that interacts with the particles from the sun. Oxygen gives off green light or red light. Purples and blues come from nitrogen in the atmosphere.

The same kind of light show can happen near the South Pole, as well. That display is called the Aurora Australis.

It's usually easiest to see the Northern Lights in a place where it is dark. It also helps to be far north on Earth, in places such as Canada, Iceland, Alaska, and Greenland. And, of course, you're most likely to see the lights after there's a big solar storm!

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Victoria Falls: The Smoke That Thunders



Victoria Falls in Africa

Victoria Falls is one of the most impressive waterfalls on the planet. It is located along the border of Zimbabwe and Zambia, two countries in southern Africa. There, the Zambezi River takes a plunge, forming the giant "sheet" of falling water. Victoria Falls is considered to be the largest waterfall in the world. And no wonder - it's about one mile wide and 360 feet high!

This amazing sheet of falling water can be heard from miles away. The spray and mist from the waterfall can be seen from many miles away, too. In fact, local tribes first called the waterfall "Mosi-oa-Tunya." That means "the smoke that thunders." But the falls received another name in 1855. That year, a Scottish explorer came across the waterfall. His name was David Livingstone. He named it Victoria Falls after Queen Victoria, who was ruling Great Britain at the time.

The mist caused by the falls also supports the surrounding environment. Around the waterfall is a rainforest-like ecosystem. Many species of trees, plants, and animals thrive there. If you travel there, you may catch a glimpse of the many different raptor species nearby, like falcons and black eagles. You may even spot elephants in the national parks on both sides of the river!

Today, the site is one of the Seven Natural Wonders of the World. Hundreds of thousands of people make the trip to Victoria Falls each year. They hope to see the spectacular "smoke that thunders" in person.

Name _____

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3 Facts

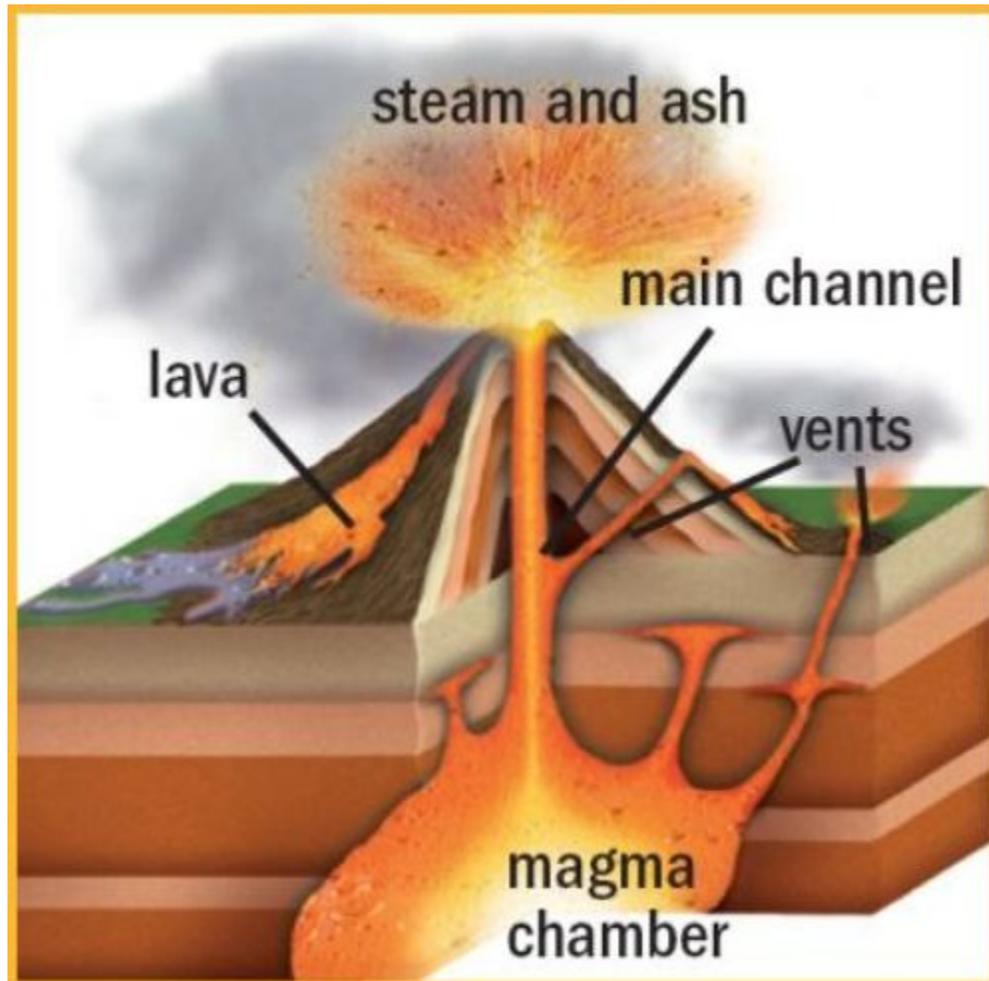
2 New Words

1 Question

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El Salvador: The Land of Volcanoes

by ReadWorks



Credit: Leigh Haeger

Drawing of an erupting volcano

There are 23 active volcanoes in El Salvador. This number is large relative to how small the country is. With so many active volcanoes, El Salvador has often experienced serious side effects from major eruptions.

One of the most significant eruptions in ancient history occurred at what is now referred to as Joya de Ceren. The volcano Loma Caldera erupted around 14,000 years ago and covered a whole village in ash. It was not until 1976, when construction started in that area, that a bulldozer unearthed this hidden village. Archaeologists have not been able to find any human remains in Joya de Ceren, which indicates that the village must have fled before the coming eruption.

Another significant volcanic eruption in El Salvador was in 260 AD with the eruption of the volcano Ilopango. The eruption was so strong that its volcanic ash reached Iceland, a country almost 5,000 miles away from El Salvador.

The most active volcano in Central America is located in western El Salvador and it is called Izalco Volcano. Since 1770, its eruptions have exceeded 50 times. As a result of this volcano's eruptive activity, a black cone has formed from the ash. Can you guess its height? It's 6,004 feet high!



Photo Credit: AP Images

Photograph of lava coming out of volcano

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Inside and Outside Carlsbad Caverns

by ReadWorks



Imagine watching hundreds of thousands of bats swirl around you, swarming to form a large, black mass that flies off into the horizon. At Carlsbad Caverns in New Mexico, this scene is a regular occurrence. The caverns, located in a United States National Park, are home to around 400,000 Mexican free-tailed bats that fly out into the night sky each evening at dusk to feed on nearby moths and insects, returning at dawn to their caves. The spectacle draws crowds from around the world into the Chihuahuan Desert, where the park is located. One such visitor was Laurel Mathews, who once visited the caves with her family on a road trip.

"At the entrance to one of the caves, there's stadium seating for visitors to watch the bats," she remembers. "We waited a long time to see them. Finally, they started circling out of the cave and they flew off-out came more and more and more, all of them flying in loops and then out into the sky. It was amazing that there were so many!"

Laurel also remembers the sound the bats made, describing the high, screeching noise. "It was really creepy, but also really cool," she says.

Laurel recalls her family's arrival at the Carlsbad Caverns National Park. "It didn't look very spectacular when we first drove in," she admits. "But then we started exploring the big network of underground caves."

The formation of the caves is a result of a fossilized reef that existed 250 to 280 million years ago in an inland sea that has long since disappeared. Since limestone is typically made up of fragments of coral, a large limestone deposit eventually formed in the area. Today, you can still find several fossilized plants and animals in the caves' limestone that date back to a time before dinosaurs walked the earth. Starting sometime between four and six million years ago, water from the earth's surface began moving through the cracks in the stone deposit. There is a type of acid in surface water. When this water combined with rainwater, the two mixed to form another type of acid as a result of their chemical compositions. This acid slowly dissolved the limestone to eventually form the winding caves that exist today in Carlsbad Caverns. This is a very common process that happens to limestone-many caves all around the world exist in limestone deposits due to the stone's solubility (the ability of a substance to be dissolved) in a mixture of water and acid.

Eventually, speleothems-formations that arise from mineral deposits in caves-began to take shape in the lower levels of the caverns. In fact, these speleothems existed during the last ice age, when instead of a desert, a pine forest sat above the caves. Over the years, park employees and rangers have found clues that hint at the caves' history. For example, according to the National Park Service, people have found some bones of ancient ice age animals scattered around the entrance to some of the caves. In 2003, an employee found a part of a stone scraper dating back to the last ice age near a cave entrance as well. Clearly, the caves have a long history-researchers have discovered that American Indians first inhabited the area sometime between 12,000 and 14,000 years ago. Ever since then, the caves have been explored by several groups, including Spanish explorers in the 1500s, and later by American explorers and guides who drew attention from all across the country to the natural phenomenon.

Laurel remembers this phenomenon very well. "It took us between one and two hours to get all the way to the bottom," she says, recounting the windy pathway leading deeper and deeper into the heart of the caves. "The park had put in blue and red lights to highlight the beautiful rock formations."

Once they reached the bottom, Laurel says that she had to take an elevator to get back to the top. "My ears popped so much in the elevator!" she remembers. "It took a really long time to reach the top; I didn't realize how far down we were until we were on our way back up."

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A Waterfall in Iceland



Manjula Raman

This is the front of Seljalandsfoss.



Manjula Raman

This is the back of Seljalandsfoss.

Have you ever seen a waterfall?

A waterfall is a place in a river where water spills downward suddenly. Waterfalls can be big or small. They can be little, thin streams of water. They can also be huge and powerful!

Iceland is an island country in the Atlantic Ocean. It has many waterfalls. One of its waterfalls is called Seljalandsfoss. "Foss" is the word for waterfall in Iceland.

The water in Seljalandsfoss falls from almost 200 feet high. It lands in a pool below. But something about the way the water falls makes this waterfall special. It's special because people can walk behind it! There is a cave behind the waterfall. Many people visit the waterfall and take a walk behind the water.

Name _____

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3 Facts

2 New Words

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The Rocky Mountains

by Susan LaBella



The Rocky Mountains are a large group of mountains on the North American continent. The Rockies are found in the western region of North America. They stretch from Canada in the north to the United States in the south. The southern part of the Rockies ends in the state of New Mexico. The Rocky Mountains also go through the states of Montana, Idaho, Wyoming, and Colorado.

The Rockies are the longest mountain range in North America. They have many high peaks. The highest is Mount Elbert in Colorado. It is nearly three miles high. Mount Elbert's peak is fourteen thousand feet above sea level.

In the summer, the Rockies are warm and dry, though it does rain sometimes. During the winter, the weather is wet and very cold. Heavy winter snow falls in the higher parts of the Rockies.

Many people like to visit these mountains. Here they ride bikes, hike on trails, ski, or fish. A special area called Rocky Mountain National Park is in Colorado. The national park is reserved for people to visit. Visitors to Rocky Mountain National Park are excited to see the wild animals that live there. Those animals include elk, moose, mountain goats, and mountain sheep.

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Famous Buildings

6 Articles

Check articles you have read:

Burj Khalifa
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Las Lajas Sanctuary
270 words

The Guggenheim Museum Bilbao
289 words

The Petronas Twin Towers
267 words

Bibliotheca Alexandria
276 words

The Sydney Opera House
275 words

A House Over Falling Water
223 words

The Eiffel Tower
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The World's First Modern Shopping Mall
366 words

The Taj Mahal
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Burj Khalifa

by ReadWorks



photograph of the Burj Khalifa

The Burj Khalifa is located in Dubai. It is the tallest building in the world. Standing at 2,716.5 feet, the Burj Khalifa contains over 160 stories. On these stories there are hotels, luxury apartments, restaurants, and more. It was constructed between 2004 and 2010, which is a short time considering how tall this building is.

As they were constructing the Burj Khalifa, engineers conducted many tests to see how the building dealt with wind. Air pressure and temperature changes with elevation. So the engineers also conducted tests to see how the building reacted to these changes. Because many people were expected to visit and live inside the Burj Khalifa, engineers spent years trying to make the building as safe as possible.



Photo Credit: Muhammad Mahdi Karim, CC BY-SA 2.5

photograph of the Hymenocallis flower

In addition to making sure that the structure was safe, engineers wanted the building to be beautiful. In fact, they modeled the building after a flower from the local area. It is called the Hymenocallis flower. Its petals form Y-shapes. Like the flower, Burj Khalifa has a Y-shaped design. Do you think that the Burj Khalifa looks like the Hymenocallis flower?

Inside of the Burj Khalifa, there are more than 1,000 pieces of artwork. Many of these pieces are dedicated to world peace. Some of these pieces also show the importance of collaboration between different countries and cultures.

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Las Lajas Sanctuary

by ReadWorks



Photo Credit: ollie harridge, CC BY 2.0

Photograph of the front of Las Lajas Sanctuary

The Las Lajas Sanctuary is a church in Colombia that is famous for its origin story. The origin story claims that a woman and her daughter were caught in a violent storm in a gorge in 1754. The mother-daughter pair felt more than just the power of the raging storm, however. They felt an invisible force. They believed this force to be the Virgin Mary, the mother of Jesus. Her image appeared to them on the rocks of the gorge. The myth also claims that the daughter, who was both deaf and mute, began to see and hear after this storm.



Photo Credit: KANDU, CC-BY 3.0

The image of the Virgin Mary

After people found out about this miracle, they set up a shrine at the location of the image. People would worship the Virgin Mary's picture at this shrine. But some people did not think a shrine was enough to celebrate this miracle. They wanted to build a chapel instead. So one man traveled across Colombia to collect donations for ten years. The myth claims that this man was blind, but when he returned from his trip, he could see again.

The construction of this chapel occurred between 1916 and 1949. While 33 years may seem like a long time, the chapel was built on a bridge that is 130 feet tall! The bridge hangs over the Guaitara River. People who stand on this bridge can watch the waterfall below. Would you want to visit this chapel?



Photograph of Las Lajas Sanctuary

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The Guggenheim Museum Bilbao

by ReadWorks



photograph of the Guggenheim Museum Bilbao

The Guggenheim Museum Bilbao is one of the most famous art museums in the world. It was designed by Frank Gehry, an American architect known for his unique architectural designs.

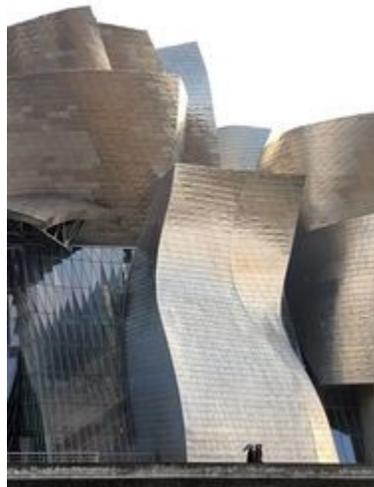
The government of Bilbao, a city in Spain, paid Gehry to design this museum. Bilbao needed money, and they thought that Gehry's building would bring many visitors to Bilbao. These visitors would then help the economy improve. It turns out that the government of Bilbao made a very good decision. Right after Gehry's building was open to the public, the economy improved. Many tourists traveled from around the world to see Gehry's building. These tourists spent money in Bilbao, which helped to bring more jobs to the local people.

Why has this museum been such a popular place for tourists? One reason is that Gehry's building design is one of a kind. Before Gehry had designed the Guggenheim Museum Bilbao, most art museums looked similar. Their designs were simple and traditional. For example, many of these art museums had columns and were built out of stone.



photograph of the Guggenheim Museum Bilbao with spider sculpture

Gehry's museum did not look like traditional art museums. Instead of building his museum with stone, he used titanium. Like the river it sits on, the museum has a flowing shape. Its curves make it look like a sculpture. Inside of the museum, there are 20 different art galleries. The main source of light for these galleries comes from a large window on the roof of the museum. This window is called a skylight. Gehry designed this skylight to look like a flower. Would you want to visit the Guggenheim Museum Bilbao?



photograph of Guggenheim Museum Bilbao exterior

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The Petronas Twin Towers

by ReadWorks



photograph of the Petronas Towers Kuala Lumpur at night

The Petronas Towers are located in Kuala Lumpur, Malaysia. They are 1,483 feet tall! Between 1998 and 2003, the Petronas Towers were the tallest buildings in the world. In 2003, a building in Taipei became the tallest building in the world. Architects added a spire to the top of the building in Taipei to make it taller than the Petronas Towers. A spire looks like a pyramid and does not contain rooms or floors. Many people think that spires make buildings more beautiful.

The two towers were built using 36,910 tons of steel. A ton is 2,000 pounds, so the buildings are very heavy. These two steel buildings are connected at the 42nd floor. They are connected by a bridge. People can walk across the bridge and look out over the city. This walk is not recommended for people who are afraid of heights!



up-close photograph of Petronas Towers Kuala Lumpur's exterior

Even though these towers are 88 stories high, it does not take a long time to get to the top of the towers. In fact, it only takes 90 seconds for the tower elevators to take people from the first floor to the 88th floor!

The towers also have 32,000 windows. Can you imagine the view at the top?

The Petronas Twin Towers were originally built to serve as the headquarters for a gas company called Petronas. The towers now contain many different types of facilities, such as clothing stores, theaters, and museums.

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Bibliotheca Alexandria

by ReadWorks



Photo Credit: Wikimedia, CC BY-SA 4.0

illustration of scholars studying in the Library of Alexandria

The Library of Alexandria was once the most important learning institution of the ancient world. It was located on a harbor in Egypt. Many people traded along the harbor, so the library was visited by people from different countries and cultures. Many famous thinkers studied at the Library of Alexandria, including Euclid. Euclid was a renowned mathematician famous for his contributions to geometry.

It is no surprise that ancient scholars would have visited this library. It housed thousands of important scrolls and books. At a time before computers and printing, people had to travel to read these scrolls. It was, therefore, helpful to have so many important scrolls in one place.

Unfortunately, the library did not last forever. While no one knows exactly what happened, most people believe that Julius Caesar had his army set it on fire. Julius Caesar was the dictator of the Roman Republic.

In 2002, a new library was opened to the public. It is called the Bibliotheca Alexandria, and it

is a revival of the Library of Alexandria. The new library shares the same purpose as the original library. Like the Library of Alexandria, the new library is a place of learning. The new library also sits along the same harbor as the Library of Alexandria once did. Its architecture is far from ancient, however. It is shaped like a tilting circle, which is a very modern design.

Would you want to visit the Bibliotheca Alexandria?



photograph of the Bibliotheca Alexandria plaza

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The Sydney Opera House

by ReadWorks



The Sydney Opera House

The Sydney Opera House is one of the most famous buildings in Australia. It is known for its unique architectural style. The main architect, Jørn Utzon, was inspired by the natural world as he designed the building. Utzon wanted the building to highlight the beauty of the sea. So he decided to shape his building's roof like rising boat sails. The white roof is also covered in tiles that look like the patterns found on leaves. These tiles reflect the sunlight. The roof glimmers on a sunny day. Can you guess how many tiles are on the roof of the Opera House? There are over one million tiles! Sometimes images will also be projected onto the roof, as you can see in the picture below. These projections look beautiful at night. They are often used to celebrate a holiday.



Photograph of colorful projection on Sydney Opera House

The Opera House took sixteen years to complete. Construction began in 1957 and ended in 1973. It took many years for Utzon and his fellow architects to figure out how to create the roof sails. One of the reasons why it was such a difficult process was that Utzon had to think about the acoustics of the building. Acoustics are the sounds inside a building. The Sydney Opera House needed to have good acoustics since many singers and musicians would be performing there. Thankfully, Utzon and his colleagues solved the problem. Now four million people visit or attend performances at the Sydney Opera House every year! Would you want to attend a performance at the Sydney Opera House?

Name _____

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The World's First Modern Shopping Mall

by Daniel Scheffler



The country in the world with perhaps the most malls, and also some of the biggest malls, is America. Edina, Minnesota, is the site of the first modern mall. It's still standing, and it's called Southdale Center. This was the first mall to offer a completely enclosed retail shopping experience.

Malls up to that point in time were modeled after the traditional European arcade. An arcade is a semi-covered walkway with shops on both sides. Examples of these arcades can be found today in Italy and Germany.

Southdale Center was actually going to be a new version of the traditional European arcade, surrounded by apartments, schools, and facilities that provide medical and emergency services. But then the plans changed completely. The developer of the shopping center, Dayton Company, and its designer and architect, Victor Gruen, saw a much bigger opportunity. They ultimately decided that Southdale Center was going to be different; it was going to be inside a big building. It was going to be on more than one level and have a town square in the middle under a skylight.

The mall opened in 1956, and it was the first fully enclosed climate-controlled retail space with

multiple shops. Although the building was enclosed, there was some daylight coming through glass panels that were built into the roof. On top of that, there was electric lighting fitted throughout the mall. This was so the day would feel much longer for people in the mall. This was supposed to encourage these shoppers to stay longer and buy more things.

The developing team also wanted to create a place with all the services people could possibly need all in one place. From grocery stores, to a postal office, to various department stores- they were all put under one roof. It even ended up including fishponds, trees, a cage with birds, balconies with hanging plants, and a small zoo!

Southdale Center was received with a lot of excitement by the American public. On opening day of the mall, 40,000 people came to see it and shop. People came from cities close by, but also from far away, to visit a shopping mall they had never experienced before.

Name _____

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The Taj Mahal

by ReadWorks



Photograph of the Taj Mahal

Located in Agra, India, The Taj Mahal was built in 1628 by Shah Jahan, the leader of the Mughal dynasty. Shah Jahan was inspired to build the Taj Mahal following the death of one of his wives, Mumtaz Mahal. She passed away after giving birth to his fourteenth child. Shah Jahan wanted to make a beautiful burial tomb for his late wife that would serve as a comfortable final resting place. And he certainly did. The Taj Mahal is one of the most impressive architectural structures in the world. In fact, it has been named one of the Seven Wonders of the World, along with sites like the Colosseum and the Great Wall of China.

There are multiple reasons why the Taj Mahal is so famous and attracts an estimated 7 to 8 million people per year. The first, and arguably biggest reason, is what it stands for. As a tangible representation, a symbol, of the Shah's mourning for his wife, the Taj has become associated with the idea of enduring love. There are some critics who argue that the Taj was

instead built purely as a religious gesture or perhaps as a project to fuel his ego, but the most commonly-held belief is that this structure was built in response to the death of his wife.

The second reason for the structure's fame is that, from a purely aesthetic standpoint, the Taj Mahal is absolutely breathtaking in its scale and design. Its exterior is made of white marble and is intricately decorated with verses from the Quran, as well as with gemstones and carvings of flowers.

The third reason is its inventive relationship with symmetry. Not only is the building complex symmetrical, with every structure on the right side repeated on the left side, but the building itself is reflected in the long strip of water in front of the Taj Mahal.

Regardless of the reasons for its fame, the Taj Mahal is undoubtedly one of the most stunning and recognizable structures in the world.

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A House Over Falling Water



Carol M. Highsmith Archive

In the 1930s, there was a family called the Kaufmanns. They lived in a city in Pennsylvania, but wanted a place to stay that was closer to nature. They had a place in mind. It was an area in the mountains. It had a stream called Bear Run that turned into a waterfall. The Kaufmanns asked the most famous architect in America to design a house for them.

The architect's name was Frank Lloyd Wright. The house he designed, called Fallingwater, is one of the most famous houses in the country.

Why is Fallingwater so famous? Because of its creative architecture! Frank Lloyd Wright looked to the nature in the area for ideas. He considered the family's desire to be in nature. He wanted to give the Kaufmanns a place where they could live with the waterfall, not just view it from far away.

And he did! The house he designed actually stretches out over the waterfall. It has parts that jut out at different angles. And it has big, open windows. From inside the house, people have a full view of the nature outside. They can hear the rush of the water below.

Today, Fallingwater is a national landmark. People are allowed to visit and tour it. They can feel what it's like to live over falling water!

Name _____

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Article Title: " _____ "

3 Facts

2 New Words

1 Question

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The Eiffel Tower



The Eiffel Tower

Paris is the capital city of France. This city is well-known for many things. It's known for its charming streets, impressive art, and delicious food. One of the things Paris is most known for is the Eiffel Tower.

The Eiffel Tower is a very tall structure. It stands over 1000 feet tall! It has four huge legs. These bend inwards till they meet to form a single tower. The structure is made of more than 18,000 pieces of iron. These iron pieces make a criss-crossing framework for the tower. This kind of framework is very strong, but also has many empty spaces. So the Eiffel Tower is tall and strong, but it weighs very little for its size!

This tower was built for a huge event called the World Fair. It was the main focus of the event. Millions of people saw the tower during and after the event. And many of them hated it! Some people from Paris felt it was ugly. Others were afraid that it was not strong and safe, and that it might fall.

Today, though, people love the Eiffel Tower. About 7 million people visit it each year! It is thought of as a beautiful symbol of Paris.

Name _____

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Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Examples of Biomimicry

6 Articles

Check articles you have read:

Gecko Feet & Space Robots
198 words

Burrs & Velcro
236 words

Birds & the Japanese Bullet Train
325 words

Shark Skin & Swimsuits
205 words

Spider Webs & Glass
301 words

The Namib Beetle & Fog Nets
271 words

Garrett Morgan
209 words

Inventions: Then and Now
261 words

New Vinci
445 words

The Invention of the Toothbrush
254 words

Gecko Feet & Space Robots

by ReadWorks



Photograph of a gecko clinging to glass

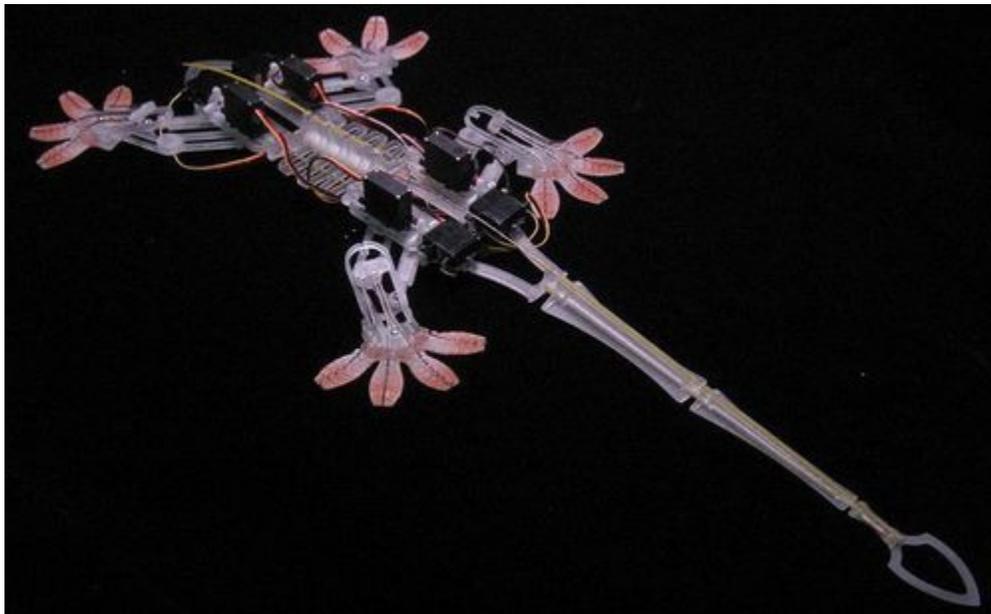
Have you ever seen a gecko climb up a wall? If so, you would know that this little creature has the impressive ability to scuttle across ceilings. It is almost as if the gecko can defy gravity! But, of course, gravity affects geckoes. Their bodies have simply adapted. To avoid falling to the ground, the geckoes have sticky feet. Their feet are covered with millions of microscopic hairs that grip surfaces. When weight is applied to the hairs, they stick to the surface.



Gecko feet have inspired the invention of a new NASA robot. The International Space Station, a large satellite that houses a research lab, needs to be checked and maintained. Since it is located in space, it is difficult for astronauts to check the outside of the satellite on a regular basis. The new NASA robot was invented to address this problem. Scientists created robots that have "gecko grippers." These grippers basically allow the robots to stick to the outside of the station as they repair it.

Photo Credit: Matt Reinbold, CC BY-SA 2.0

Photograph of gecko feet



Douglasy, CC BY-SA 3.0

Photograph of a sticky robot

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Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Burrs & Velcro

by ReadWorks

Have you ever seen Velcro before? Chances are you have! It can be found on a range of different things, from clothing to NASA space equipment. Velcro is often used in place of a zipper. Just like zippers, Velcro was first designed to fasten clothing together.



Photo Credit: Zephyris, CC BY-SA 3.0

Photograph of a burr

How was Velcro first invented? Velcro was inspired by burrs, which are seeds covered in hooks. When George de Mestral, the inventor of Velcro, was hiking with his dog, he noticed that his dog was covered in the spiky seeds. The seeds had attached to tiny loops in the dog's fur. De Mestral studied the burr and the fur under a microscope. He soon realized he could adapt this hook-loop design into an adhesive tool. Years of testing led to the invention of Velcro. Velcro is made up of two strips of fabric. One strip is made up of hooks, and the other is made of loops.



Photo Credit: liz west, CC BY 2.0

Photograph of burrs

From its invention in 1941 to present day, Velcro has turned into a material with many different and varied uses. Velcro has many uses in homes, including holding picture frames up and keeping rugs in place. Velcro is also used in hospitals to keep patients fastened during surgery.

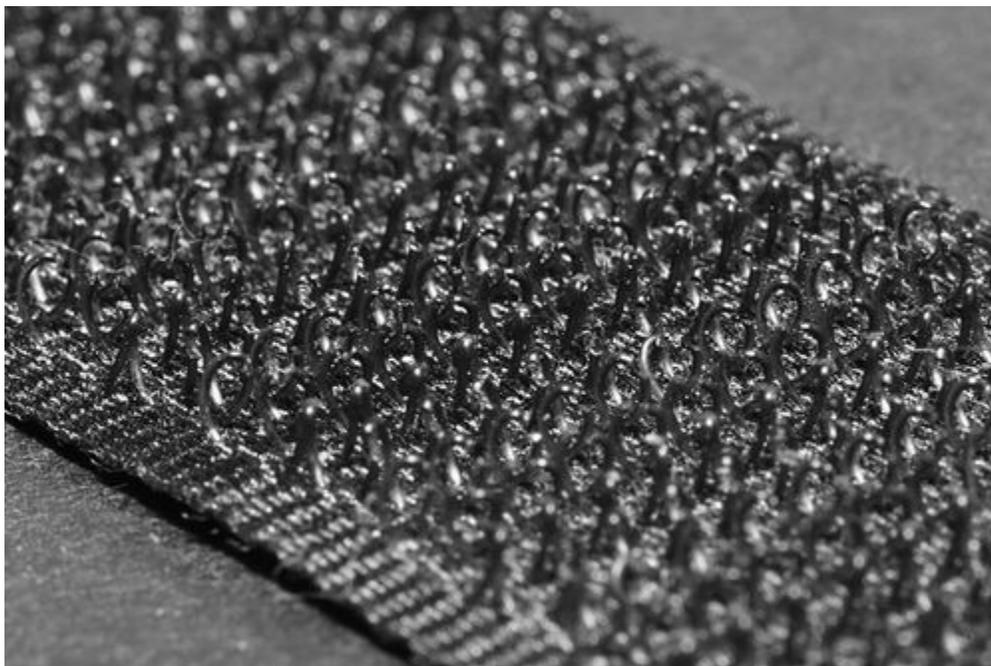


Photo Credit: Alexander Klink, CC BY 3.0

Close-up photograph of velcro hooks

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3 Facts

2 New Words

1 Question

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Birds & the Japanese Bullet Train

by ReadWorks



Bullet train

Eiji Nakatsu was an engineer who was working to improve a bullet train in Japan. A bullet train is a train that travels incredibly fast. But Japan's bullet train design had a problem. The Japanese bullet train could travel at 200 miles per hour, but it created too much noise. For example, when it left a tunnel, the train would create a booming noise because it would make direct impact with the air outside the tunnel.



Photo by Laitche [CC BY-SA 4.0]

Photograph of a kingfisher bird

To solve this problem, Nakatsu turned to nature. After all, he was not just an engineer. He was a birdwatcher, too! As a birdwatcher, he had observed kingfisher birds with fascination. Kingfisher birds must efficiently fly into water to catch food. The kingfisher's beak allows it to enter into the water without feeling a great deal of impact. The kingfisher does not hit the water directly. Instead, it glides through the water, because its beak is shaped in a way that lets water flow past it. Nakatsu also observed owls. The owl fascinated Nakatsu because it is able to travel silently. Owls' feathers have tiny little cuts. These minimize the noise made by an owl's wings while it is flying.

Nakatsu realized that these two birds held the answers for Japan's bullet train problem. Nakatsu saw that the kingfisher birds could travel from air to water effortlessly, so he decided to mimic their beak shape. The beak shape became the inspiration for the front of the bullet train. In order to minimize the train's noise, Nakatsu decided to replace the pantograph. This is the device that brings electricity to the train. Nakatsu decided to mimic owl feathers by

making small cuts in the pantograph. Because of these changes, the Japanese Bullet train is now much quieter and faster than it once was.



Photo Credit: Parag.naik, CC BY-SA 3.0

Photograph of a Japanese bullet train

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3 Facts

2 New Words

1 Question

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Shark Skin & Swimsuits

by ReadWorks



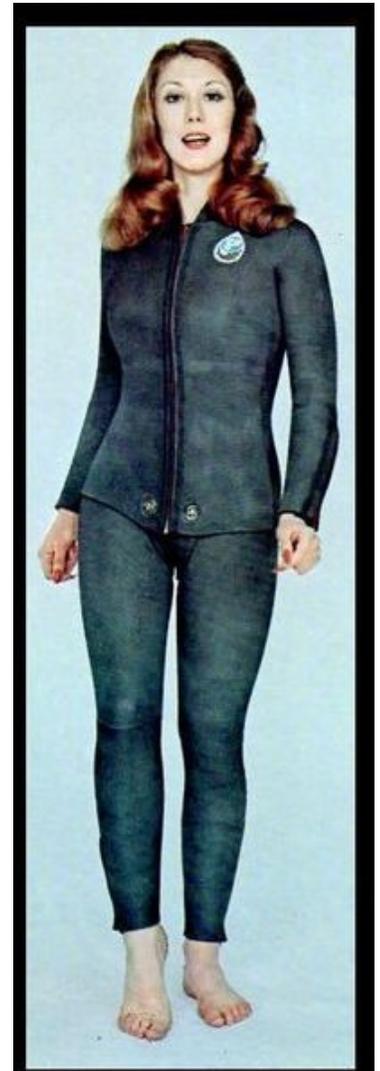
Pixabay

shark closeup

A shark's skin is covered in tiny scales called denticles. Denticles, or "little skin teeth," help the shark move quickly in the water. The denticles are shaped in a way that allows water to flow past the shark. They are also rough, which makes it difficult for algae and barnacles to grow on them.

Scientists have been inspired by shark skin. They have been working to invent a swimsuit made out of artificial shark skin. Would you want a sharkskin swimsuit? It's likely that these suits will be too expensive to afford for a while. It is also expected that these suits will be banned from major swimming competitions. It is estimated that the suits would reduce swimming time by 3 to 5 percent. This would give an unfair advantage to anyone wearing one in a race.

Scientists also believe that an artificial shark skin material would be ideal for ships. This material would allow the ship to move through water more quickly and efficiently. It would also stop any algae and barnacles from growing on the ship. As a result, the shark skin ship material would cut down on oil costs and on clean-up costs.



Photograph of a sharkskin wetsuit

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3 Facts

2 New Words

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Spider Webs & Glass

by ReadWorks



Photo Credit: Erich Ferdinand, CC BY 2.0

Photograph of window marking left from bird crash

Birds in flight can sometimes fly into clear glass windows. It can be hard for birds to see that the clear window is solid. As a result, birds will not know to avoid the window and will fly into it, dying or getting hurt at impact. A German company, Arnold Glas, believed that they could help address that problem. They believed they could create windows that would be visible to flying birds. The inspiration for this design came from a spider web. The certain kind of spider's web reflects UV light. While humans cannot see this type of light, birds can. As a result, birds avoid flying into the web. This keeps the spider's web protected and unharmed.



Adam.inglis84, CC BY-SA 3.0

Photograph of the orb-weaver spider

Arnold Glas tested how birds reacted to their new spiderweb-inspired window glass. They compared that to how birds reacted to normal window glass. During these studies, nets were placed in front of these two different types of glass. Birds were encouraged to fly towards the glass. Even when birds did fly towards the glass, the net would protect them from direct impact. Researchers found that in 100% of the cases, birds avoided flying into the new type of window glass.

A famous lookout tower in England has recently replaced their windows with this new type of window. About 300 bird species fly past this tower when they are migrating, so the owners wanted to protect the birds from clear windows. Many tourists also visit this tower, so the new glass windows were ideal because the UV light is invisible to humans.

Name _____

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3 Facts

2 New Words

1 Question

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The Namib Beetle & Fog Nets

by ReadWorks



photograph of the Namib Desert beetle

The Namib Desert is one of the hottest and driest places in the world. Not only does the temperature of the desert sand reach up to 140 degrees, but there is also very little ground water in this region. And yet, an insect called the Namib beetle is able to live there. How does the Namib beetle survive in these harsh conditions? The beetle's shell allows it to turn fog into drinkable water!

Fog is a cloud of water droplets. A few mornings a week, fog drifts across the desert floor. This is the main source of water in the desert. To collect the water from the fog, the beetles climb to the top of the sand dunes. They lift their wing scales. Their scales are covered in waxy bumps that catch the water droplets as the fog drifts by. The water droplets drip down the beetle's wing scales and into its mouth.



Photo Credit: Luca Galuzzi, CC BY-SA 2.5

photograph of the Namib Desert

Scientists have been thinking about how to adapt the beetle's wing scales to collect water for people. Tools that collect water from fog, called fog nets, have been around for a while. But scientists think that they could be made much more efficient by adding waxy bumps to the design. In addition to changing fog nets, scientists have invented a new type of water bottle. The inside of the water bottle is covered in bumps like the Namib beetle's wing scales. These water bottles are special because they are self-filling! Would you want one of these water bottles?

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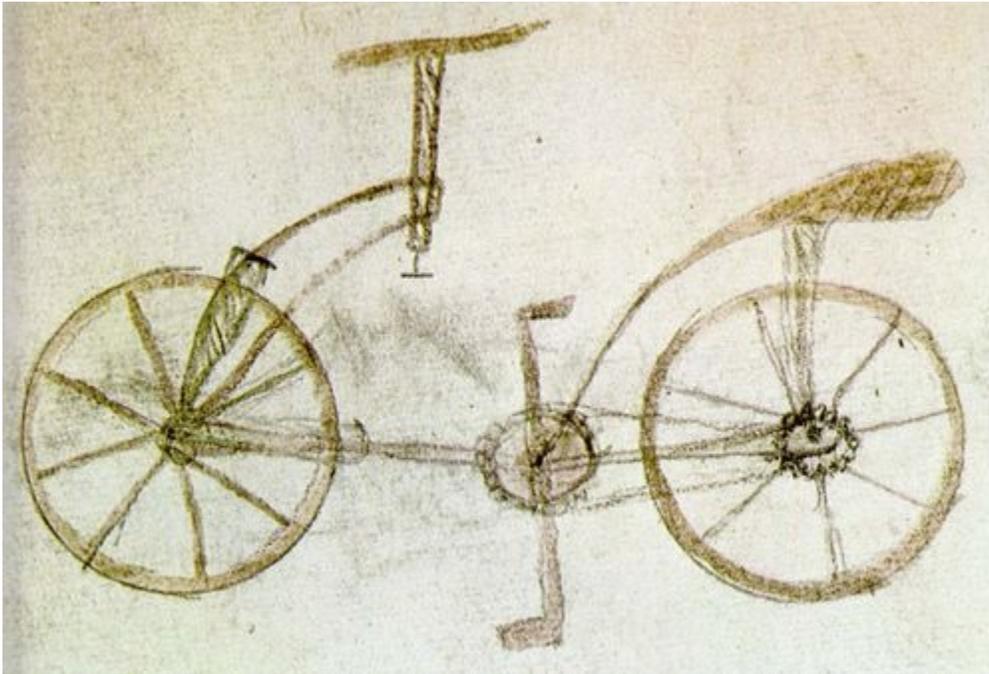
3 Facts

2 New Words

1 Question

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New Vinci



Leonardo da Vinci's bicycle sketch, 1493

Smooth Shifting

Old ideas help power the newest bicycles.

Leonardo da Vinci never rode a bike. Bicycles didn't exist when he lived (1452-1519). But designs by da Vinci did inspire one of today's cutting edge bikes. Parts of the new bike follow sketches done by the artist and inventor in 1490.

What can today's bicycles gain from old da Vinci sketches? Bill Klehm says da Vinci's doodles were the inspiration to overcome some basic challenges of bike riding. "Have you ever had the chain fall off your bike?" Klehm asks. "Have you ever been stuck in the wrong gear and unable to climb a hill?"

Klehm is the president of Fallbrook Technologies. His company invented a new type of **transmission** for bikes. A transmission is a device that sends a vehicle's power to its wheels. The company named the new bike transmission NuVinci in honor of da Vinci.

Geared Up

The transmission in a traditional bike is a system of **gears**. Gears are sets of wheels with interlocking spikes. A chain connects gears on the pedals to gears on the wheel.

When you shift the gears on your bike, you move the bike chain between gears of different sizes. A large gear on the pedals and a small gear on the wheel make the bike travel a long way with each turn of the pedal. However, going uphill is hard. Shifting to larger gears in back and smaller pedal gears makes pedaling easier, but the bike doesn't go as fast.

Early bikes had just one gear. Top bikes today let riders choose between 24 gears. Not bad, Klehm says-but there's room for improvement. Switching the chain between gears can make pedaling hard. Sometimes the chain falls off.

On the Ball

Fallbrook's new bike transmission, called a **continuously variable transmission (CVT)**, doesn't have those problems. In fact, it doesn't have traditional gears at all. It uses a system of rotating balls. The balls transmit the power from the chain to the wheel. The position of the balls determines how much each turn of the pedal moves the wheel. Unlike shifting conventional gears, changing the position of the balls goes very smoothly. "There's no clicking between gears," Klehm explains.

So far, more than 15,000 bikes with the NuVinci have hit the streets. In 2008, Klehm said, the company expects to sell 80,000 more. Bike gears soon might go out of style, just as huge front tires did 120 years ago. If gears go, expect learning to use the new transmission to be simple. As Klehm says, "You adjust until it feels good ... and you're where you need to be."

Name _____

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3 Facts

2 New Words

1 Question

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The Invention of the Toothbrush

The text is from "Everyday Mysteries" by the Library of Congress.

Question:

Who invented the toothbrush, and when was it invented?

Answer:

Various Peoples. 1938 (modern).

The toothbrush as we know it today was not invented until 1938. However, early forms of the toothbrush have been in existence since 3000 BC. Ancient civilizations used a "chew stick," which was a thin twig with a frayed end. These 'chew sticks' were rubbed against the teeth.

The bristle toothbrush, similar to the type used today, was not invented until 1498 in China. The bristles were actually the stiff, coarse hairs taken from the back of a hog's neck and attached to handles made of bone or bamboo.

Boar bristles were used until 1938, when nylon bristles were introduced by Dupont de Nemours. The first nylon toothbrush was called Doctor West's Miracle Toothbrush. Later, Americans were influenced by the disciplined hygiene habits of soldiers from World War II. They became increasingly concerned with the practice of good oral hygiene and quickly adopted the nylon toothbrush.

Some other interesting toothbrush facts:

- The first mass-produced toothbrush was made by William Addis of Clerkenwald, England, around 1780.
- The first American to patent a toothbrush was H. N. Wadsworth, (patent number 18,653,) on Nov. 7, 1857.
- Mass production of toothbrushes began in America around 1885.
- One of the first electric toothbrushes to hit the American market was in 1960. It was marketed by the Squibb [Company] under the name Broxodent.



Free dental care for children at the Guggenheim Dental Clinic... [between 1940 and 1945?]. Prints and Photographs Division, Library of Congress.

Name _____

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3 Facts

2 New Words

1 Question

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Garrett Morgan



Garrett Morgan was a very successful African American inventor. Inventors are often known for one important thing they created. But Garrett invented many things!

One of Garrett's most important inventions was called a safety hood. People could wear it to breathe safely when there was smoke, gas, or other unsafe things in the air. Garrett once used his invention to save people. Workers were digging a tunnel under a lake when there was an explosion. The workers became trapped. They were stuck in a place with dangerous gases and lots of dust. Garrett and his brother put on safety hoods and went to the tunnel to help. They helped save two lives!

Another important thing Garrett invented was a traffic signal. Today, there are traffic signals in many places where two streets cross each other. These help people know when it's safe to cross a street. But these did not exist in Garrett's time. After seeing an accident at an intersection, Garrett decided to change that. He made a traffic signal with a warning light. The light showed drivers when they would need to stop.

Both of these important inventions have saved many lives over the years. So Garrett Morgan was more than an inventor. He was a hero!

Name _____

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3 Facts

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Inventions: Then and Now

Inventions solve problems and help make our lives easier. The Wright brothers invented the first airplane in 1903. The first flight traveled about half the length of a football field and lasted 12 seconds. Today's airplanes can travel long distances. Look at the ways that some inventions have changed over the years.

Discover how some inventions have changed over time.

Telephone

Then



Alexander Graham Bell invented the telephone in 1876. The first phone had a trumpet-shaped part that was used to speak and to listen.

Now



Many people carry small cell phones. They have no wires, unlike earlier phones. Cell phones let people talk all over the world.

Calculator

Then



The first calculator was invented in Asia nearly 500 years ago. People moved beads on a wooden rack to help them count.

Now



Calculators come in many shapes and sizes. They can even be part of other inventions, including computers, watches, and cell phones.

Television

Then

Television became popular in the 1950s. The first TVs did not have a remote control. The screens showed pictures in black and white, and the sound was poor.

Now

Many modern TVs have flat screens. Some can be hung on a wall. Today's televisions have very clear, colored pictures, and excellent sound.

Clock

Then



Long ago, people kept track of time by recording the movement of the sun across the sky. The first clock was called a sundial.

Now



Clocks keep time for us. With a quick glance at a clock or watch, we know the time of day. What time is it now?

Name _____

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Article Title: " _____ "

3 Facts

2 New Words

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Musical Instruments

6 Articles

Check articles you have read:

Musical Instruments: Woodwind Instruments
196 words

Musical Instruments: The Orchestra
257 words

Musical Instruments: Brass Instruments
298 words

Musical Instruments: Percussion Instruments
256 words

Musical Instruments: The Bugle and "Taps"
297 words

Musical Instruments: String Instruments
288 words

Making Music with Electronics
244 words

The Cuatro
149 words

The String Family
265 words

The Woodwind Family
208 words

Musical Instruments: Woodwind Instruments

by ReadWorks

The first woodwind instruments were hollow pieces of wood. By blowing a certain way into a hole on one end, people made sound. Over time woodwind instruments became more complicated. Because they were made of wood, they became known as woodwind instruments.

Today, many woodwind instruments are no longer made of wood. For example, flutes are often made of silver, gold, or platinum now. Many professional flute players play on solid silver flutes. Students often play on flutes made of silver-plated metal.

The flute is a long, narrow tube. When musicians blow over the mouthpiece of the flute, the instrument makes a sound. Musicians use their fingers to cover the holes along the tube. This controls what notes the flute plays.

In symphony orchestras, the woodwind section has more kinds of instruments than any other family. The section is made up of flutes, piccolos, oboes, English horns, clarinets, saxophones, bass clarinets, bassoons, and contrabassoons. All of these instruments are hollow tubes made of wood, metal, plastic, or a combination of the three materials. The piccolo, less than 13 inches long, is the smallest instrument in the whole symphony orchestra.



Flute (27 inches)



Piccolo (12.5 inches)

Name _____

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3 Facts

2 New Words

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Musical Instruments: The Orchestra

by ReadWorks

An orchestra is a group of musicians who perform together by playing a variety of instruments. The musicians usually play classical music. Orchestras often play in concert halls. The conductor is the person who leads the orchestra. The conductor stands with his or her back to the audience and conducts all of the musicians. The conductor keeps the beat and tempo with a stick called a baton. The conductor makes sure that musicians play their notes at the right time and speed.

Sometimes orchestras accompany operas. An opera is a type of play set to music. Operas include songs and sometimes dances. When an orchestra plays for an opera, it often performs from an area below the level of the stage. This area is called the pit.

Symphony orchestras are large orchestras. They have four families of instruments. There are strings, woodwinds, brass, and percussion. The instruments in each family are related because they make sound in a similar way.

Groups of musicians have been playing together for thousands of years. However, the idea of the modern symphony orchestra took shape around the year 1600. Before 1600, groups of musicians didn't play specific instruments. They used any instruments that were around, and the musicians sat anywhere in the groups. Today, musicians' seats in a symphony orchestra are arranged by instrument. The seating chart below shows one way all of the different instruments can be placed. If your classroom were a symphony orchestra and your teacher were the conductor, which instrument would you play?



symphony orchestra seating chart

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Musical Instruments: Brass Instruments

by ReadWorks

Loud and bold! Brass instruments have been around for ages. In ancient Egypt, a metal trumpet was used for rituals or for military uses. In other cultures since then, brass instruments have been used to send messages to warriors on battlefields. Today, some militaries still use brass instruments for special occasions.

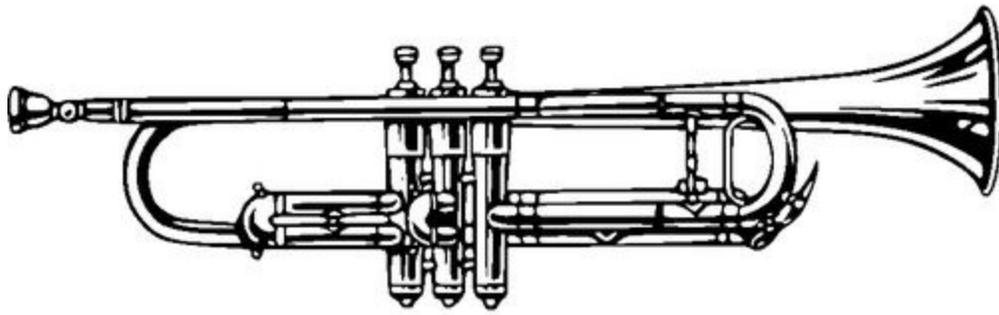
Brass instruments became used more as musical instruments in the time period called the Middle Ages. All brass instruments make sound in the same way. The musician presses his or her lips into a tiny cup on the end of the mouthpiece. When he or she blows air into the mouthpiece, the musician's lips buzz.

After the air goes through the mouthpiece, it enters tubes wound round and round. The air exits through a large hole at the other end of the tubes. This end is shaped like a bell.

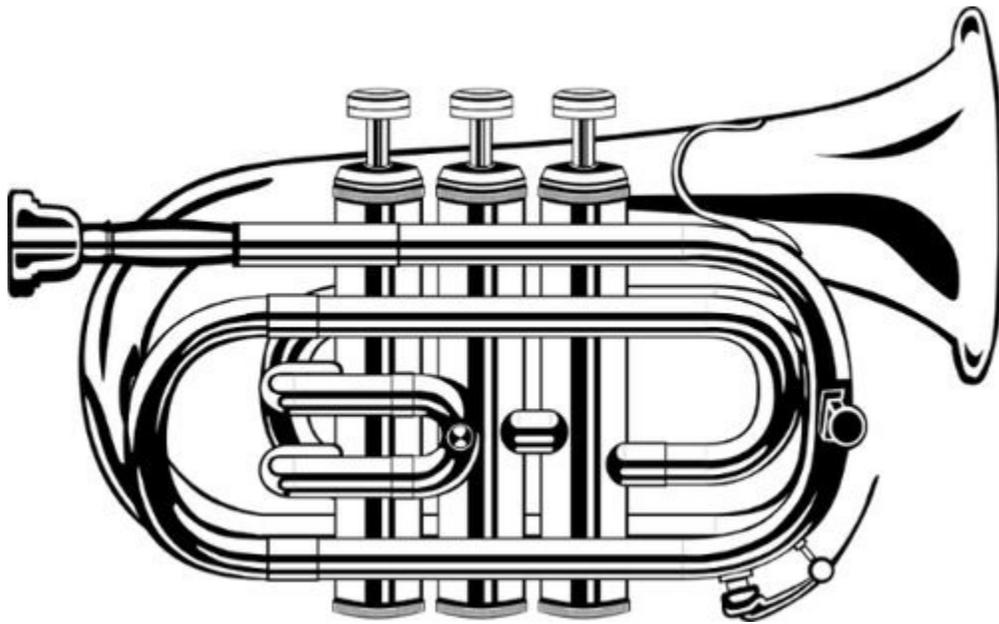
The sound of a brass instrument depends on the length of the tubes. Some brass instruments have small holes in part of their tubing. There are buttons at each of these holes. These buttons are called valves. When musicians press on the valves with their fingers, they change the lengths of the tubes in which the air can travel. This is how brass instruments with valves make different notes. Examples of these brass instruments include trumpets and the French horn.

Trombones are brass instruments that have a different way to change the lengths of the tubes. They have a U-shaped tube that slides in and out. Sliding the U-shaped tube out extends the lengths of the tubes in which the air travels.

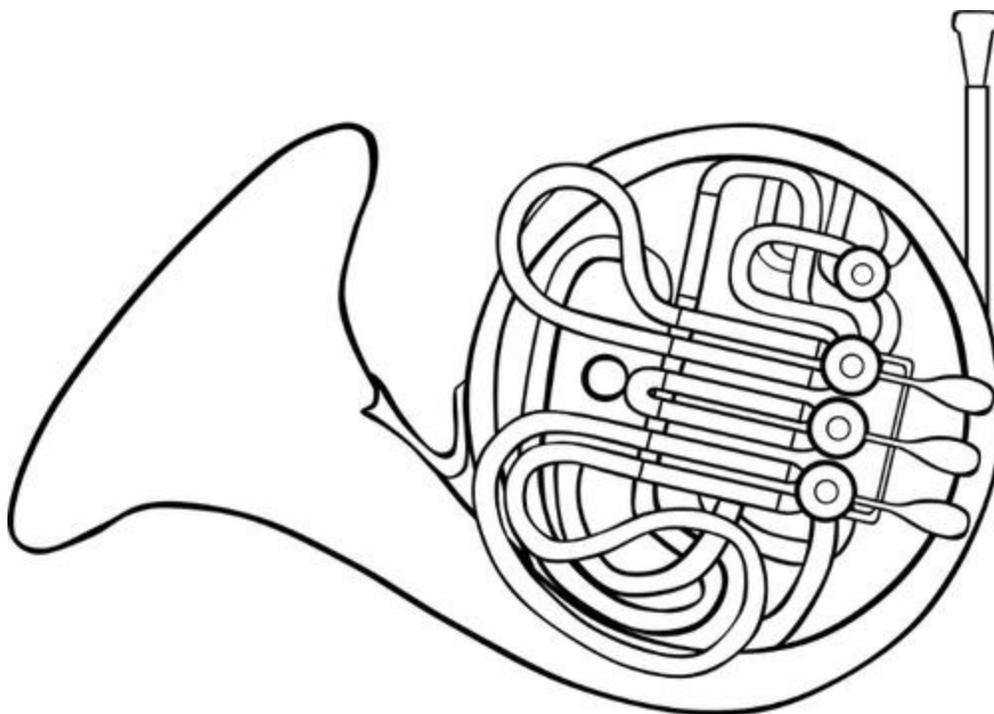
Brass instruments are usually made out of brass. Brass is a shiny metal that looks like gold. The instruments can also be made out of other metals.



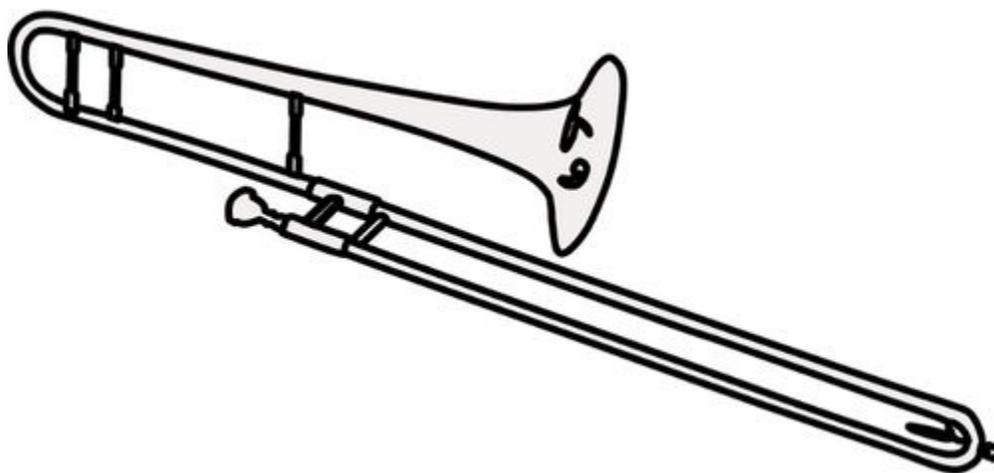
trumpet



pocket trumpet



French horn



trombone

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Musical Instruments: Percussion Instruments

by ReadWorks



Drums are a large part of the percussion family. The body of a drum is usually made of a wooden cylinder. A drum skin is stretched across one or both ends of this cylinder. A drum skin is often made from animal skin. When a drummer hits the surface of a drum skin, the surface vibrates. Those vibrations produce sound!

Drums have been around for a long time. Ancient art includes pictures of drums. This art shows that drums have been used since about 6000 B.C. Many different societies have used drums for ceremonies and sacred occasions. Today, drums are also often used in orchestras and popular music.

The biggest drum is called the bass drum. The bass drum makes the deepest sound. In an orchestra, the bass drum often helps to keep the rhythm for the rest of the orchestra. The sound from the bass drum is so strong that the other musicians can feel it!

All percussion instruments are not drums, however. Do you see the cymbals at the top of the drum set in the image above? Cymbals are round and made from metal. They have been around since at least 1500 B.C. Other percussion instruments are not in the image above. One example is the xylophone, an instrument made up of wooden bars. These wooden bars have different lengths. Bells and the gong are also percussion instruments. These instruments are very different from drums, but all percussion instruments have one thing in common. They all make sound when someone strikes their surface.

Name _____

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3 Facts

2 New Words

1 Question

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Musical Instruments: The Bugle and "Taps"

by ReadWorks

The bugle is a brass instrument. The United States military uses the bugle for announcing events or commands. Bugle songs are often described as calls because the music calls soldiers to duty or communicates something that needs to be done. Outside of the U.S. military, the most widely recognized bugle call is "Taps." "Taps" tells soldiers that it is time for "lights out" at night.

The tune of "Taps" as we know it today was created during the United States Civil War. It was created by General Daniel Adams Butterfield in 1862. He was in charge of troops in the Northern Army. Before 1862, the United States Army used a different call for "lights out." General Butterfield did not like the tune of the call. He thought it sounded too formal. In an evening in July, General Butterfield hummed a French bugle song called "Tattoo." An aide wrote the music notes down. Then, General Butterfield decided to make some notes longer and some shorter. When he was satisfied, he ordered the bugler to play the new call for "lights out." From then on, General Butterfield's bugle call played at the end of the day.

"Taps" was made an official U.S. military bugle call after the U.S. Civil War. The United States military also plays "Taps" at military funerals and memorial services.

Here are some of the verses sung to "Taps":



Day is done, gone the sun,
From the hills, from the lake,
From the sky.
All is well, safely rest,
God is nigh.

Go to sleep, peaceful sleep,
May the soldier or sailor,
God keep.
On the land or the deep,
Safe in sleep.

Love, good night, Must thou go,
When the day, And the night
Need thee so?
All is well. Speedeth all
To their rest.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Musical Instruments: String Instruments

by ReadWorks



String instruments make music with their strings. Most string instruments are often played with a bow. A bow is a piece of wood with horsehair stretched from end to end. When a musician draws the bow across the strings, the instrument's strings vibrate and produce sound. The sound echoes inside the hollow body of the instrument. The body is made of wood.

There are four instruments that make up the string section of the orchestra. They are the violin, viola, cello, and double bass. The picture above is a viola, but the violin, cello, and double bass also have the same basic shape. They are very different in size, though. The violin is the smallest. It is about 24 inches long. The double bass is the largest. It is over 6 feet tall!

The violin can play the highest notes of any of the instruments in the string family. The violin usually plays the melody of a song in the orchestra. It is held under the chin, and it rests on the left shoulder.

The sounds produced by the viola are deeper than those of the violin. In the orchestra, the viola usually plays the harmony. It is held similarly to the violin.

The cello is larger than the viola. The cello makes even deeper sounds than the viola. At about 50 inches long, the cello can't be held like the violin or viola. It has to rest on the floor, and a musician plays the cello sitting down.

In order to play the double bass, the musician either stands or sits on a very high stool to play the instrument. Its sound is one of the lowest out of all of the instrumental voices of the orchestra.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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The String Family

by ReadWorks



Photograph of musicians playing string instruments

The string family is the largest section in an orchestra, and is composed of four different instruments: the violin, the viola, the cello, and the contrabass. All four of these string instruments are wooden and have hollow bodies, which vibrate with sound. In order to create this vibration, the player must either pluck individual strings or slide a bow across a set of strings. These strings are centered over a hole in the instrument, so that its vibrations will travel into the instrument and create resonance. While the strings of the instrument are usually steel or nylon, both synthetic materials, the strings on the bow are strands of horsehair.

Among the most popular string instruments, the violin is the smallest and has the highest-pitch. It has four strings that can be tuned by the player. The viola is the second smallest and similar to the violin, produces a higher pitch than the larger instruments. The reason that smaller instruments create higher pitches is that the vibrations that create the sound are much faster. Think of a small child. Because they are smaller, they often have higher-pitched voices. The cello, on the other hand, is much larger and therefore produces a lower pitch. The body of a cello is very big which means that its vibrations are slower. Likewise, the contrabass has

an extremely low pitch because of its large size. Many contrabasses are actually taller than its player! Would you rather play a smaller, higher-pitched instrument or a larger, lower-pitched instrument?



Photograph of a violin

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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The Woodwind Family

by ReadWorks



Photograph of clarinet keys

There are multiple instruments in the woodwind family, including the clarinet, the oboe, and the flute. Can you guess why these instruments are considered to be a part of the woodwind family? The earliest versions of these instruments were composed of wood. In the modern era of mass production, however, there are cheaper versions that are metal or plastic.

Can you guess why the word "wind" is included in the name? The player must blow wind into the instrument in order to produce sound! Some woodwinds require the use of a reed, which is a small piece of wood placed on the instrument's mouthpiece. If the reed is properly prepared, then it will vibrate everytime the player blows into the instrument. Sometimes the reed's vibrations are so strong that they tickle the player's lips!

In order to play a note, the musician must place his or her fingers over the instrument's tone holes. The player determines the pitch of the note based on which holes are open or closed on the instrument. As you can see in the picture provided above, these holes are encircled by metal keys, which actually make it easier for the musician to play more notes.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Making Music with Electronics



Music is made with lots of different kinds of instruments. If you turn on a radio, you can hear some of those instruments. You may hear pianos, drums, and more. You may also hear music that was made with computers! This kind of music is called electronic music. Electronic music is music that is made with electronic machines.

Today, this kind of music is common. Computers are often used in music. They are able to create sounds that sound like other instruments. And they are also able to create noises that don't sound like any other instruments! This opens up people's choices when they are making music. With computers, people don't need to stick to the instruments that they have in front of them.

Synthesizers are also electronic instruments. These are used in a lot of music today. Like computers, they give people a lot of control over the kinds of sounds they can make in their music. Many of them can be played like keyboards. They let people change the sound of the keyboard in a lot of ways. People can make it sound loud and harsh. Or they can make it sound smooth and soft. They can make a steady note get loud, then soft, then loud again. Or they can make it waver between other notes!

So the next time you turn on the radio, listen closely. Is that a piano you hear? Or is that a computer or a synthesizer?

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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The Cuatro

by ReadWorks



Photo Credit: Fernando da Rosa, CC BY-SA 3.0

Photograph of a cuatro

A popular instrument in Venezuela is called the cuatro. It looks like a small guitar. To make sound, people strum the cuatro's strings. While guitars have six strings, the cuatro only has four strings. Because the cuatro is small, it is very light. This makes it easy for people to hold.



Photo Credit: The Photographer, CC BY-SA 3.0

Photograph of a man playing the cuatro

Although it is very popular in Venezuela, the cuatro was not invented there. People do not know who invented it. Some people argue that it has been around for 5,000 years! People think this because ancient instruments were found in Egypt that look very similar to the cuatro. But how did the cuatro cross the sea to Venezuela? It was brought to Venezuela by Spanish people around 500 years ago.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Objects and Light

6 Articles

Check articles you have read:

Lenses
158 words

What Is a Mirror?
196 words

Concave and Convex Mirrors
270 words

Refracting Light
194 words

Scientific Instruments
256 words

Plane Mirrors
221 words

Light
91 words

Sunlight in the Night
104 words

Why Do Things Look Darker When They Are Wet?
350 words

How Are Rainbows Formed?
455 words

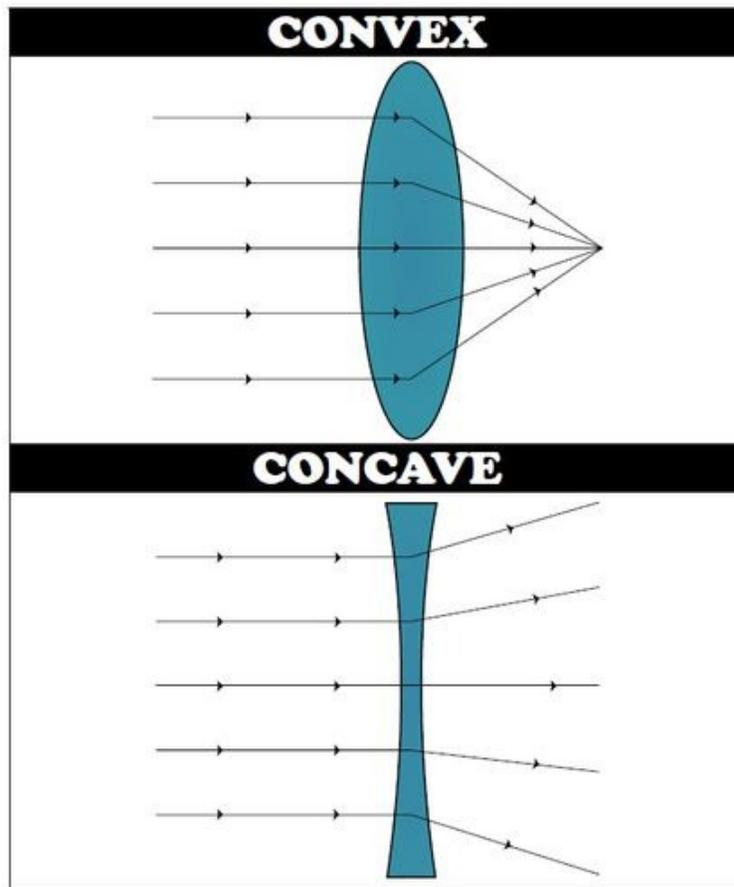
Lenses

This text is adapted from an original work of the Core Knowledge Foundation.

Lenses are all around us these days. Sunglasses and eyeglasses have lenses. Cameras have lenses. Telescopes have lenses. The list goes on and on. But what exactly is a lens? Lenses are pieces of clear materials that refract, or bend, light.

Lenses can be convex or concave. Both types of lenses have curved surfaces. However, they differ in the way they refract light. A convex lens refracts and bends light rays closer together. When you look through a convex lens, an object will look larger and closer. It looks magnified because the light rays are closer together.

A concave lens curves inward. A concave lens refracts and spreads light rays apart. If you look through a concave lens, an object will look smaller. It looks smaller because the light waves are spread apart.



Convex and concave lenses bend light in different directions. Do objects look larger or smaller through a convex lens? What about through a concave lens?

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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What Is a Mirror?

This text is adapted from an original work of the Core Knowledge Foundation.

Have you been to the dentist recently? Do you remember if he or she used a tool with a mirror to look at your teeth? Think for a minute about how useful that mirror is. Why does the dentist use it? This simple tool allows him or her to see the back of your teeth. He or she can also see teeth way in the back of your mouth. Without it, he or she couldn't do his or her job nearly as well! Ask to see this tool the next time you're at the dentist.

So what is a mirror? A mirror has a smooth, shiny surface that reflects light. Light that is reflected bounces off of something in its path. Light travels in a straight line, unless it runs into something in its way. If light hits a transparent object, it passes right through the object. If it hits an opaque object, the light is absorbed and blocked so a shadow is made. If light hits a smooth, shiny surface like a mirror, it is reflected.



Light reflected from the surface of this mirror allows the dentist to see the back of this person's teeth.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Concave and Convex Mirrors

This text is adapted from an original work of the Core Knowledge Foundation.

Mirrors come in all shapes and sizes. For example, there are large flat mirrors in which you can look at yourself. Mirrors with flat surfaces are called plane mirrors.

In addition to plane mirrors, there are two other types of mirrors. They are called concave mirrors and convex mirrors. These mirrors have curved surfaces. The smooth, shiny side of a concave mirror curves inward like a spoon. The smooth, shiny side of a convex mirror curves outward.

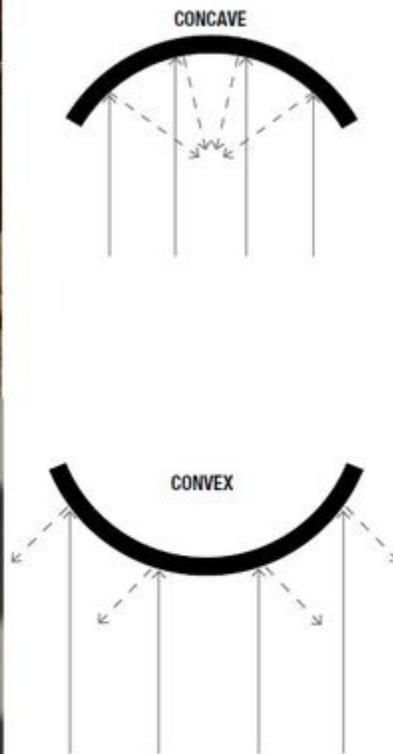
Here's another way that concave and convex mirrors are different from plane mirrors. In a plane mirror, the reflection of an object is about the same size as the object. In concave and convex mirrors, the reflection can look larger or smaller than the real object.



Three types of mirrors

Concave and convex mirrors are both useful. Concave mirrors can be used to provide heat using the light from the sun. Remember that sunlight is a form of light and heat energy. The large concave mirror in the image below reflects the sun's energy so that people can warm their hands or bodies outside.

What about convex mirrors? The next time you get on a bus, take a look at the mirrors on the sides of the bus. Most buses and large trucks have a small, extra convex mirror on the side-view plane mirror. The convex mirror makes objects look smaller but shows a wider area so you can see more. It helps drivers avoid hitting something they might not see in the regular plane mirror.



Curved mirrors change the look of things because of the ways they bounce light rays back.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

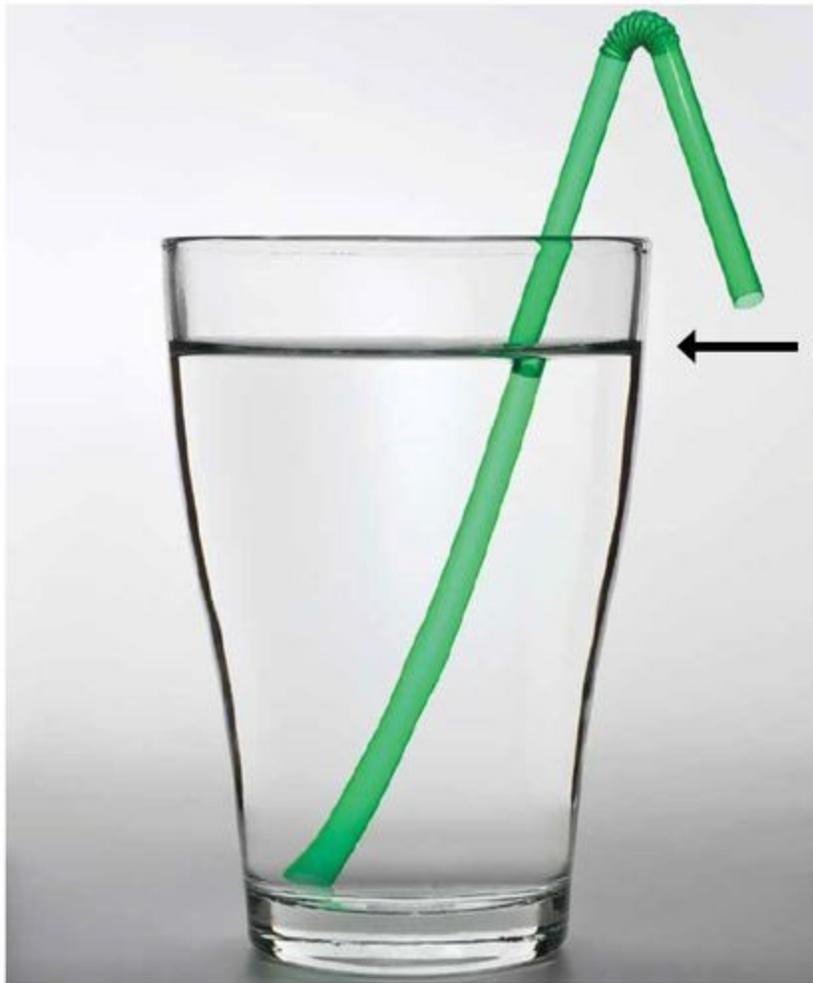
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Refracting Light

This text is adapted from an original work of the Core Knowledge Foundation.

The speed of light is very, very fast. However, the speed of light can change.

Take a straw and put it in a glass of water. Now, look at the straw where it enters the water. Can you see that it appears to be at a different angle? That is called refraction. It's caused by the slowing down of light as it moves from air to water. As the light enters the water, it changes angle direction because it slows down. It seems like magic, but it's really just how light travels-no trick.



Why does the angle of the straw look different after it enters the water?

You may be surprised to learn that there are many ways that we use light refraction every day.

Do you or any of your classmates wear eyeglasses? The lenses in eyeglasses correct

different kinds of vision problems by refracting light. Transparent glass or plastic lenses are made to refract light in different ways. Like mirrors, these lenses can be convex lenses or concave lenses. Mirrors and lenses that are concave or convex have curved surfaces.



Lenses can be used to refract light to correct vision problems.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Scientific Instruments

This text is adapted from an original work of the Core Knowledge Foundation.

In the search for answers to important scientific questions, scientists may use a variety of instruments. An archaeologist might use a magnifying glass to inspect some ancient artifacts. A biologist might use a microscope to study organisms invisible to the human eye. Both of these instruments have lenses, or pieces of clear materials that bend light.

Let's take a closer look at some instruments that have lenses. One example is a magnifying glass. People use a magnifying glass to more clearly see the details of something small. A magnifying glass is an example of a simple convex lens. These types of lenses bend light rays closer together. If you hold and look at something closely through a magnifying glass, it will look larger.



A magnifying glass has a convex lens that makes small details appear larger if you hold the magnifying glass close to the

object you are looking at.

Convex lenses are also found in scientific instruments. These lenses spread light rays apart as they bend them. A scientist might look through a microscope with a convex lens. The lens magnifies very small things that cannot be seen with the naked eye. Scientists study outer space with telescopes. Telescope lenses are also convex. They make the moon, stars, and planets look larger and closer so scientists can learn more about them.



Scientists look through microscopes with a convex lens to see tiny things that are not visible to the naked eye, like these germs.



Scientists also use telescopes with convex lenses to study outer space.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Plane Mirrors

This text is adapted from an original work of the Core Knowledge Foundation.

A mirror is a smooth, shiny surface that reflects light. Light that is reflected bounces off of something in its path.

When a mirror is made, glass is coated with hot, silvery metals and then cooled. This coating makes the mirror shiny so it reflects back all the light that hits it.

Did you know that there are different types of mirrors? You probably use a plane mirror every morning when you get ready for school. A plane mirror has a more or less flat surface. The reflection of something in a plane mirror is almost the same size as the real object.



This little girl is looking at her reflection in a plane mirror.

Plane mirrors are used in many tools. Cameras, telescopes, and microscopes sometimes use plane mirrors. Some toys even use plane mirrors. Have you ever looked through a toy called a kaleidoscope? A kaleidoscope is a tube with plane mirrors inside. There are also tiny bits of colored glass and beads sealed up inside the kaleidoscope. You look through a small hole at one end of the kaleidoscope and point it toward the light. As you rotate the tube, you will see beautiful, colored patterns.



Here's what the outside tube of a toy kaleidoscope looks like.



Here's what you might see if you looked inside a kaleidoscope.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

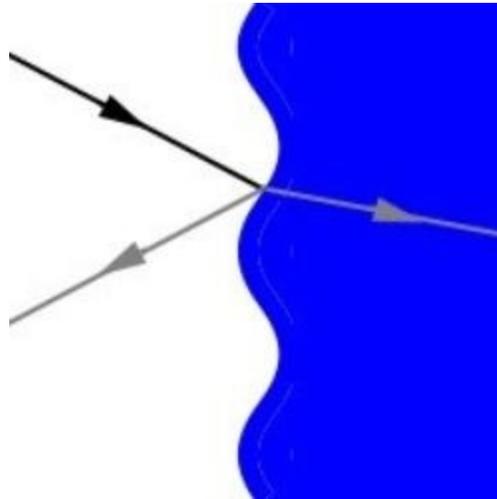
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Why Do Things Look Darker When They Are Wet?

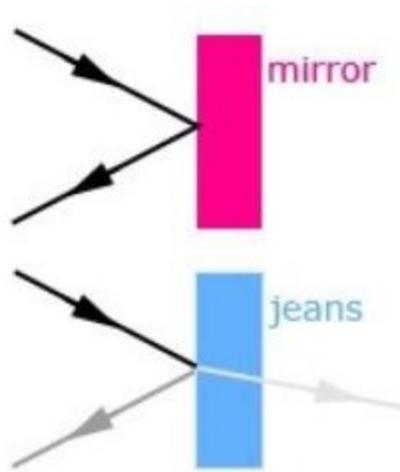
by Dr. Hany Farid

When light strikes an object, some of it penetrates the object, and some of it is reflected and reaches your eye. When an object is wet, more light penetrates the object, so less light is reflected. As a result, less light reaches your eye and so the wet object looks darker. Read on for a more detailed explanation.

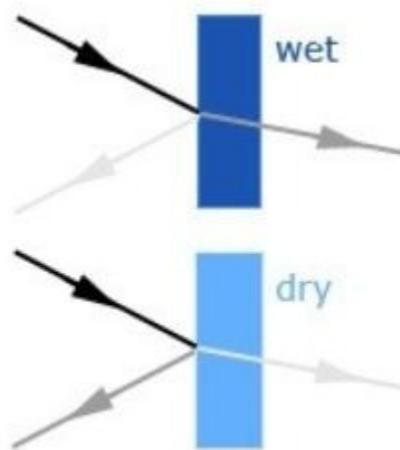
Fact 1. When light moves from air to water, some of the light reflects and some refracts. The reflected light "bounces" off the water, and the refracted light bends at the air/water boundary and passes through the water.



Fact 2. When light strikes any object, some of the light is reflected and some is refracted and transmitted through or absorbed by the object. The relative amounts of which depend on the material properties of the object, its index of refraction.



Fact 3. When a material gets wet and absorbs water, the material's index of refraction is effectively changed, making it so that more light penetrates and less light is reflected.



The light that is reflected from an object is the light that we perceive. How light or dark an object appears depends on how much light that strikes an object reflects back to our eye. For an object whose material has an index of refraction close to that of air very little light is reflected. For an object whose material has an index of refraction different than air, most of the light that strikes it is reflected.

When an object gets wet and absorbs water, its index of refraction effectively moves closer to that of air. When light strikes a wet object, therefore, less light is reflected than when it is dry. A pair of wet pants, a wet sidewalk, and a wet beach, therefore, reflects less light, and therefore looks darker. Steel, glass or plastic doesn't look darker when it is wet because it doesn't absorb any water, and therefore the same amount of light is reflected whether it is dry or wet.



This photo shows a person's t-shirt partly wet. The wet part looks darker than the dry part.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

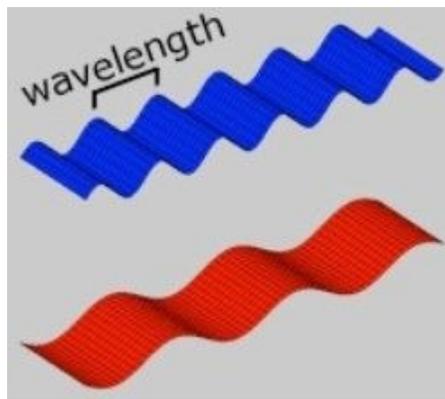
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How Are Rainbows Formed?

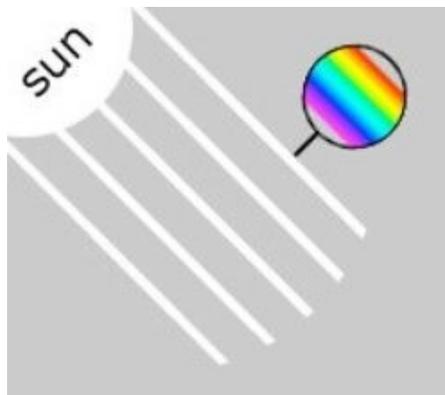
by Dr. Hany Farid

Sunlight is composed of light of varying wavelengths. Short wavelength light appears blue, violet and indigo, and long wavelength light appears red, orange and yellow. When sunlight enters a raindrop in the air, the light splits into a multitude of colors. This light then reflects off the back of the raindrop and re-emerges in the direction in which the light first entered. The light emerging from many raindrops creates a rainbow. Read on for a more detailed explanation.

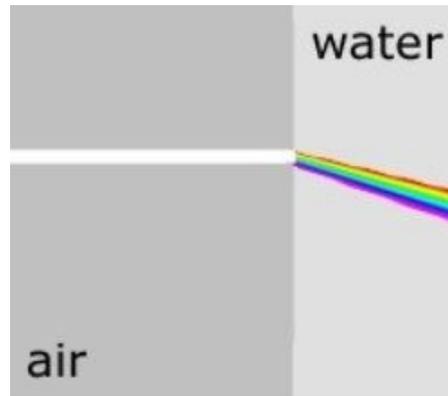
Fact 1. Light travels in waves. The light's wavelength determines its perceived color. Short wavelength light, for example, appears blue, and long wavelength light appears red.



Fact 2. Sunlight is composed of light of many wavelengths. In the range that we can see, this includes the colors of the rainbow.

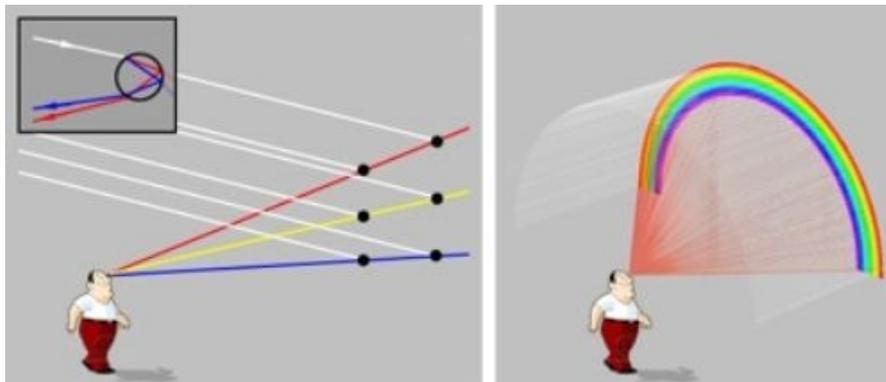


Fact 3. When light enters water it bends (refracts). The amount of bending depends on the wavelength of light. As a result, the light splits into its component colors.



When a ray of sunlight enters a raindrop it bends (refracts). The light then strikes the back of the raindrop, where some of the light passes through and some is reflected. As the light exits the raindrop, it is refracted again. The angle at which the light emerges depends on the wavelength of light. This path is illustrated in the small box below, where only the bending of two wavelengths (blue and red) are shown.

Consider now the diagram on the left. The sun is behind you (white rays) and there is rain in front of you (black dots). As the sunlight enters each raindrop, the light is refracted and reflected as described above. Because the sun is so far away, the rays of sunlight are nearly parallel to one another. As a result, the angle between the red line and each ray of sunlight striking a raindrop on that line will be the same. So, the light that reaches your eye along this ray will be of the same wavelength (color). The same is true for the yellow, blue and intermediate lines corresponding to each color of the rainbow.



Consider now the diagram on the right which explains why the colors of a rainbow form an arc. The angle between the incoming rays of sunlight (white) and all of the red lines, forming a circular cone, have the same angle. As a result, the light that reaches your eye along these lines have the same wavelength (color). The same is true for each band of the rainbow.

The reason that rainbows are somewhat rare is that you will only see them when there is rain in front of you and somewhat in the distance, and the sun is behind you and fairly low on the horizon.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Light

by ReadWorks



Photo Credit: Lyndon Hatherall

Some things in nature give off light. The sun gives off light. Fire gives off light. Lightning gives off light.

Some objects give off light too. Lamps give off light.

Flashlights give off light. Televisions give off light.

Clear things let light pass through. Water lets light pass through. Glass lets light pass through.

Some objects block light. A tree blocks light. A dog blocks light.

Will light go through you? No! What happens when light shines on you? It makes a shadow. The shadow is dark.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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Sunlight in the Night

by ReadWorks



Photo Credit: Yarl

You cannot see the sun in the nighttime. But did you know that you can see the sun's light at night? Here's how it works.

When it is dark, you see the moon shining in the sky. But we know that the moon does not make its own light. Moonlight is really light from the sun. The moon reflects the sunlight. When something is reflected, it is thrown back.

The sun's light is thrown back to Earth. That makes the moon look as if it has its own light. What you are really seeing is the reflection of the sun's light.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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The Sun, Moon, and Planets

6 Articles

Check articles you have read:

The Earth's Moon
281 words

In the Center of a Group of Planets
308 words

The Planets Closest to the Sun
526 words

The Movement of the Earth
305 words

The Outer Planets
405 words

Eclipses
339 words

The Longest and Shortest Days
105 words

Why Don't We See Stars in the Daytime?
106 words

The Ever-Changing Sky
567 words

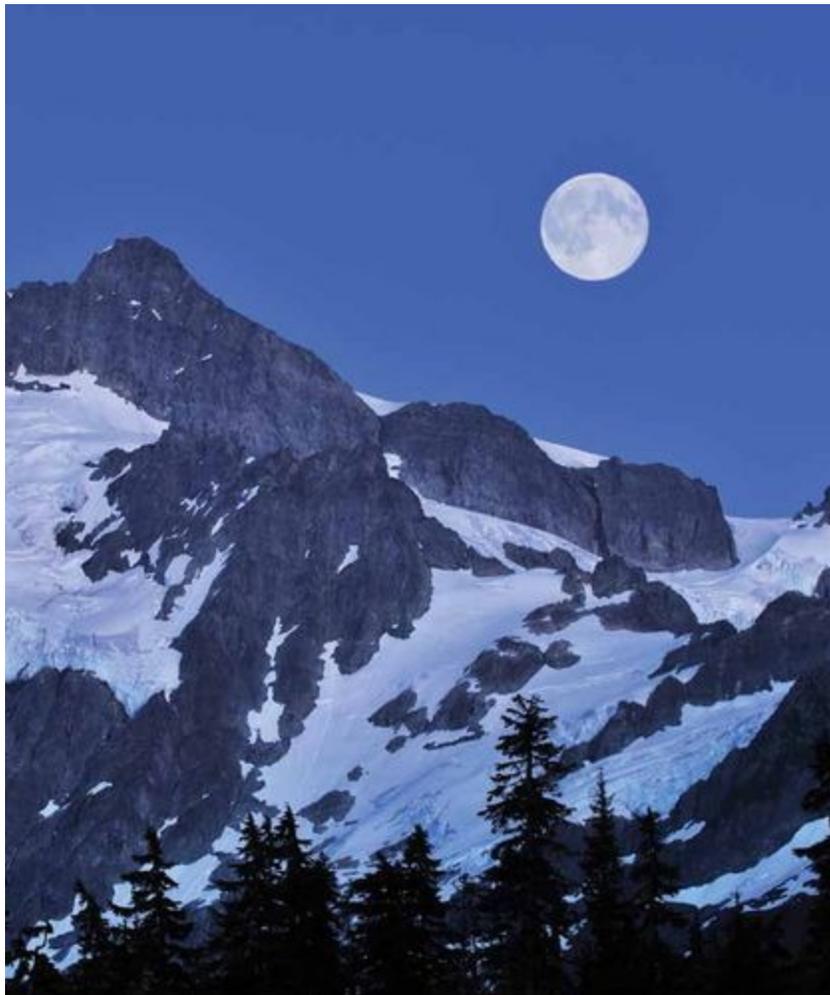
What's Up In Space?
257 words

The Earth's Moon

This text is adapted from an original work of the Core Knowledge Foundation.

Look up in the sky at night. What do you see? If it is not cloudy, you may be able to see the moon.

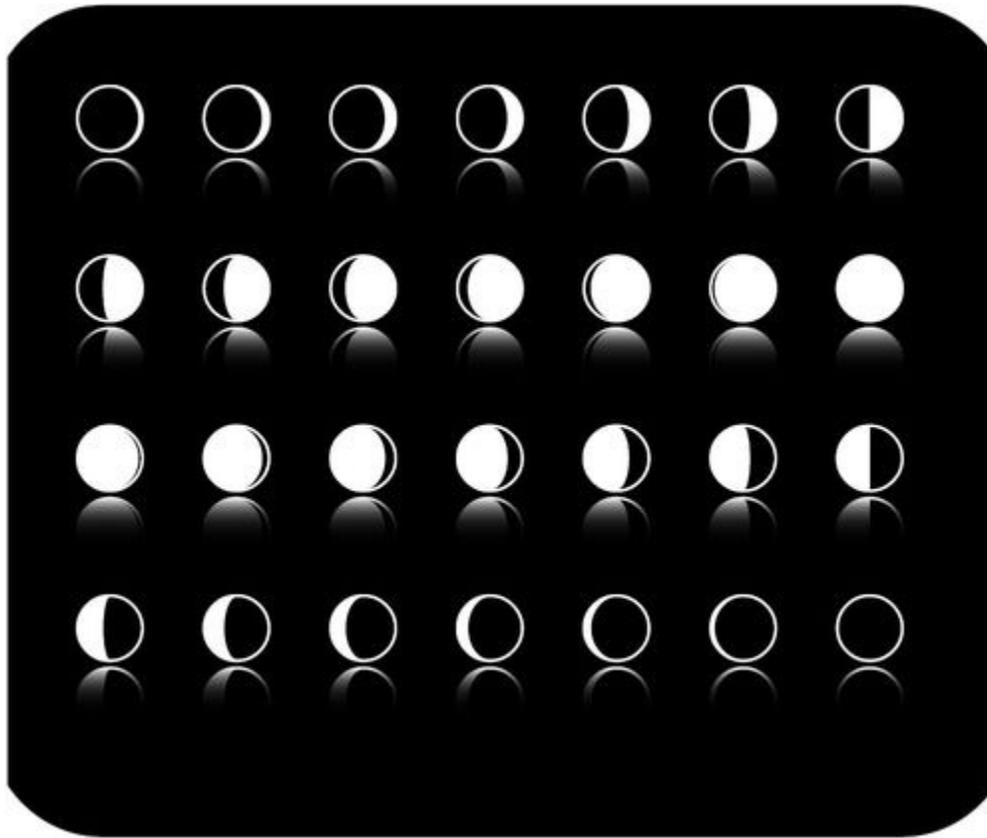
When you see the moon at night, it might look white. It might look gray or silver. Sometimes, it seems to shine and glow. But the moon does not give off light the way the sun does. The moon is a ball of rock that gives off no light of its own. It simply reflects light from the sun. That means light from the sun hits the moon and bounces off.



Our moon is easily visible on most clear nights.

You may know that Earth orbits around the sun. But did you know that the moon orbits around Earth? It takes just about one month for the moon to completely circle Earth. If you look up at

the night sky each night of the month, you may think that the size and shape of the moon is changing. However, the size and shape are not really changing. The moon is still a round ball. It looks different at different times of the month because of the way the light from the sun is reflected and how much of the moon we can see from Earth.



This chart shows the phases of the moon. It shows what you might see if you looked at the moon each night for a month. You can read the chart just like you would read a book. Start at the top and go from left to right. When you finish reading the first row, go on to the next one. You can see how the moon seems to change during the month.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

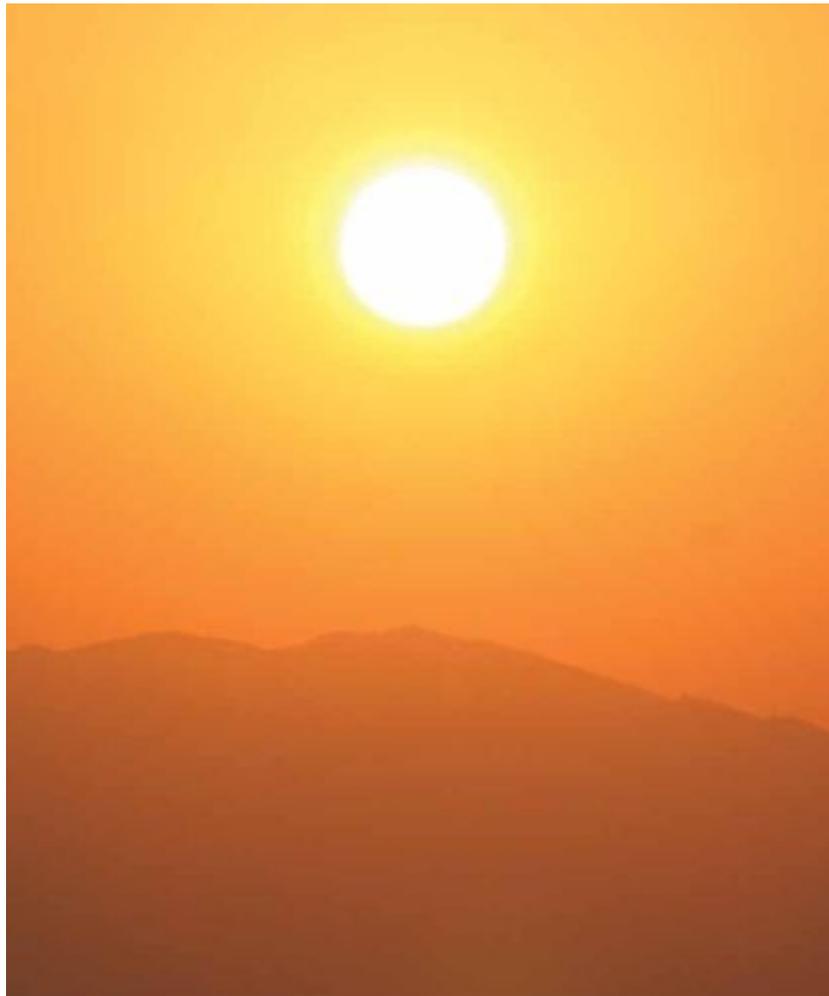
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In the Center of a Group of Planets

This text is excerpted from an original work of the Core Knowledge Foundation.

Look up in the sky at noon. What do you see? If it is not cloudy, you will see the sun shining brightly in the sky.

The sun provides energy-both light and heat energy. The sun's light and heat give life to plants and animals. Without the sun, Earth would be freezing cold. Have you ever wondered what the sun is made of or why it gives off so much light and heat?

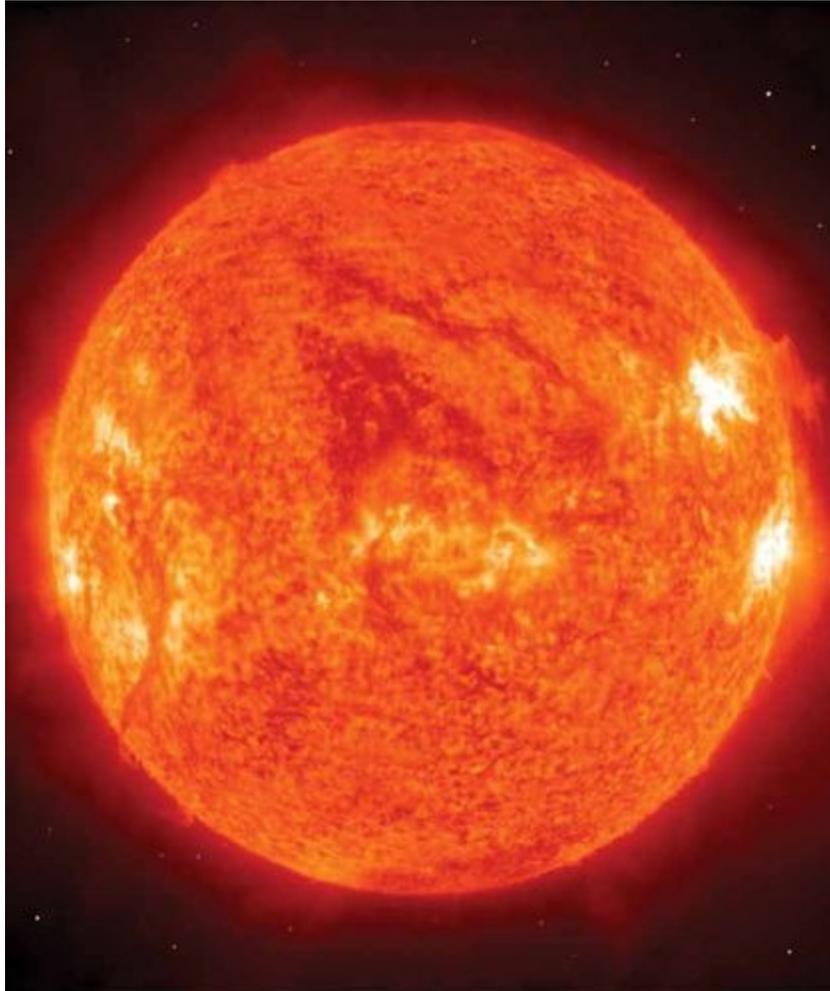


The sun gives us light and heat energy.

You may be surprised to know that the sun is a star. It is in fact the closest star to Earth. It is made up of different, hot gases. How hot? A hot summer day on Earth is 100 degrees. On the sun, it is 10,000 degrees! The sun stays that hot all the time! The sun's gases create the light

and heat energy it gives off.

Long ago, people believed that the sun moved around Earth. This seemed to make sense. Each morning at the start of the day, the sun rose in the east. At the end of the day, the sun set in the west-exactly opposite from where it had come up. To explain this change, people said the sun moved around Earth. But now we know that this is not what really happens. The sun does not move around Earth. It is Earth that moves around the sun!



A close-up of the sun

The sun is in the center of a group of eight planets. All of these planets, including Earth, circle, or orbit, around the sun. The sun, planets, and other objects in space that orbit the sun are called the solar system. The word *solar* has the Latin root word *sol*, which means "the sun." Everything in the solar system relates to the sun.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

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The Planets Closest to the Sun

This text is excerpted from an original work of the Core Knowledge Foundation.

Our planet Earth is one of eight planets in our solar system that orbit around the sun. The other planets are Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. People have been looking at the planets for thousands of years. People from Mesopotamia, the Greeks, Mayans, Incas, and Aztecs were all interested in the planets. They used just their naked eye to study the planets. Now, we have telescopes and other tools that help us get a better look at the planets.



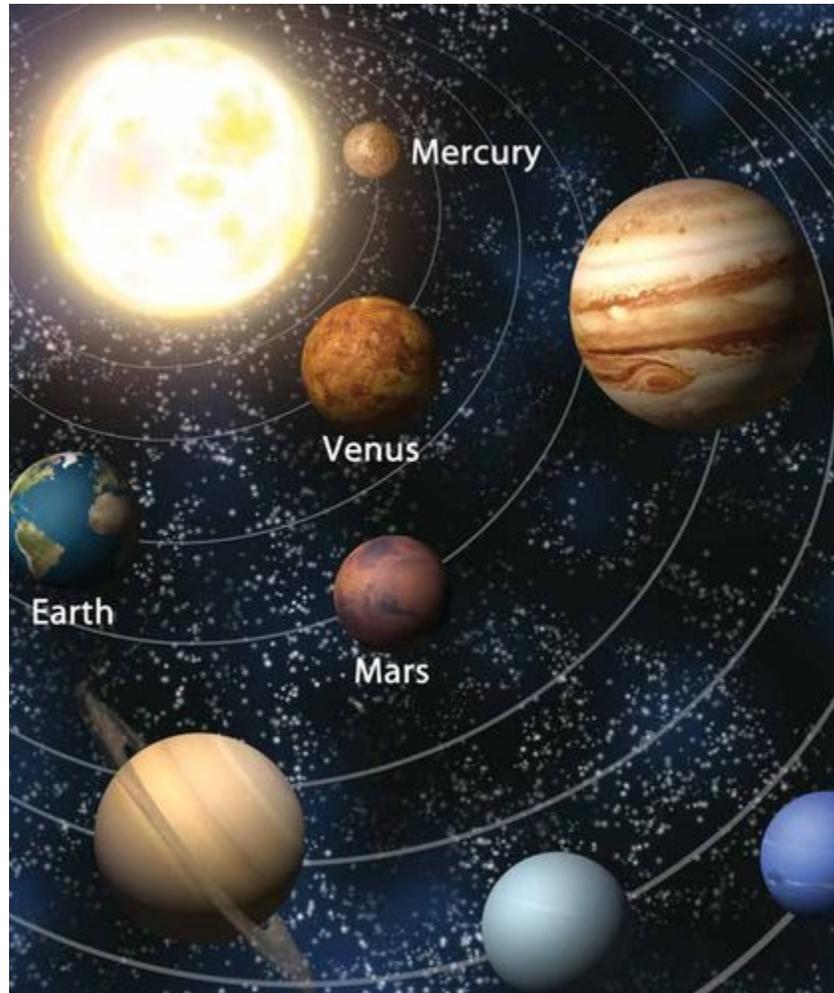
A telescope

The four planets closest to the sun—Mercury, Venus, Earth, and Mars—are small planets. These planets have a rocky, or solid, surface.

Mercury and Venus are closer to the sun than Earth. The other planets are farther away.

Earth needs 365 days to make one orbit around the sun. That is the length of one year on Earth.

The closer a planet is to the sun, the less time it needs to make an orbit around the sun. Mercury is the closest planet to the sun. It needs just 88 days to make one orbit. Venus is the next closest to the sun. It needs just 225 days to make an orbit. The planets that are farther away take much longer. It takes Neptune 165 years to orbit the sun!

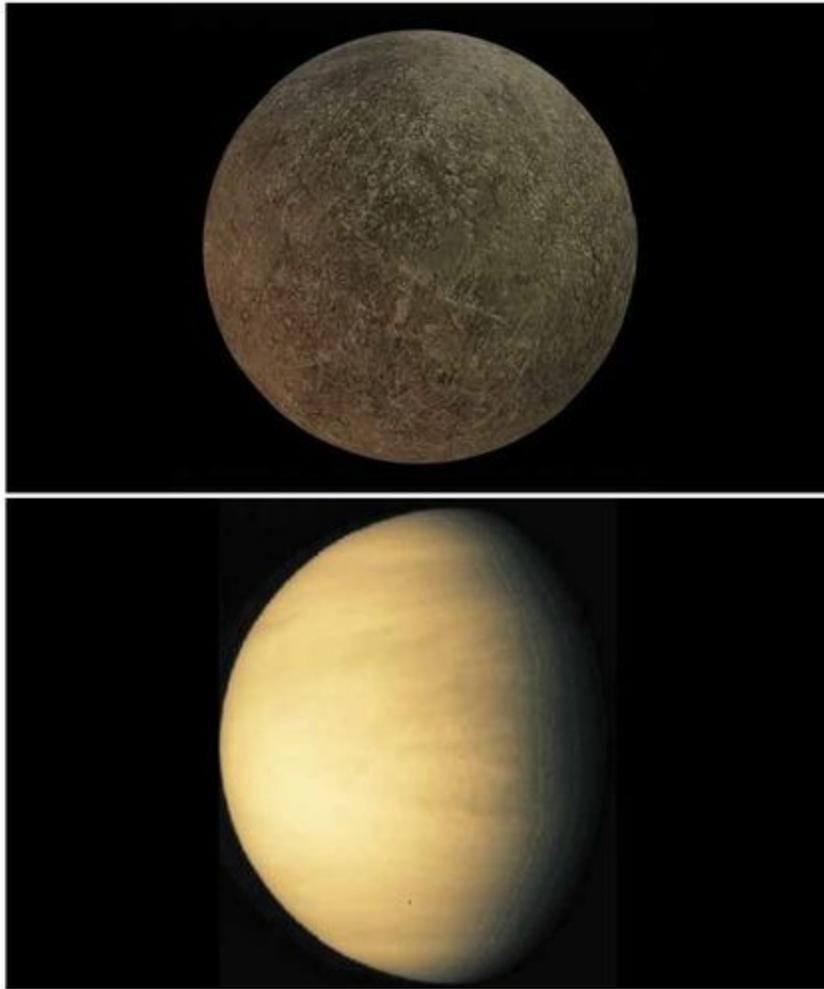


The sun and planets

Besides being closest to the sun, Mercury is the smallest of all the planets. The English name for the planet comes from the Romans. They named the planet after the Roman god Mercury. The Greek name for this same god is Hermes.

Venus is the second planet from the sun and is closest to Earth. This planet was named after the Roman goddess of love. For a long time, scientists thought that Venus might be a lot like Earth. After all, it is close to Earth. It is about the same size as Earth and it is covered with clouds, like Earth. But this idea turned out to be wrong, too. We know now that Venus and Earth are different in lots of ways.

Scientists had to change their ideas to fit the new facts. They have now concluded that Venus is much hotter than Earth. It would not be a good place for us to live or even visit.



Mercury (top) and Venus

Mars is the fourth planet from the sun. It is named after the Roman god of war. When you look at Mars in the night sky, it looks quite red. This is because the rocks on Mars contain rust.

Many space probes and robots have landed on Mars. They have taken photographs and also dug up rocks.

One probe that went to Mars not long ago found some ice. That was big news. Ice is frozen water. If there is water on Mars, there might be life. Some experts argue that nothing could live on Mars. They say it is too cold and too dry. Others think there might be life on Mars. They think there might be something alive down under the rocks. Still others think there might have been life on Mars at one time but there isn't any now.



Mars

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

1 Question

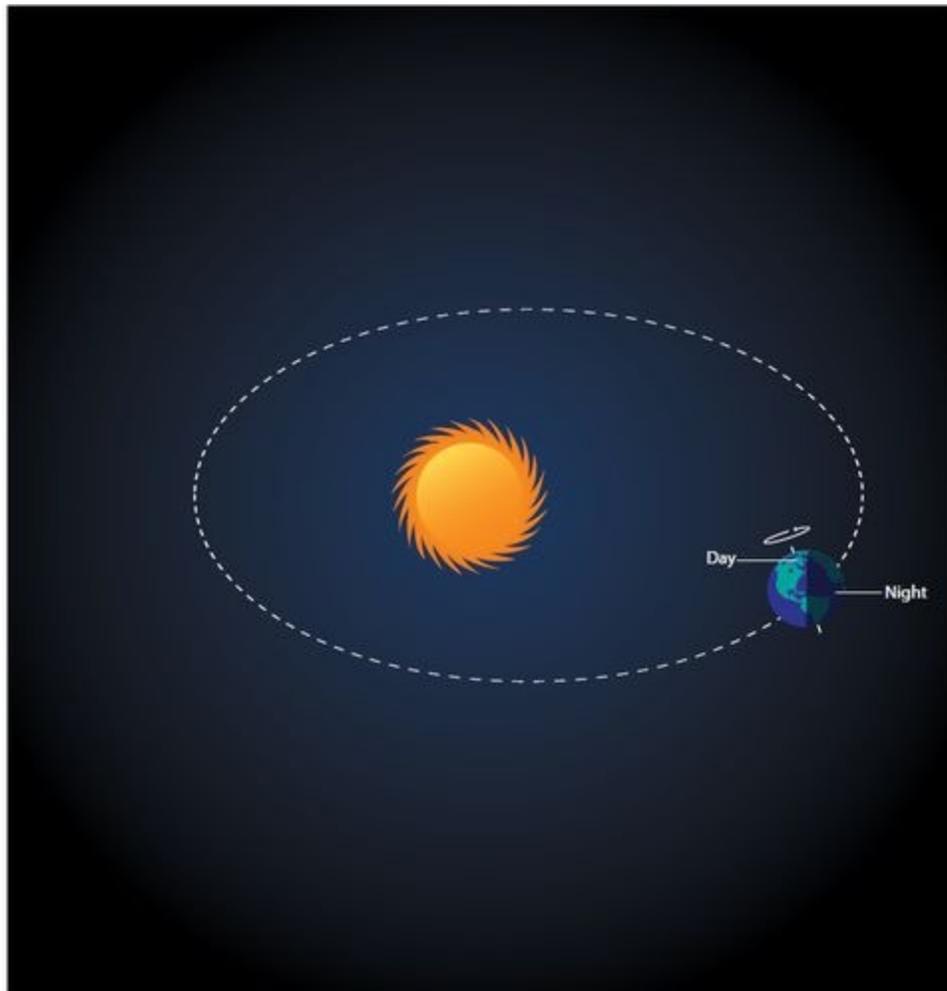
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The Movement of the Earth

This text is adapted from an original work of the Core Knowledge Foundation.

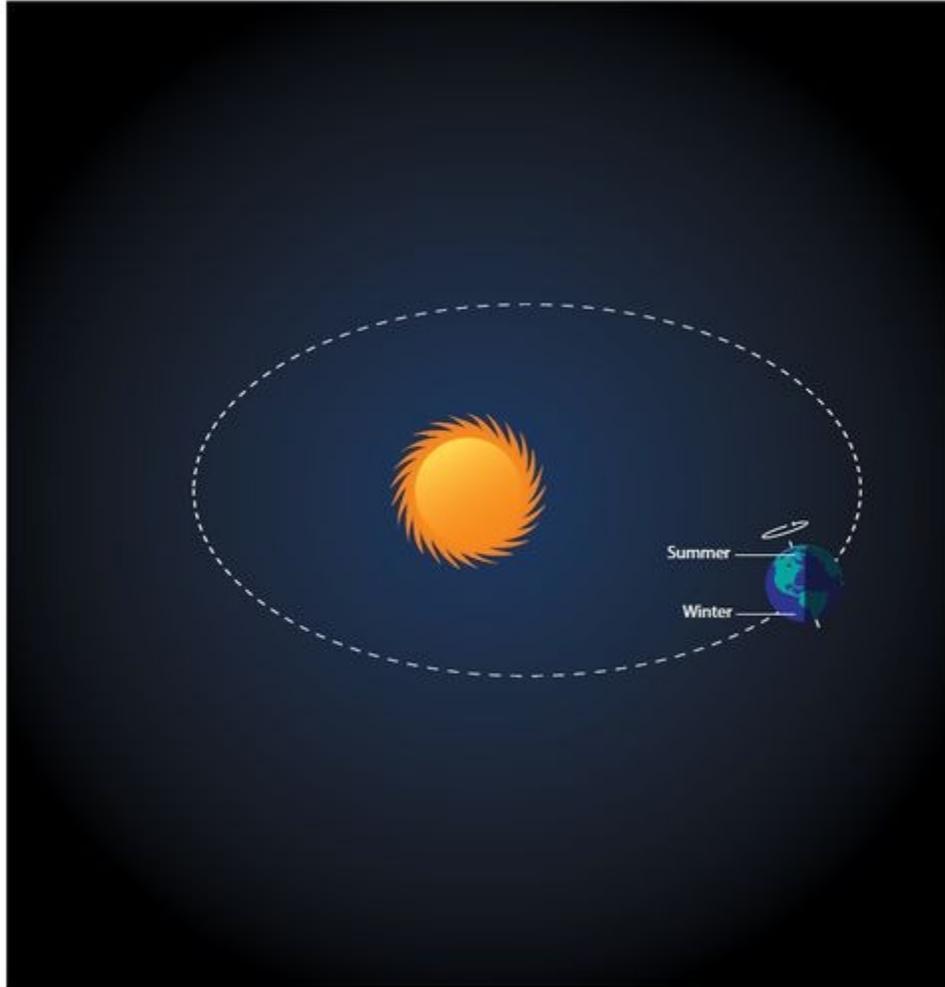
Our planet, Earth, moves in two ways. The Earth circles around the sun. It takes about 365 days, which is one year, for Earth to orbit the sun.

Earth also moves by spinning, or rotating, on its axis. It is this spinning that makes day and night on Earth and the motion of the sun across the sky from sunrise to sunset. It takes one day for Earth to make one complete rotation on its axis. As Earth rotates and spins, different parts of it face the sun. When the part facing the sun gets sunlight, it is daytime on that side of Earth. The part that faces away from the sun gets no sunlight. So, on that side of Earth, it is nighttime. Did you know that when it is daytime where we live, it is nighttime on the other side of Earth?



Earth spins on its axis. On the side of Earth facing the sun, it is daytime. On the side facing away from the sun, it is nighttime.

When Earth rotates on its axis, it is tilted. At certain times of the year, one part of Earth is tilted toward the sun. The sunlight is more direct and it feels hotter. For people living on this part of Earth, it is summer. For people living on the part of Earth tilted away from the sun, there is less sunlight and it is winter. So, when it is summertime for us, there are people living on other parts of Earth where it is winter! So, the fact that Earth is tilted on its axis is what creates the seasons of the year.



When Earth is tilted on its axis towards the sun, it is spring and summer. When Earth is tilted on its axis away from the sun, it is fall and winter.

Name _____

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Article Title: " _____ "

3 Facts

2 New Words

1 Question

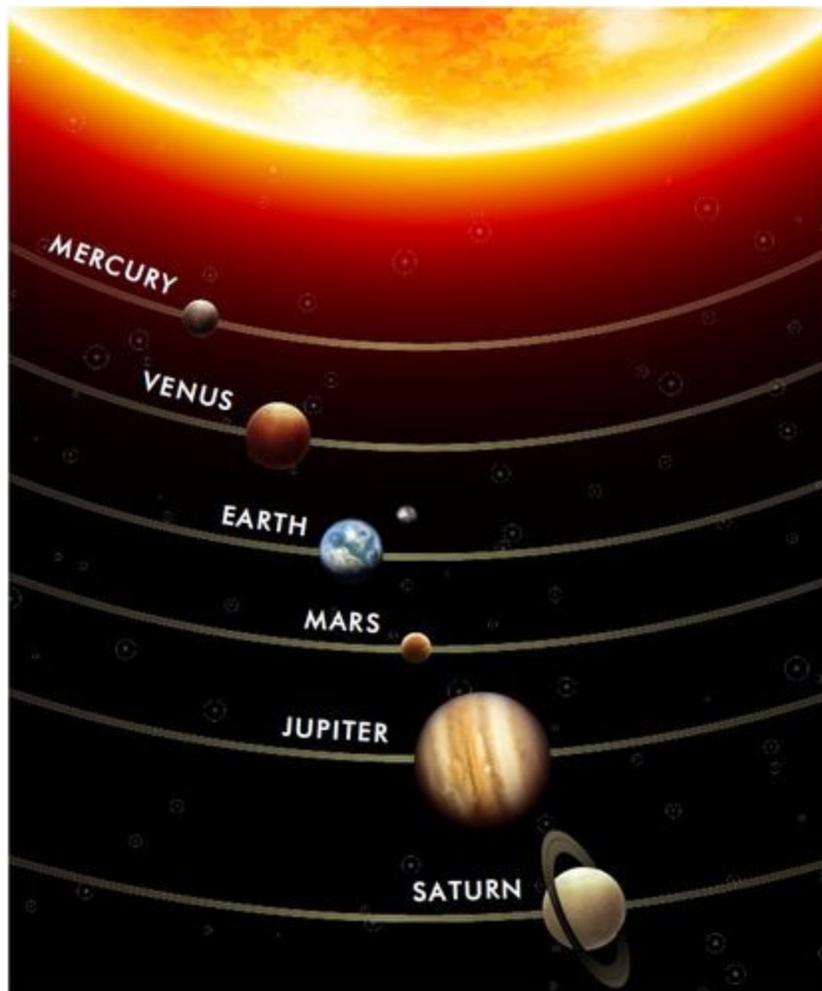
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The Outer Planets

This text is adapted from an original work of the Core Knowledge Foundation.

The four planets closest to the sun are Mercury, Venus, Earth, and Mars. There are four more planets in our solar system called the outer planets. So there are eight planets in all.

Jupiter is the very next planet after Mars. After Jupiter come Saturn, Uranus, and Neptune in that order. Neptune is the planet that is farthest from the sun. Uranus is difficult to see with the naked eye and Neptune is impossible to see without help. Neptune is only visible using a telescope.



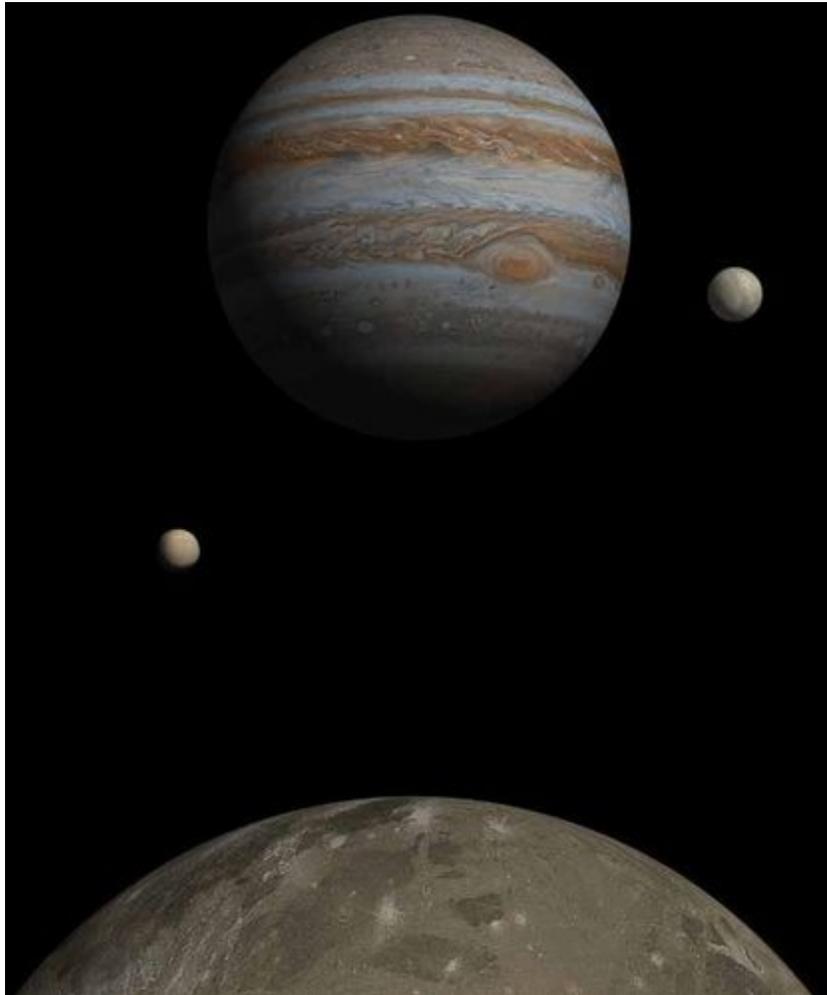
Part of our solar system: the sun and six of the eight planets

The outer planets are very large and are mostly made of gas. Scientists often call these planets gas giants. Of all the planets, Jupiter is the largest: 1,300 Earths could fit inside

Jupiter! It is made mostly of hydrogen gas, the most common gas in the universe.

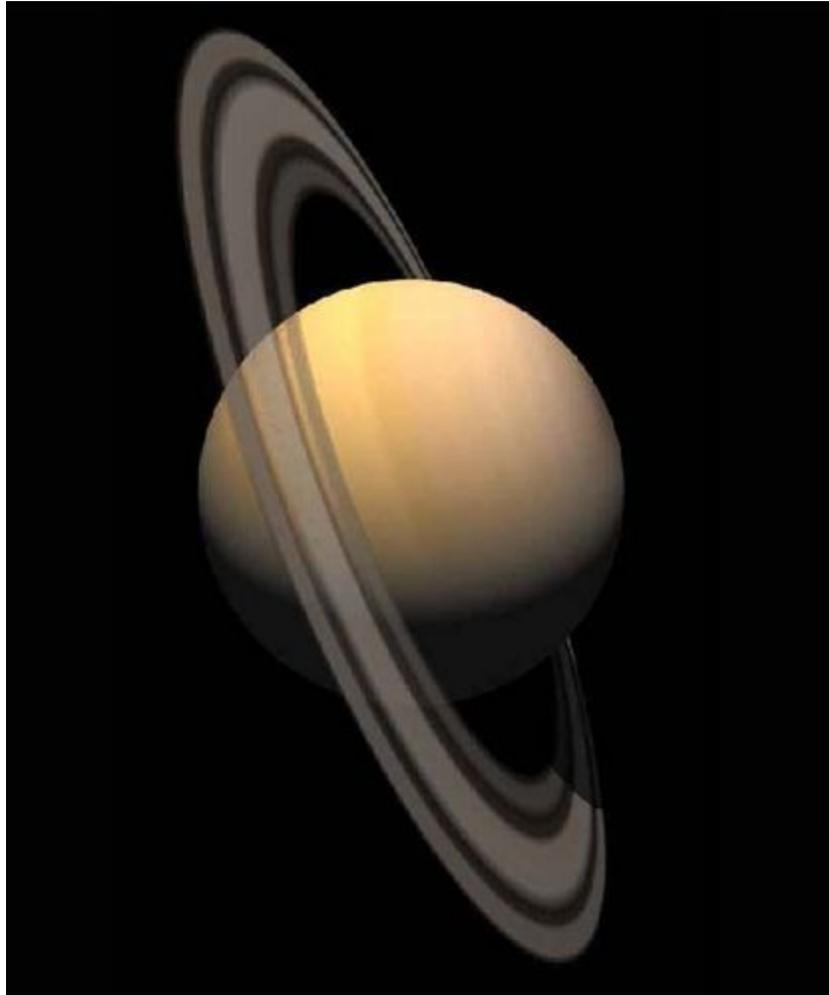
The gases on Jupiter seem to be blowing around. In the image of Jupiter below, you can see the giant, red spot. It looks like an eye! Experts think it is a big wind storm, like a huge hurricane.

Jupiter also has 63 known moons that orbit it. Some of these moons are very large, even larger than Earth's moon.



Jupiter and some of its moons

Saturn is known for its many large rings that orbit the planet. These rings are made of ice and dust. The ice reflects light and makes the rings glow. Saturn also has many moons that orbit it.



Saturn and its rings

The last two planets are Uranus and Neptune. These planets are the farthest from the sun so they are very cold. Uranus and Neptune also have rings, but they aren't easily seen like Saturn's. Both planets also have moons.

So now you know the names of all eight planets. Try asking the adults in your family how many planets there are. They may tell you that there are nine planets. When the adults in your family were in school, people said that there was a ninth planet called Pluto. But in 2006, scientists decided that Pluto did not have all of the characteristics needed to be classified as a planet. They removed Pluto's name from the list of planets, so now there are only eight planets.

Name _____

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3 Facts

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Eclipses

This text is adapted from an original work of the Core Knowledge Foundation.

Earth orbits around the sun. The moon orbits around the Earth. The way that Earth, the moon, and the sun move can make other interesting things to look at in the sky. When Earth, the moon, and the sun all move together in a direct line, something called an eclipse can take place.

We can see two kinds of eclipses from Earth. One kind happens when the moon gets in between the sun and Earth. When that happens, we can't see the sun for a while. At least, we can't see part of it. We call this a solar eclipse or an eclipse of the sun.



During an eclipse of the sun, the moon moves between Earth and sun and blocks out the sun.

The other kind of eclipse, called a lunar eclipse, also involves the sun, the moon, and Earth. It

takes place when the moon passes behind Earth and into its shadow. In the image on the next page, you can see that a shadow covers part of the moon. It is Earth's shadow that you see. Earth has blocked out the sun and left part of the moon in darkness.

Eclipses do not happen often because the sun, Earth, and the moon all have to line up just right. Solar eclipses can only be seen from a narrow strip of Earth at a time. While they happen once or twice a year, it is very, very rare to see one. Eclipses of the moon happen more often, several times each year. They can be seen from half of Earth at a time, so are more often visible.

Whether or not you can see an eclipse depends on where you are on Earth. You must never look directly at a solar eclipse. The sun is very bright and could burn your eyes. But, it is safe to look at an eclipse of the moon. If an eclipse is predicted, it is usually big news, so you will likely hear about it.



The moon during a lunar eclipse

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The Ever-Changing Sky

by Megan McGibney



Look up at the sky on a clear day. You will see the sun. It is bright and shiny, warming much of what its light touches. Look up at the sky again at night. You may see the stars. They are also bright and shiny, glimmering in the dark sky. You may also see the moon. It looks bright and shiny, reflecting light from the sun. People have always looked up at the sky with wonder. Some have even studied the sun, moon, and stars. These people, called astronomers, have learned that those objects in the sky do not stay in the same place all the time.

The earth revolves around the sun and also rotates on its axis, which is an imaginary line that runs from the North Pole to the South Pole, through the earth's center. It takes just under 24 hours for the earth to complete one rotation on its axis - a day, that's right! And guess how long it takes the earth to revolve around the sun? A little over 365 days. That's a year, with an

extra quarter of a day.

Let's take a closer look at the moon. The earth does not revolve around the moon. Instead, the moon revolves around the earth. It takes the moon about four weeks to complete a revolution around the earth. The portion of the moon we, here on Earth, see changes over this period of about four weeks as the moon's position around the earth changes. The moonlight we see at night is the moon's reflection of sunlight onto Earth. The different ways the moon appears to us are known as the moon's phases. The moon's phases depend on the moon's position in relation to the earth and the sun.

The four-week period starts and ends with the new moon. The new moon cannot be seen because the side of the moon lit by the sun is facing away from the earth. This is because the moon is nearly between the sun and the earth at this time. After that comes the first quarter moon, which is when we see half of the side of the moon lit by the sun. Then comes the full moon, when we can see the entire side of the moon lit up by the sun. This is because the earth is nearly lined up between the sun and the moon, and the sunlit part of the moon is facing the earth. One of the last phases is called the last quarter moon. This is when we see the other half of the lit side of the moon.

Sometimes the way the sun, moon, and earth are positioned causes an event known as an eclipse. There are two types of eclipses. A lunar eclipse happens when the earth passes between the moon and the sun and when the earth blocks the moon from the sun. The earth's shadow may block the entire moon or just part of the moon from view. A solar eclipse happens when the moon passes directly between the earth and the sun. A solar eclipse can block part of the sun or the entire sun from the earth's view.

Because of the regular orbit of the moon around the earth and the regular orbit of the earth around the sun, astronomers can predict when an eclipse will happen even many years into the future.

Earth has one **moon**. It travels in an orbit around Earth. The moon is made of rock. It is covered with deep holes called craters. The moon may look as though it gives off light, but it does not. It looks bright when it reflects light from the sun.

Space Facts!

- The sun is so large that it could hold a million Earths.
- Earth is called the Blue Planet because it is covered in so much water.
- Some planets have many moons. Jupiter has the most. It has more than 60 moons.

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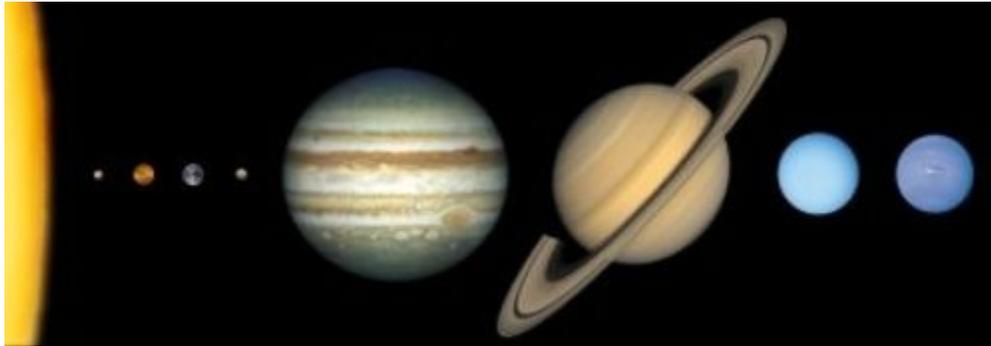
3 Facts

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What's Up In Space?



Places in Space

Space is an exciting place! Our solar system is in space. It is made up of the sun and the eight planets that travel around the sun. Our solar system also has moons, stars, and other space objects.

In the Center

The **sun** is at the center of our solar system. The sun is a hot, bright **star**. A star is a ball of hot gas. It gives off heat and light. The sun is the star closest to Earth. That is why it looks different from other stars. Most stars look tiny and can be seen only at night because they are so far away.

Around the Sun

A **planet** is a large ball made of rock or gas. Eight planets make up our solar system. You live on one of them-Earth! The others are Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. Each planet moves in a path around the sun. The path is called an **orbit**.

Around Earth

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Date _____

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3 Facts

2 New Words

1 Question

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The Longest and Shortest Days

by ReadWorks



When is the longest day of the year in the United States? It is around June 21. That is the first day of summer. It is called the summer solstice. Summer days are long. We have many hours of sunlight.

Why? Earth tilts as it travels around the sun. In the summer, the north half of Earth tilts toward the sun. The United States is in Earth's north half.

What is the shortest day of the year? It is around December 21. That is the winter solstice. It is the first day of winter. In the winter, Earth's north half tilts away from the sun.

Name _____

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3 Facts

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Why Don't We See Stars in the Daytime?

by ReadWorks



Photo Credit: ESA Hubble NASA

At night, we see many stars in the sky. Those stars are made of burning gases. They are hot, and they shine. But stars are in the sky both day and night. So why do we only see stars at night?

In the daytime we see the sun shine. Our sun is a very bright star. The sun's bright light blocks out other stars. It blocks out stars that are not as bright.

When evening comes, we cannot see the sun. Its bright light goes away. We see a dark night sky. That lets us see the lights of other stars.

Name _____

Date _____

Article Title: " _____ "

3 Facts

2 New Words

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