

**Future Literacy 80-2****Unit 1. Why Are There Days and Seasons?**

Many people know that night and day occur because the Earth is constantly spinning on its own axis. As it turns around, the part of the Earth's surface that is facing the Sun rotates away from the light and turns dark. However, the occurrence of seasons is a bit more complicated. Not only is the Earth spinning in place, but it is also orbiting the Sun. Another important aspect of seasons is the fact that the Earth is tilted at a 23.5-degree angle. The Earth takes approximately 365 days to complete one lap around the Sun. During this time, there are times when the top part of the Earth is tilted towards the Sun. This is when summer occurs in the northern hemisphere. It gets longer days and warmer weather. Roughly six months later, when the Earth has orbited around to the opposite side of the Sun, its southern hemisphere will be tilted towards the Sun, meaning that it's summertime there while the northern hemisphere is experiencing winter.

**Unit 2. The Shape of the Earth**

Even before astronauts took pictures of the Earth from space and visually proved that the Earth was round, many mathematicians and thinkers had figured this out. Alongside Aristotle and Pythagoras, a Greek thinker called Eratosthenes contributed to the proof that the Earth was not flat. He did so by measuring the circumference of the Earth using math formulas. He first noted that the position of the Sun during noon was different depending on the city he was in. Then, he measured the distance between the two cities and used trigonometry to calculate the circumference of the whole planet. Other people, such as the explorer Ferdinand Magellan, actually navigated around the Earth, an impossible journey if the Earth had been flat. However, for many sailors, it was evident before Magellan's quest around the globe that the Earth was round. All they had to do was sail towards a tall mountain in the ocean and notice that the top of the mountain could be seen over the horizon before any other part.

### **Unit 3. The Mystery of the Moon**

The Moon is the largest and brightest object at night and it's quite beautiful. However, our Moon has other uses than simply being a pretty thing to look at. For example, our Moon makes the Earth a better place to live on by keeping the Earth's stability on its axis. This leads to a more stable climate, which means that we can live in more comfortable temperatures and weather conditions. Our Moon is also what gives us ocean tides. It's hard to imagine what humans would do without the tide, especially for fishermen and sailors. Some scientists and writers once thought that the Moon could be a suitable place to live on. This would mean that humans could go to the Moon someday. However, explorations of the Moon have found that its atmosphere is thin and weak. Unlike the Earth's atmosphere, there is no protection from the Sun's radiation or meteoroids. Therefore, it's better to be thankful to the Moon for what makes the Earth a wonderful home.

### **Unit 4. The Earth's Blanket**

The Earth's atmosphere protects and sustains life on our planet. It keeps out meteoroids by breaking them up before they hit the Earth. It also prevents the strong radiation and heat of the Sun from directly reaching the inhabitants of our planet. The atmosphere is mostly made up of nitrogen but is also composed of 21% oxygen. This allows us to breathe the air. The atmosphere also allows a diverse range of creatures to inhabit the Earth, everything from camels to humpback whales. It's much easier to understand just how special Earth's atmosphere is when you compare it to neighboring planets such as Mars or Venus. The atmosphere of Mars, for example, is 100 times thinner than Earth's and is mostly made up of carbon dioxide. Similarly, Venus's atmosphere is almost entirely carbon dioxide. In addition, Venus has a greenhouse effect on its surface, which makes its temperature unbearably hot at 467 degrees Celsius.

## Unit 5. Art and Health

Some people might think that art therapy is not very effective because it seems similar to simply playing with arts and crafts. However, the purpose of art therapy is to help people engage in self-exploration and meaning-making. This is done by encouraging the patient to create a tangible, visual work that expresses their experiences and feelings. At its core, art therapy helps people “talk” without using words when they are unable or too afraid. This allows people to communicate through a variety of senses including touch. One example of art therapy being used in meaning making is in the treatment of someone who has gone through a traumatic event or suffers from an emotional disorder. In such cases, the patient may only be able to articulate themselves by creating imaginative stories. Art therapy can help such patients steadily release these traumatic experiences through storytelling.

## Unit 6. Painting in the Air

Virtual reality (VR) was first developed in the late 20<sup>th</sup> century and is now a popular technology used most prominently in the gaming industry. VR uses a headset to enable users to see a panoramic field of vision. What is shown on the headset moves along with the movements of the user, thereby making it appear as if the user is inside a virtual reality. The technology is also being used by artists to create new and exciting artwork. Artist Marina Abramovic has exhibited her VR artwork *Rising*. It uses VR to transport the user to a drab place where the user’s avatar is trapped in a glass box half-filled with water. The user is then given a choice of whether or not to vow to care for the planet. If the user refuses, the water level rises, drowning the user’s avatar. This interactive artwork was used to teach users about the dangers of global warming.

## Unit 7. Picasso's Famous Painting

Pablo Picasso's *Three Musicians* was painted in the summer of 1921. It is currently on display at the New York Museum of Modern Art. The painting is very large and is more than 2 meters tall and wide. It resembles cut paper and is in the style of Synthetic Cubism. The Cubist style turns the subject of the artwork into flat shapes such as planes, lines, and arcs. Art historians view Cubist art as a form of intellectual art because the artist is required to analyze the shapes of their subjects and then reconstruct them in the paintings. In *Three Musicians*, there are three musicians in the painting made with bright colors and abstract shapes. From left to right are the clarinet player, the guitar player and a singer. All three figures seem to overlap and intersect, making it difficult to tell where one starts and another ends.

## Unit 8. Points of Color

Pointillism was an art technique that was developed in the late 1800s. It was first used to describe the paintings of artist Georges Seurat. Seurat used small, distinct dots in primary colors to form a pattern. These patterns, when viewed from afar, looked like beautiful images. This technique is made possible because of the way that the human brain processes images. Instead of seeing hundreds of tiny individual spots of color, the human brain connects the dots into a picture. This is also true for the colors. Although the paintings use hundreds of tiny dots, each with a distinct color, the human brain tricks people into seeing a seamless range of colors instead of many individual ones. Unfortunately, not many artists practice pointillism today and prefer to blend their paints to achieve their desired color. However, Seurat's paintings left a great impact on modern art. Art historians credit his art with starting a style that is known today as Neo-impressionism.

## **Unit 9. Earning Money**

There are many ways to make money even when you are a young child. First, you should draw up a plan of ways you can make money. One very common way children have made money is by building a lemonade stand. Making lemonade is quite cheap. All you need is some lemons, sugar, and water. Build your lemonade stand close to your home so that you don't have to carry all your equipment around. Then, set a price for each cup of lemonade. You can also have an icebox with bottles of lemonade. Make sure the weather is hot outside since more people drink cold drinks when the Sun is out. If you need help, ask your friends or siblings to work with you. You can also make a large sign so people know you are selling lemonade. After you have sold your lemonade, count how much money you have made. Save this money to buy what you want.

## **Unit 10. How People Use Money**

Economics is a study that looks at how people, companies, governments, and everyone in society decide to use things that are not enough for everyone. It checks out how things are made, shared, and used, and tries to figure out how to do this better to make life better and keep the economy stable. Learning about economics helps people think smarter and make better choices in daily life, like how to save money or pick what to buy. Economics also helps us understand how what happens in one part of the world can affect other places. Knowing this is very important today because countries trade with each other a lot and what happens in one country's economy can matter to others.

## Unit 11. Making Money

Paper money is used throughout the world. Each country has a specific currency that is used in stores. That is why each country is in charge of printing that specific paper money. In the United States of America, paper money is printed by the Bureau of Engraving and Printing. One is located in Washington, D.C. and the other one is in Fort Worth, Texas. Then they put special designs in the paper money so that it is difficult to make fake copies. Special ink and serial numbers are used to make it even harder to create copies. In addition, special paper is used. American paper money is usually created to last a long time. It can be folded around 4000 times before it rips. If you ever find a dollar bill, try to see if the paper is too thin or the design is different.

## Unit 12. Penny Pincher

Penny pinchers are people who don't like to spend money and usually keep good track of it. It's important for kids to learn not to spend money when they are younger. As adults, many people who have never learned to save money can get in trouble for spending too much. They don't know how to control themselves and they even borrow money to buy things. A good way for children to learn how to save money is to put it in a clear jar. This way, children can watch the money literally pile up. It also shows that even saving coins and small amounts of cash can add up to a lot. Parents can also teach their children patience. This is important in teaching them not to buy things without planning ahead. The term "penny pincher" often seems like a bad label because some people view it as being too stingy. But knowing how not to spend money is just as important as knowing how to spend it.

## Unit 13. Music in a Bottle

There are several ways to make music with glass. Glasses filled with different levels of water can be set up on a table. Wetting one's fingers and running them around the rim of the glass can create musical notes. Another way is to fill bottles of water with different amounts of water. Blowing across the opening of these bottles can produce sound. The reason that each bottle or glass can produce a different note is because of the difference in pitch that is created. The pitch is how high or low your notes are. In bottles with less water and more air, the vibrations are slower. This makes the pitch lower compared to glasses filled with less air. Another way to use glass is to fill it with grain and shake it. This makes a percussive noise like a maraca. If you get a bunch of friends together with glass bottles, you can create a musical bottle band!

## Unit 14. Mouth Music

Beatboxing is a type of vocal percussion that uses only one's mouth, lips, tongue, and voice. It became popular in the early 1980s as a part of the modern hip-hop culture. Beatboxing creates sounds very similar to that of drums. Beatboxing also uses sounds that imitate record players and a variety of musical instruments. Some of the earliest beatboxing pioneers included Doug E. Fresh, Swifty, Buffy, and Wise. Thanks to their pioneering work in developing the art, beatboxing still remains a popular form of music. Some beatboxers have even started to use their hands and other body parts to add to the variety of sounds. The popularity of beatboxing has spread all across the globe. Many countries have their own beatboxing championships. In fact, beatboxing is so globally popular that, in 2011, over 2000 people gathered to make the Guinness World Record for the largest human beatbox ensemble.

## Unit 15. Eat Your Instruments

The Vegetable Orchestra is an Austrian musical orchestra. As their name suggests, their performances feature a lot of vegetables. This is because the orchestra only uses fresh vegetables as their instruments. They use drills to hollow out carrots to create a flute-like instrument and rub peppers together to make squeaking sounds. The orchestra also uses pumpkins as bass drums by hitting them with their hands. Before each show, the orchestra members get to work creating their instruments from the produce they purchase at the market. Their performance also has an interesting feature in that the leftover materials from the produce are used to make a soup. This vegetable soup is served to the audience at the end of the performance. This means that anyone who goes to watch The Vegetable Orchestra can enjoy both the music and the taste of vegetables.

## Unit 16. Telling Stories with Music

Musical theater combines music, songs, spoken dialog, and dance to create a performance. The story is communicated through words, dance, and staging to entertain countless audiences around the world. Some musicals are big-budget productions that take place in large venues. Broadway theater productions are one such example. Professional actors and singers get together to put on magnificent shows. People often pay hundreds of dollars per seat to see such performances. But not all performances occur on Broadway. Smaller regional productions or school groups offer performances in smaller venues. Their production might not be as good or expensive as the ones on Broadway, but these musicals are still enjoyable. Some of the most famous musicals, such as *The Sound of Music* and *Fiddler on the Roof*, are established standards for both professional and amateur theater companies. It can be fun just to compare the different performances if you decide to watch any one of the musicals more than once.