**Unit 1 The Mighty Travelers**

Plants and trees need space to grow, so seeds must be able to spread out. Some seeds are good at traveling long distances. After they travel far away, they plant themselves into the ground. It becomes their new home. These seeds travel by wind, by water, and by animal.

Traveling by Wind

Dandelion seeds travel by wind. Try blowing on a dandelion puff ball! The seeds will catch a gust of wind and fly far away. These seeds are light and look like feathers. They can fly away easily. Maple tree seeds also travel by wind. They have wings on them. Wind will carry maple tree seeds by their wings to new places.

Traveling by Water

Some seeds use water to travel. Coconut palm trees grow near the ocean. The coconut seeds fall into the ocean. Then, they float and drift away on ocean currents until they reach a beach.

Traveling by Animal

In New Zealand, over 70% of seeds are inside small fruits. Birds love these fruits. Birds eat them and fly far away. Then, the seeds come out in their droppings. The kereru, tui, and bellbird are examples of fruit-eating birds. They help the seeds make long journeys.

Plant and tree seeds must travel to survive. Seeds have become mighty travelers so they can spread out and grow.

**Unit 2 Banks for Seeds**

When people need money, they go to a bank. When farmers need seeds, they go to a seed bank! Seed banks are places that collect seeds and keep them safe. Did you know that seeds need to be kept safe?

Centuries ago, farmers used certain seeds to grow crops. However, some of those seeds are no longer used today. Instead of being lost forever, they are put in a seed bank. These seeds are saved from extinction. They are valuable to keep so we can study them. They also teach us how people lived in the past. The seeds are kept in a room with a cool temperature and low humidity. Cool temperatures and low humidity help keep the seeds healthy.

Seed banks also protect seeds from climate change and natural disasters. The temperature on Earth is increasing. Seeds are having trouble growing because of the higher temperatures. Crops are dying and the seeds are wasted. Wildfires, typhoons, and earthquakes are also dangerous for seeds. These natural disasters can destroy large amounts of crops. Farmers need seed banks to protect their crops from these dangers.

Seed banks are useful in many ways. Most importantly, they help us study the past and protect the future of our farms.

**Unit 3 Helpful Clothes**

Clothes are more than just fashion. Clothes can help protect our bodies too. Some jobs have special uniforms to help keep people safe and comfortable.

Firefighters wear special suits that protect them from fire. When firefighters walk into a burning building, their clothes must help keep them cool. Firefighting suits are made of three layers. The outside layer is a tough fabric that does not easily catch fire. The second layer blocks dangerous chemicals and vapors from touching the skin. The third layer is closest to the body. It decreases heat stress and keeps the firefighter’s body dry and cool. Firefighting suits are more effective when they are thicker. However, they must not be too heavy or uncomfortable to wear.

Athletes also wear special uniforms that help them do their jobs better. When they play sports, they move a lot. So their uniforms need to be strong and comfortable. Many athletic uniforms are made of polyester. This fabric is strong and does not tear easily. It is lightweight and pulls sweat away from the skin. Athletic uniforms help athletes play better and not worry about overheating.

Take a look at the clothes you are wearing now. How are they helping you?

**Unit 4 Eco-Friendly Fashion Sense**

The clothes we wear can affect the environment. The fashion industry produces 10% of the world’s carbon emissions. It is also the second-largest user of the world’s water. However, being fashionable does not mean hurting the earth. There are several kinds of fabrics that are good for the environment!

Bamboo is a tough, quick-growing grass. It can be turned into a fabric using chemicals. Bamboo fabric is breathable, biodegradable, and antibacterial.

Recycled polyester is created from used polyester scraps and soda bottles. Recycled polyester has a 75% lower carbon footprint than traditional polyester.

Wool is a natural fiber. Most wool comes from sheep. Sheep are sheared once a year for their wool. Then they grow new wool for the following year. Wool is renewable because it can be obtained every year.

Silk can also be made in an eco-friendly way. After processing soybeans into food, the leftover soy fiber can be made into soy silk. It is expensive, but good for the environment.

The next time you go clothes shopping, check out the labels. Find out what fabrics are used and make a smart choice. There is another way to have eco-friendly fashion sense. Use your clothes longer so you go shopping less.

**Unit 5 Special Effects Makeup Artists**

Do you ever wonder why monsters look so real in the movies? It is thanks to the work of special effects makeup artists. Their job is to apply special makeup to actors’ faces and bodies.

Sometimes, actors need to look like they have wounds such as cuts, bites, and bruises. Special effects makeup artists use latex or silicone to create fake skin. They use thick, red liquid to create blood. For bruises, they use black and blue makeup on the skin. When these materials are applied to the actors’ bodies or faces, they look like they have real injuries.

Other times, actors need to look completely different. In the Guardians of the Galaxy movies, Zoe Saldana plays Gamora. Gamora is a space alien with green skin. It takes special effects makeup artists a lot of time and effort to turn her into the character. First, they apply thin pieces of silicone to her forehead and cheeks. This changes the shape of her face. Next, they cover her face and some body parts in green makeup. Finally, they add small details such as eye shadow and eyeliner.

From small wounds to alien characters, special effects makeup artists do their best to make movies more realistic for viewers.

**Unit 6 Movie Sounds from a Kitchen**

Sounds are an important part of the movie experience. They make horror movies really scary. But you are not going to believe this. You can make some scary sounds in your very own kitchen!

You can use some common foods to create the sounds of serious injuries. Bite into a juicy apple. It is the sound of a werewolf biting into its victim. Snap some carrots in half! That can be the sound of a zombie’s bones breaking. And twist a long piece of celery. That is the sound of a monster breaking someone’s neck or back.

Not all sounds in horror movies have to be horrible. Put some potato chips in a bowl and crunch them with your hands. This will create the sound of footsteps in a forest. Crunch them a little faster. Now, the person is running. Pour some milk into a glass and blow bubbles into it with a straw. Doesn’t it sound like you are underwater? Put some cornstarch in a bag and step on it. You won’t feel cold, but it will sound just like you are walking in the snow!

The next time you watch a horror movie, focus on the sounds. Try to guess what food items they used to make the sounds.

**Unit 7 Science behind a Slide**

Slides are simple but always fun. All you need to do is climb up to the top and slide down. But did you know that there is science behind this simple playground equipment?

Isaac Newton said what goes up must come down. He was talking about gravity. Gravity is an invisible force that pulls everything down. Slides work because of gravity. But that is not all.

You climb up the slide and sit down. You are ready to go. Are you sliding down? No, not yet. Things stay still unless something makes them move. It is Newton’s first law. So you have to give yourself a push to start the journey down.

Now you are sliding down. Do you feel you are slowing down a bit? When two things rub against each other, they cause friction. It is a force that works against the motion. Without friction, you will slide down faster and faster to the bottom of the slide. That might be more fun, but it is dangerous.

At the bottom of the slide, you come to a full stop. Your feet touch the ground and add extra friction. Newton’s first law also says moving things keep moving unless something makes them stop. So if you do not use your feet, you will fly off the slide and hurt yourself.

**Unit 8 Engineering with Origami**

What do kayaks and pop-up shelters have in common? They can be made by using the Japanese art of origami.

The Oru Kayak is a small boat for one person. It is about 3.5 meters long. But it folds up to the size of a suitcase. Anton Willis is the inventor of the Oru Kayak. He came up with the idea while living in San Francisco. He enjoyed kayaking on the ocean. But he had no room in his small apartment for a regular kayak. He needed a kayak that could fold up. He started by folding kayak models out of paper. Then, he tried cardboard. Finally, he created his first usable kayak with flexible plastic. Now, people can use his folding kayak on the water!

Cardborigami is a company that makes popup shelters. Tina Hovsepian is the founder of Cardborigami. She created the shelters to help homeless people using recycled cardboard. When folded, the shelter is about the size of a hula hoop. When unfolded, it is 1.8 meters long and 1.2 meters wide. Two adults can sleep comfortably in the shelter. The shelter’s folding pattern makes it stronger than a tent.

Japanese origami is not just an art form. It can also be practical!

**Unit 9 Underwater Hockey**

In the 1950s, the British Navy wanted to improve the underwater abilities of its divers. It also wanted to keep them in shape. Some people in the navy decided to make the training fun. So they invented a new game: underwater hockey.

Underwater hockey has a similar objective as ice hockey: score goals. But unlike ice hockey, it requires players to swim, not to skate. The rules of the game are simple. There are two teams with six players each. Players pass a puck with a stick. They score goals by shooting the puck into a goal tray. However, the game takes place underwater. Players must stay underwater until somebody scores a goal.

Players use snorkels to breathe while they are underwater. They also wear a mask, fins, gloves, and a cap with ear guards. This equipment keeps them safe and helps them play better.

An underwater hockey game has two fifteen-minute halves. Thirty minutes may not seem long, but underwater hockey is a physically intensive sport. Players get a great workout during the game.

Does underwater hockey sound fun? Why not try it? People play it in many countries. There is even a world championship for underwater hockey. Teams from around the world participate in it every two years.

**Unit 10 Aquatic Therapy**

Many people need physical therapy. They need it after having operations, suffering injuries, or being sick. These days, more and more patients are receiving physical therapy in the water. This is called aquatic therapy or hydrotherapy.

Most aquatic therapy takes place in swimming pools. Patients swim, walk, lift weights, or do other activities. Aquatic therapy provides several benefits. The warm water relaxes muscles and increases the circulation of blood in the body. The water provides resistance to improve patients’ strength. It helps patients with mobility problems feel lighter and move better. Finally, the water helps patients feel less pain.

Aquatic therapy is so successful that some vets use it for animals. Racehorses, especially, use aquatic therapy. The water reduces stress on their bones, joints, and ligaments. It also improves their strength. Smaller animals use it too. Some vets have dogs try aquatic therapy. It is particularly useful with older and overweight dogs. It helps reduce their joint pain and move better. An added advantage is that many dogs enjoy being in the water.

Aquatic therapy is popular with humans and animals these days. It has numerous benefits and is also a fun way to improve their health and physical condition.

**Unit 11 A Body’s Thirst**

Do you know how much water is inside your body? More than half of your body weight is from water. Your brain contains 73% water. Even your bones contain 31% water. Yes, water is essential to your body. Humans cannot survive one week without water.

So how much water should you drink each day? Doctors say it depends on your weight, your activity level, and the weather. They generally recommend around eight glasses of water a day. That seems like a lot of drinking to remember. But don’t worry! Your body sends out warning signals when it needs more water.

Dehydration happens when your body does not have enough water. The first sign of dehydration is thirst. As soon as you feel thirsty, you should drink a glass of water. Dry eyes, mouth, and skin are also signs that your body is thirsty. If you feel tired and cannot concentrate, try drinking water. When your body is thirsty, you may also feel dizzy. Dark yellow urine is another sign that you need to drink more water.

Remember to drink water throughout your day. Drink more water if you are exercising or if the weather is hot. And always listen to your body!

**Unit 12 Unhealthy Eating Habits**

Some people develop unhealthy eating habits in their teens. They think they weigh too much, so they change how they eat. This may cause eating disorders. The two most common eating disorders are anorexia and bulimia.

People who have anorexia eat very little food. They limit their daily calories so they can lose weight. People with anorexia spend a lot of time worrying about weight gain. That is why they are very strict about how much they eat. Eating very little food will lower body weight. However, it causes damage to the body and many health problems.

On the other hand, people who have bulimia eat too much food. Sadly, they cannot control how much they eat. After they overeat, they vomit up their food. Some people with bulimia take weight loss pills or use laxatives to empty their bowels. These actions may hurt their throat, stomach, or bowels. Other people with bulimia overexercise after eating too much. This may cause problems like dehydration and bodily injuries.

Eating disorders are very dangerous. They not only cause physical problems but also emotional ones. If you or your friend is struggling with an eating disorder, please tell a trusted adult. Anorexia and bulimia can be treated by a doctor.

**Unit 13 Zero**

Look at the pictures and say the numbers. Then, cross out the zeros and say them again. Do the numbers mean the same as before? No. It is because zero has two functions in our numeral system. It is both a number and a placeholder.

Our numeral system is a place value system. That means the position of a digit in a number determines its value. Take the number 327 as an example. The first digit 3 means three hundreds. The second digit 2 means two tens. And the last digit 7 means seven ones.

Then, what do we do to express the number three hundred and seven? We use zero as a placeholder for the tens position and write 307.

Ancient civilizations did not have the number zero. But they had a placeholder in their numeral system. The Babylonians and Mayans used a special symbol to indicate a placeholder. And the Chinese used an empty space between their numbers.

Zero finally became a number in India in the mid-7th century. However, it took some time for people to accept zero as a number. By the 15th century, Arabic numbers with zero (0, 1, 2, 3 …) were widely accepted by all mathematicians. Zero has become an important part of modern-day mathematics and science.

**Unit 14 Unlucky Numbers**

In many countries around the world, the number 7 is considered a lucky number. People believe it brings good luck. Then, is there an unlucky number that brings bad luck? Yes, there is. People have their own superstitions about certain numbers.

Ask people from China, Japan, or Korea what their unlucky number is. Most of them will answer that the number 4 is unlucky. There is a simple reason behind this superstition. These three countries use some Chinese characters in their languages. The number 4 and the word “death” in Chinese characters sound the same. So some people from these countries consider the number 4 unlucky, and try to avoid it. In these Eastern countries, many buildings do not have a 4th floor at all.

However, many people from Western countries believe the number 13 is an unlucky number. This superstition originated from the story of the Last Supper. 13 people, Jesus and his 12 followers, had a secret dinner. Afterwards, Jesus was betrayed and killed. This is why the number 13 is connected to bad luck. And because Jesus was killed on a Friday, many people consider Friday the 13th a very unlucky day.

Numbers are just numbers. Superstitions make them lucky or unlucky. How about you? Do you believe in superstitions?

**Unit 15 Melting Glaciers**

When snow falls and compresses in the same place for a long time, it becomes a glacier.

Glaciers are masses of ice that store around 70% of Earth’s freshwater. They are important natural resources. However, greenhouse gases continue to warm planet Earth, so these glaciers are melting really fast.

One concern is how melting glaciers affect people in mountainous regions. The Gangotri Glacier is one of the largest glaciers in the Himalayas. It is the main source of water for the Ganges River. The Ganges River feeds freshwater to the land of India and Bangladesh. It provides over 400 million people with drinking water. However, its main source is disappearing.

Another concern is rising sea levels. As the glaciers in Antarctica and Greenland melt, the habitats of thousands of animals disappear. This is especially true for polar bears. They rely on the ice sheets for traveling and hunting.

Also, freshwater from melting glaciers could change salt levels in the oceans. This will affect marine ecosystems. All marine life depends on salt water for survival. Some may not be able to adjust to these changes.

Then, what can we do to help? Reducing carbon emissions will make a big difference. Let’s walk, ride a bicycle, and use public transportation!

**Unit 16 A World without Forests**

As the demand for beef and palm oil rises, acres of the Amazon are slashed and burned for farming. Palm oil is used in most of the foods we eat such as cookies, instant noodles, and even ice cream. Our love of beef burgers and steaks comes at the expense of the Amazon too.

Do we need to save the Amazon? Absolutely.

Firstly, the Amazon is the lungs of Earth. Billions of trees absorb carbon dioxide every year and convert it to oxygen. Not only do they slow down climate change, but they also provide 20 percent of Earth’s oxygen.

Secondly, our oceans need the Amazon. Trees release moisture into the air when they absorb carbon dioxide. The moisture becomes clouds which generate rain. As rain enters the ocean, it prevents the ocean from becoming too salty. It helps maintain healthy fish habitats.

Lastly, the Amazon is home to many forms of life. There are thousands of species of plants, birds, and mammals in the Amazon. There are also several hundreds of indigenous tribes. They call the Amazon home.

The future of the Amazon depends on us. Let’s be more conscious of what is in our food. Changing our eating habits is a step towards change.