

Class

Name

Unit 1 Broken Chopstick

Listen to the audio and fill in the blanks.

Track 03



A car is driving along the (1)_____. What happens if it drives (2)_____ someone's lawn?

The (3)_____ of the car changes. The road and the lawn are made of (4)_____ things. The car turns, too.

What about (5)_____? It's the same for light.

Light passes through many materials. They change its speed.

Water is (6)_____ than air. Because of this, light slows down when it enters water.

It refracts the light. The light changes (7)_____.

When we look at an object inside water, it looks different. Light refraction changes how it looks.

Step 1. Prepare a (8)_____ cup and a chopstick.

Step 2. Put the chopstick into the (9)_____ cup. You can see the straight chopstick.

Step 3. Now, (10)_____ the cup with water and put in the chopstick. What does it look like now?

Did the chopstick look (11)_____ when it was inside the water?

No, it didn't. It looked bent. It looked like the chopstick was (12)_____. The chopstick in the water also looked slightly (13)_____.

Why is this? Light changed direction when it entered the water. When the light reflected from the chopstick (14)_____ our eyes, it looked like the chopstick was in a different position. Refracted light is focused. It makes things look bigger. So the (15)_____ looked wider, too.

Class

Name

Unit 2 Tall Boy, Short Legs

Listen to the audio and fill in the blanks.

Track 06



Rick was the (1)_____ boy in the entire school. He had really long arms and legs. One hot (2)_____, Rick, Ted, and Amy went to the swimming pool. Rick dove into the water. He was so (3)_____ when he saw his legs!

"Look! My legs look so (4)_____ and wide! What happened to my legs?" he (5)_____.

"Ha ha, you look so funny!" said Ted.

Amy said, "It's because of light refraction. Light goes into the water and slows down. It changes (6)_____."

"Why does that make my legs look (7)_____?"

"The light from the sun (8)_____ off your legs in the water. Our brain only sees light as a (9)_____ line. It doesn't know the light has been refracted. So your legs look (10)_____ and strange. They look shorter than they really are..."

Amy wanted to keep talking, but Rick (11)_____ her into the pool.

"I can't be the only one with short legs. Come in, (12)_____!"

Class

Name

Unit 3 Pressure Changes, Volume Changes

Listen to the audio and fill in the blanks.

Track 09



(1)_____ is the amount of force air makes on a certain area.

Can pressure change the (2)_____ of things? If we apply pressure to water, will its volume change? What about the volume of a gas?

Yes, pressure (3)_____ the volume of a gas.

When you apply (4)_____ pressure to a gas, the volume gets a little

(5)_____. And when you apply high pressure to it, it gets a lot smaller.

Let's (6)_____ it happen.

Step 1. Put 40 ml of water in a syringe (7)_____ a needle. Cover the end with your finger.

Step 2. Press the plunger lightly and (8)_____ the changes. Then press the plunger hard.

Step 3. Now, put 40 ml of air in the syringe. Cover the end with your (9)_____.

Step 4. Repeat step 2 with air (10)_____ of water. Observe the changes based on the pressure you put on the plunger.

What happened? The volume of water in the syringe didn't change. No matter the pressure you put on it, it (11)_____ at 40 ml.

What about when you put air in the syringe? Did the volume stay the same?

It didn't. When you pressed the plunger lightly, the volume got a little smaller. It was (12)_____ than 40 ml.

When you pressed the plunger (13)_____, the volume of the air got a lot smaller.

The harder you pressed the plunger, the smaller the volume of the (14)_____ got.

Now you know that pressure can (15)_____ change the volume of a gas.

Class

Name

Unit 4 A Bag of Chips

Listen to the audio and fill in the blanks.

Track 12



Irene went (1)_____ with her family. She packed a bag of her

(2)_____ chips in case she got hungry.

Irene was so proud when she (3)_____ the top of the mountain! She sat down for a (4)_____ and took out her bag of chips.

She was very (5)_____. The bag was swollen. It looked like it was about to burst.

Irene (6)_____ it to her mom.

"Mom, look, the bag of chips is inflated. It looks like it's (7)_____ bad!"

Mom answered, "It's the air (8)_____ here that makes the bag inflate. The air pressure gets lower as you go up the (9)_____. Do you notice how it's harder to breathe up here? That's (10)_____ of the low air pressure. When air pressure (11)_____ the bag lowers, air volume inside it (12)_____. This is why it inflates."

Irene (13)_____ at her mom. She had a suspicious look on her face.

"So, these chips are (14)_____ to eat?"

"Of course they are! Can I have (15)_____ chips?" said Mom.

Class

Name

Unit 5 Two Different Lenses

Listen to the audio and fill in the blanks.

Track 15



We use a lens to bend and (1)_____ light. Lenses can be convex or concave. Convex lenses are thick in the (2)_____ and thin at the edges. Concave lenses, on the other hand, are thick at the (3)_____ and thin in the middle.

Let's take a closer (4)_____ at convex lenses.

Convex lenses are mostly (5)_____. They are made of glass or transparent plastic.

Let's watch how light goes (6)_____ a convex lens.

Step 1. Prepare a convex lens and a laser pointer.

Step 2. Point the laser at the edge of the lens. You'll see the laser beam curve (7)_____ the middle.

Step 3. Now, point the laser at the middle of the lens. The laser beam doesn't (8)_____, but goes (9)_____ through.

The laser beam bent toward the middle as it (10)_____ through the edge of the lens. It was refracted.

The laser beam went straight through the middle of the lens. It didn't bend.

When a light beam (11)_____ through a convex lens, it is refracted just like the laser beam.

All light beams that (12)_____ the edge of a convex lens are refracted to the middle. Light is focused at one (13)_____. This focused light makes things look (14)_____.

Sunlight, a type of light, can also be refracted through a convex lens.

What happens when it is focused in one (15)_____?

Class

Name

Unit 6 Telescopes, Microscopes, and More!

Listen to the audio and fill in the blanks.

Track 18



Fran went on a (1)_____ trip to the observatory. She learned about stars and (2)_____. She saw (3)_____ from space. She saw many cool telescopes there, too.

Fran was very (4)_____. "Wow, it's my first time seeing a real telescope! It's so big!"

"These are Keplerian telescopes," explained the teacher.

"How do they (5)_____?" asked Fran.

"Well, they use two (6)_____. A convex lens gathers and (7)_____ light from far away. It makes (8)_____ things look bigger or closer. We can see (9)_____ and planets in more detail. Then a concave lens takes this light, and it (10)_____ into your eye."

"Teacher," said Fran, "(11)_____ use convex and concave lenses, too, right?"

"That's right," the teacher (12)_____. "Cameras use convex and concave lenses. Binoculars use them, too. Convex lenses (13)_____ us see far away and make small things look bigger and closer. This is why microscopes (14)_____ convex lenses. Concave lenses spread the light and give us a (15)_____ image."

Class

Name

Unit 7 The Flow of Electricity

Listen to the audio and fill in the blanks.

Track 21



How does electricity (1)_____? First, it needs an electrical circuit. The electricity flowing through the circuit is (2)_____ an electric current.

Can we make a circuit to turn on a light (3)_____? Prepare a battery, wires, and a light bulb. Let's make two (4)_____ circuits.

Step 1. Get two wires. (5)_____ one end of each wire to each pole of the (6)_____ (+/-).

Step 2. Connect the other (7)_____ of the wires to the light bulb. What happens?

Step 3. (8)_____ two wires. Connect one end of two wires to one (9)_____ of the battery.

Step 4. Connect the (10)_____ ends of the wires to the bulb. What happens?

When did the bulb (11)_____ up? It only turned on in Circuit 1.

Why do you think that was?

An electrical circuit needs (12)_____ things.

1. The battery, wires, and bulb should all be connected.

2. The electrical conductors should be connected to (13)_____ poles of the battery.

3. The light bulb should be connected to both conductors.

In Circuit 2, only one pole of the battery was connected.

The bulb didn't turn on because the electrical circuit wasn't complete. The electricity (14)_____ flow.

Take the battery, wires, and light bulb again. What other circuits could you

(15)_____ with them?

Class

Name

Unit 8 All of the Lights

Listen to the audio and fill in the blanks.

Track 24



Liam and his dad were getting ready for New Year's Day. They were going to have a

(1)_____. Liam was putting up a string of lights.

"Dad, these lights are too (2)_____. Can I cut the wire in (3)_____?"

Then I can add some thread to make the lights (4)_____."

"No," said Dad. "You (5)_____ to connect the bulbs to conductors.

(6)_____ they won't light up. They're joined with (7)_____ wires which conduct electricity. Thread isn't a conductor, so the lights won't light up."

"Okay, Dad. Is there (8)_____ else I need to know?"

"You should check (9)_____ the wires are connected to both poles of the

(10)_____. They should be connected to the positive and negative

(11)_____. Otherwise the circuit won't be (12)_____."

"The wires go into a battery (13)_____. I'm sure they're (14)_____ connected to both poles. I'm going to turn them on!"

"Wow, Liam! These lights look (15)_____. Let's show Mom!"

Class

Name

Unit 9 More Batteries

Listen to the audio and fill in the blanks.

Track 27



We made an (1)_____ circuit with just one battery. We can use two or more batteries, too.

You can connect the opposite poles of each battery. That's called a "series connection."

You can connect the same poles of each battery. That's called a "parallel connection."

Let's make (2)_____ types of electrical circuits.

Step 1. Connect the (3)_____ (+) pole of one battery to the (4)_____

(-) pole of the other battery. (5)_____ wires to the remaining positive and

negative poles. Connect both wires to a light bulb.

Step 2. Connect the positive and negative poles of two batteries (6)_____.

Connect wires to each pole of one of the (7)_____. Connect to the light bulb.

Step 3. (8)_____ the brightness of the bulb in each connection.

Which circuit was series? Which was parallel?

Circuit 1 was a series (9)_____.

Circuit 2 was a parallel connection.

Which was (10)_____? The bulb with the series connection was brighter than the one with the parallel connection.

Why is that? Series connections (11)_____ battery voltage. They make the batteries (12)_____. Parallel connections aren't as strong. But they make the batteries (13)_____ longer.

Which do you think is better?

Do you know any (14)_____ ways to make a series or parallel

(15)_____?

Class

Name

Unit 10 Electricity Everywhere

Listen to the audio and fill in the blanks.

Track 30



Sophia was at home (1)_____ TV. She had the lights on. The electric heater was also running. The TV was (2)_____, so she turned on the (3)_____ as well.

Her phone battery was (4)_____. She plugged her phone and the TV into the same outlet.

Then she looked (5)_____. It was snowing!

She called her brother James. They went outside to play in the (6)_____. They threw snowballs and made a (7)_____.

Sophia started getting cold. She went back inside to make some hot (8)_____.

The snow on her (9)_____ melted and made her hands wet. She was about to plug in the (10)_____ when...

"(11)_____!" Her mom was just back from the grocery store.

"Sophia, don't touch electrical things with wet hands. It's very (12)_____."

"Oh! Sorry, Mom."

"And look! You didn't (13)_____ off any of the electrical things. You plugged the TV and your phone, which are electronics, into the (14)_____ outlet."

"Is that (15)_____?"

"Yes, it is. The plug could overheat. It could start a fire."

Class

Name

Unit 11 Sea Breeze and Land Breeze

Listen to the audio and fill in the blanks.

Track 33



Have you ever felt the (1)_____ at the sea coast? It's not (2)_____ the same.

In the daytime, a cool breeze (3)_____ from the sea. We call it a sea breeze. In the (4)_____, a cool breeze blows as well. But now it blows from the land to the sea. This is a land breeze.

Why does this happen? Let's see.

Step 1. (5)_____ two lamps, a bowl filled with water, a bowl filled with sand, a (6)_____ box, and an incense stick. Turn on the lamps and heat the sand and water for about 5 (7)_____.

Step 2. Put the box over the heated sand and water. Put the (8)_____ incense stick into the box.

Step 3. (9)_____ the movement of smoke for 30 seconds.

The smoke moved from the cool water to the (10)_____ sand.

Why did this happen? The sand was warm, but the water was still cool.

Sand heats up more (11)_____ than water. The warm sand created a low air pressure (12)_____. The cool water created a high pressure area.

Air always moves from (13)_____ to low pressure. This movement is what we call wind.

In the daytime, the land heats up faster than the sea. The temperature of the land is higher. A sea breeze blows from the sea to the land.

At (14)_____, the land cools down faster than the sea. Now the

(15)_____ of the land is lower. A land breeze blows from the land to the sea.

Class

Name

Unit 12 Flying a Kite

Listen to the audio and fill in the blanks.

Track 36



One (1)_____ weekend, Daniel took a trip to the (2)_____ with his family.

He (3)_____ a kite with his dad.

"Dad, why is the kite flying (4)_____ us? I thought it would fly above the sea."

"Well, Daniel, the wind blows from the sea to the land in the (5)_____."

"Will the kite fly toward the land at night, (6)_____?"

"Why don't we check it out after (7)_____ dinner?"

They went out to the beach (8)_____ after dinner. Daniel flew his kite again.

Now it flew in the (9)_____ direction.

"Dad, it's flying toward the sea! Does the wind blow in the opposite (10)_____ at night?"

"Yes, because it's cooler at night. Sand (11)_____ down much faster than water. So the sand's (12)_____ is lower than the water's temperature at night."

"Wind (13)_____ blows from a cooler place to a warmer place, right?"

"Yep. Cool air creates higher air (14)_____, and warm air creates lower pressure.

Wind is the flow of air as it (15)_____ from higher to lower pressure," said Dad.

Class

Name

Unit 13 The Height of the Sun

Listen to the audio and fill in the blanks.

Track 39



Have you ever (1)_____ something about the sun?

In (2)_____, it's very high in the sky. On the other hand, in (3)_____, the sun is much lower.

The (4)_____ of the sun differs from season to season.

The height of the sun in the sky affects the (5)_____ of the day. It affects the temperature, too.

Let's do an (6)_____.

Step 1. Set a (7)_____ at a steep angle to a bowl of sand.

Step 2. Heat the sand using the lamp for 5 minutes. Then, (8)_____ the temperature.

Step 3. Now, set the lamp at a shallow angle to the sand.

Step 4. (9)_____ again, heat the sand for 5 minutes and measure the temperature.

When was the temperature of the sand (10)_____?

It was higher when the lamp and the sand (11)_____ a steep angle. The lamp was at its highest.

This is what the sun is like in summer. The sun is high up in the sky.

When the sun is at its highest, it shines on a (12)_____ area.

The heat (13)_____ in that area increases. The ground is (14)_____ up. The temperature rises.

That's why it is hot in summer when the sun is high. That's why it is cold in winter when the sun is (15)_____.

Class

Name

Unit 14 The Length of the Day

Listen to the audio and fill in the blanks.

Track 42



It's too (1)_____ to play outside. Emily reads books at home (2)_____.

She reads by the (3)_____ through the window. She notices her

(4)_____ is long.

It starts getting dark. (5)_____ can't see her book well. She looks outside. The sun has (6)_____ set!

She looks at the (7)_____. It's only 5 p.m. How (8)_____! In summer, it was so bright at 5 p.m.!

Emily (9)_____ on the light. She looks for another book. She finds a science book.

She (10)_____ about solar altitude and the sun. Solar altitude

(11)_____ during the day. It changes with the seasons as well.

She learns that Earth is at an angle. As it revolves (12)_____ the sun, we get closer and (13)_____ away from the sun.

During the summer, solar altitude is at its maximum. The days are (14)_____.

During the winter, solar altitude is at its minimum. The days are (15)_____.

Emily closes her book. She learns something today. And she can't wait for summer to come again!

Class

Name

Unit 15 Electricity from the Sun

Listen to the audio and fill in the blanks.

Track 45



We can't imagine a world (1)_____ electricity. We use it every day.
 But (2)_____ of our electricity comes from (3)_____ coal or gases. This
 creates (4)_____. It causes climate change. It's bad for our (5)_____.
 Solar power comes from the sun. Solar (6)_____ turn light from the sun into
 electricity. This is much (7)_____ for the planet.
 Solar power has many uses. It can (8)_____ houses and cars. It can
 (9)_____ water.
 Solar engineers work to make solar power more effective. They plan, (10)_____,
 and implement solar energy (11)_____.
 There are (12)_____ with solar power. It only makes power when the sun is
 (13)_____. It is expensive, too. As a (14)_____, only 2% of the world's
 electricity comes from solar power.
 But solar power is essential to the future of the planet. The work of solar engineers is very
 important. Their hard work can make solar power stronger and (15)_____. They
 can help make the world a cleaner place.

Class

Name

Unit 16 Web Developer

Listen to the audio and fill in the blanks.

Track 48



You want to buy tickets for your (1)_____ singer.

You go on the website to (2)_____ them. You click on the "Buy" button for the (3)_____. Nothing happens. You (4)_____ again. The website crashes.

What is happening? Too many (5)_____ are using the website. Finally it works.

You manage to put the tickets in your (6)_____.

You want to pay, but you can't find the (7)_____ for it. You scroll down the page. You find it at the bottom of the (8)_____.

Finally, you click "Pay." But the tickets have sold out. You were too (9)_____!

Doesn't this (10)_____ annoying?

Web (11)_____ have an important job. They design websites. They design what (12)_____ look like. Text should be (13)_____ to read. Buttons should be easy to find.

They also (14)_____ the technical side of the website. Websites should load fast. They shouldn't crash when many people use them.

Websites are fun to use. But they're (15)_____ to design!