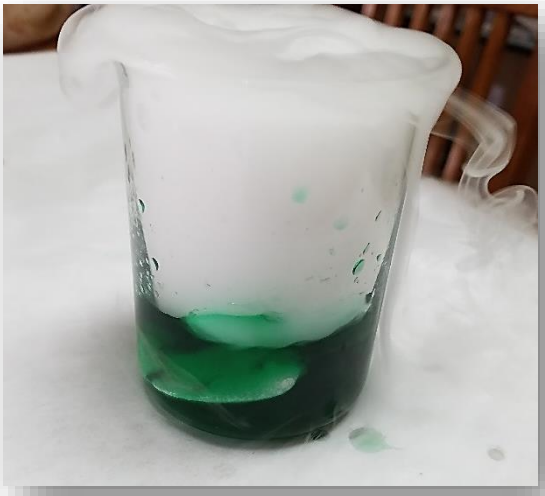
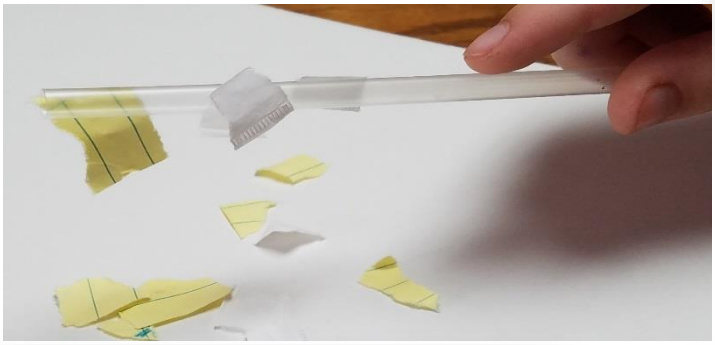
Fun, Easy, Hands-On Science





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Density

Kinder – Forces
Second – Properties of Matter
Third – Forces
Fifth – Properties of Matter
Eighth – Forces

Place different weighted bowling balls in a tank with fresh water. A bowling ball that weighs less than 12 pounds will float in fresh water. It is less dense then the fresh water.

More than 13 pounds will sink in fresh water. It is more dense then fresh water.

Expansion
Golf Balls and Ping Pong Balls
Regular Soda and Diet Soda
Orange with Peel and Orange without Peel
Add salt to the water to see what happens to the balls

Why?

Key Point - Less dense materials float in more dense materials
The upward force of the water will overcome the downward force of the gravity acting on the ball.

Key Point – More dense materials sink in less dense materials.
The upward force of the water cannot overcome the downward force of gravity acting on the ball

Density

Kinder – Forces
Third – Forces, Weather
Fifth – Earth's Systems, Structure of Matter
Sixth – Earth's Systems, Weather
Eighth – Forces

Add salt/sugar to various cups of water. Use food coloring to color the water. The more salt, the more dense the water will be. Use pipettes or straws to have students layer the water. Figure out which color is more dense and prove your idea.

Expansion
Have students weigh the water
Color the water like a rainbow to help some students
Use salt and explain this is a model of natural fresh and salt water interactions

Why?

When salt is added to water, it increases the water's density as it adds molecules to the water
Key Point - Less dense materials float in more dense materials

Key Point – More dense materials sink in less dense materials

Density

Kinder – Forces
Third – Forces, Weather
Fifth – Earth's Systems, Structure of Matter
Sixth – Earth's Systems, Weather
Eighth – Forces

Use a clear tank filled with room temperature water. Add blue ice cubes (add food coloring to the ice cubes before freezing). Watch that the blue water sinks. Add red hot water (add red food coloring to the hot water). Watch that the red water floats.

Expansion
Hot/Cold air
Use cups of different temperature water – add food coloring to each cup
This is how air and water currents move around the Earth

Why?

Heat makes fluids move faster.
Key Point - Faster moving fluids are less dense than slower moving fluids
Key Point - Less dense materials float in more dense materials

Key Point – More dense materials sink in less dense materials

Forces – Pressure

Bernoulli's Principle

Kinder – Forces
Third – Forces, Weather
Fifth – Earth's Systems, Structure of Matter
Sixth – Earth's Systems, Weather
Eighth – Forces

Place a small coin on a smooth surface. Blow over top of the coin. The coin will flip up.

Expansion
Use a can of compressed air
Try different size coins/cups/paper
Try to jump the coin into a cup or other object

Why?

Key Point - Faster moving fluids are less dense than slower moving fluids.
Air is a gas. Gasses are a fluid.
When you blow air, you reduce the density of the air.
The air above the penny/cup becomes less dense, and the penny/paper is pushed upwards.
This creates an unbalanced force, which causes movement.

Forces – Pressure

Bernoulli's Principle

Kinder – Forces
Third – Forces, Weather
Fifth – Earth's Systems, Structure of Matter
Sixth – Earth's Systems, Weather
Eighth – Forces

Place small pieces of paper at the bottom of a cup. Blow across the top of the cup. The papers will fly up.

Use a cup with water in it. Place a straw in the cup. Blow across the top of the straw (you need to blow very hard). The water will move up the straw. If you blow hard enough, the water will come out the top of the straw.

Expansion

Use a can of compressed air
Try different size coins/cups/paper
Try to spray someone with the water/papers

Why?

Key Point - Faster moving fluids are less dense than slower moving fluids.
Air is a gas. Gasses are a fluid.
When you blow air, you reduce the density of the air.
The air is less dense and has less pressure.
The air above cup becomes less dense, and the paper/water is pushed upwards.
This creates an unbalanced force, which causes movement.

Forces – Pressure

Bernoulli's Principle

Kinder – Forces
Third – Forces, Weather
Fifth – Earth's Systems, Structure of Matter
Sixth – Earth's Systems, Weather
Eighth – Forces

Place a soda can in a cup. Blow between the soda can and the cup. The soda can will jump out of the cup.

Expansion
Use a can of compressed air
Try different size cans and cups
Try to jump the can into a cup or other object
Make it a race

Why?

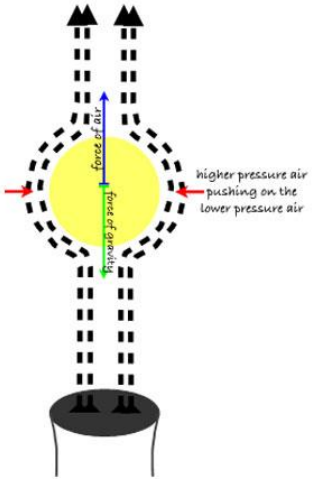
When you blow between the can and cup, you create an area of high pressure between the bottom of the can and the cup. The pressure above the cup stays the same, but is lower in reference to the pressure below the can.
Key Point – High pressure moves to low pressure.
This creates an unbalanced force, which causes movement.

Forces – Pressure

Bernoulli's Principle

Kinder – Forces
Third – Forces, Weather
Fifth – Earth's Systems, Structure of Matter
Sixth – Earth's Systems, Weather
Eighth – Forces

Place 2 soda cans next to each other on a smooth surface. Place them close together, but not touching. Blow in-between the cans. The cans will move together.



Turn on a blow dryer. Place a ping-pong ball in the air stream. The ball will float in the air stream.

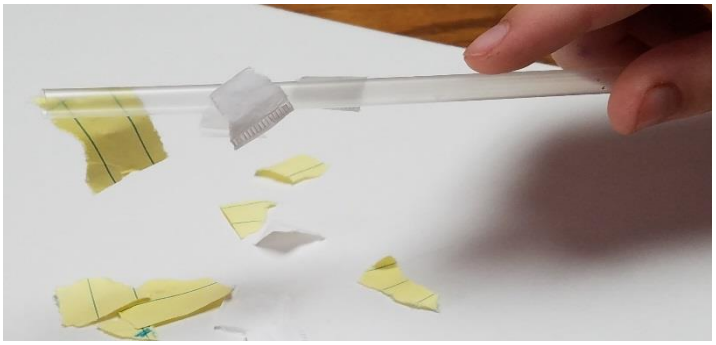
Expansion
Use a can of compressed air
Try different size cans
Try multiple cans
Use different sized balls
Try the blow dryer on high, low, cold air, hot air

Why?

When you blow between the can and cup, you create an area of high pressure between the bottom of the can and the cup. The pressure above the cup stays the same, but is lower in reference to the pressure below the can.
Key Point – High pressure moves to low pressure.
This creates an unbalanced force, which causes movement.

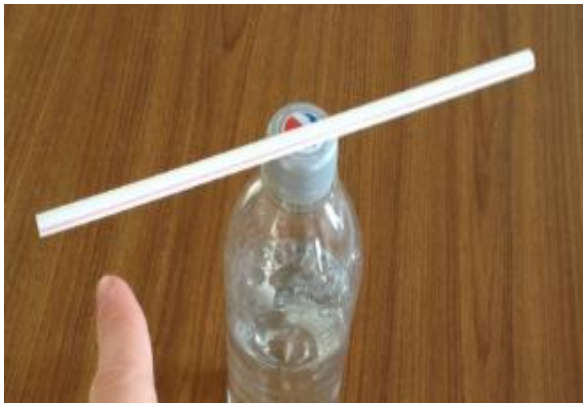
Forces – Magnetic

Kindergarten – Force
Third - Force
Fifth –Property of Matter
Sixth – Earth's Systems, Weather
Eighth - Force



Use a straw that has a paper cover. Take the cover off. Tear the cover into small pieces. Rub the straw in your hair. Use the straw to move the paper.

Rub a straw in your hair. Place the straw on a cap. Put your finger next to the end of the straw. The straw will move away from your finger.



Expansion
Use different kinds of paper
Use different sizes of paper
See who can get the most pieces on a straw

Why?

When you run the straw through your hair or on a fleece cloth, you add electrons to the straw. This creates a static charge on the straw. The paper is attracted to the charge on the straw. The finger repels the straw
Key Points – The static (magnetic) force can repel and attract other static forces

Matter – Dry Ice

First – Waves: Sound
Second – Properties of Matter
Fifth –Structure of Matter
Sixth – Earth's Systems, Weather
Seventh – Earth's Systems, Properties of Matter

Place a coin on the dry ice. The coin will make a noise.

Expansion
Use different coins
Use different materials: wooden spoon, metal spoon, plastic spoon

Why?

The dry ice changes the temperature of the coin quickly. The speed of the change of temperature causes the coin to vibrate and make a noise.
Key Points – Metal is a good conductor of heat (temperature moves through metal quickly)
Key Point – Temperature can cause vibrations, causing noise

Matter – Dry Ice

First – Waves: Sound
Second – Properties of Matter
Fifth –Structure of Matter
Sixth – Earth's Systems, Weather
Seventh – Earth's Systems, Properties of Matter

Place dry ice in a cup. Add different temperature water to measure how quickly the dry ice sublimates.

Add liquid soap.

Expansion
Use food coloring
Add different types of soap
Use salt water
Use a wet string to create a bubble across the top

Why?

Water speeds up the change of state of dry ice. The warmer the water, the faster it sublimates into carbon dioxide.
Key Points – Increasing temperature increases molecular motion, speeding reactions

Matter – Dry Ice

First – Waves: Sound
Second – Properties of Matter
Fifth –Structure of Matter
Sixth – Earth's Systems, Weather
Seventh – Earth's Systems, Properties of Matter

Cut a hole in the top of a plastic cup. Place a zip-lock bag on the large opening of the cup. Use a rubber band to secure the bag. Add warm water to the cup. Add dry ice. Use your hand to tap on the bottom of the zip-lock bag. Carbon Dioxide gas will puff out of the top.

Expansion
Use food coloring
Add soap

Why?

Water speeds up the change of state of matter of dry ice. The warmer the water, the faster the solid dry ice sublimates (changes from a solid straight to a gas) into the gas carbon dioxide.
Key Points – Increasing temperature increases molecular motion, speeding reactions

Matter

Second – Properties of Matter
Fifth –Structure of Matter
Seventh –Properties of Matter

Using bottled water, mix lemonade or some other mixture to the water. Talk about the state of matter of each substance before mixing. After mixing, talk about new state of the substance. Use the words solvent, solution and solute. This is a mixture, not a chemical reaction.

Pour whole milk into a bowl. Add food coloring to the milk. Put dish soap on the end of a Q-tip. Touch the Q-tip into the milk. The colors will begin to swirl. This is a chemical reaction.

Expansion
Try with hot water and with cold water
Use different types of milk
Try different types of soap

Why?

The water dissolves the lemonade, but the lemonade is still present.
Key Point – A mixture occurs when 2 or more substances combine together, but do not form a new substance
The soap is attracted to the fat in the milk. As the soap and fat combine, the fat moves. This creates the movement.
Key Point – In a chemical reaction, you cannot reverse the process and a new substance is formed.

Waves – Sound

First - Waves
Fourth - Waves
Eighth - Waves

Cover a bowl with plastic wrap. Put rice or sprinkles on the top. Hum next to the bowl. The salt/sprinkles will move around.

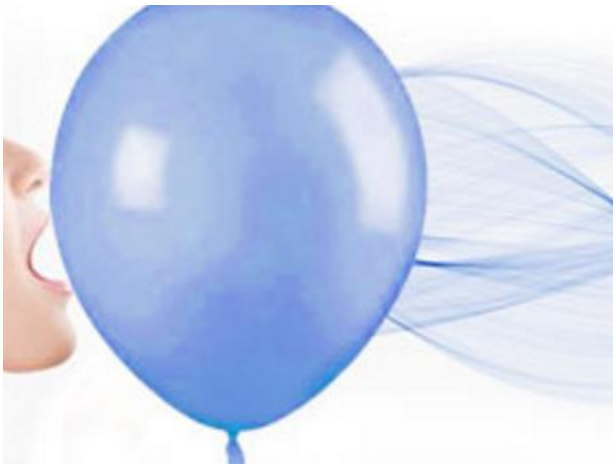
Expansion
Sing or speak
Use a speaker
Try different types of wraps (i.e. thick wrap, balloon material, etc.)
Try different types of salt

Why?

When you hum, you create sound. Sound waves are molecules in motion. The motion of the sound creates vibrations in the air. The vibrations hit the plastic wrap and vibrates the material. You see the vibrations when the salt jumps around. Key Points – Sound causes vibrations; vibrations cause movement.

Waves – Sound

First - Waves
Fourth - Waves
Eighth - Waves



Blow up a balloon. Tie it. Hold it against your ear. Have another person talk into the balloon or tap on the other side of the balloon.

Place a hex nut (6 sided nut) inside a balloon. Blow up the balloon. Tie it. Move the balloon in a circle. You will hear the hex nut make a noise.

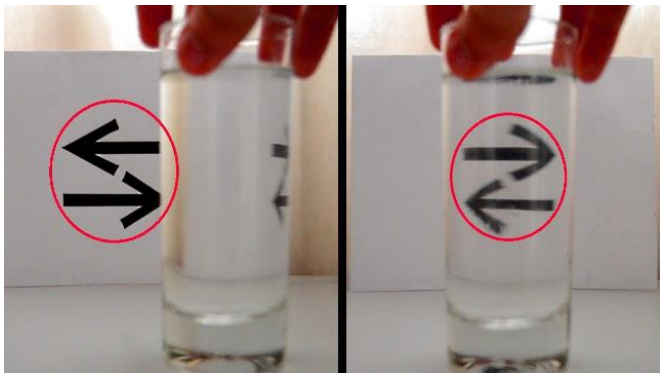
Expansion
Sing or speak
Use a speaker
Use different types of nuts

Why?

Sound waves are molecules in motion. The motion of the sound creates vibrations in the air. The vibrations hit the balloon and vibrate the material moving to your year. You hear the sound. The hex nut creates vibrations on the balloon. You hear the vibrations creating sound.
Key Points – Sound causes vibrations; vibrations cause movement.

Waves – Light

First - Waves
Fourth - Waves
Eighth - Waves



Fill a glass or clear plastic cup with fresh water. Draw an arrow on a piece of paper. Move the paper behind the glass/cup. The arrow will change direction.

Using a CD, shine a white light onto the CD or go outside and use sunlight. You will see a rainbow.

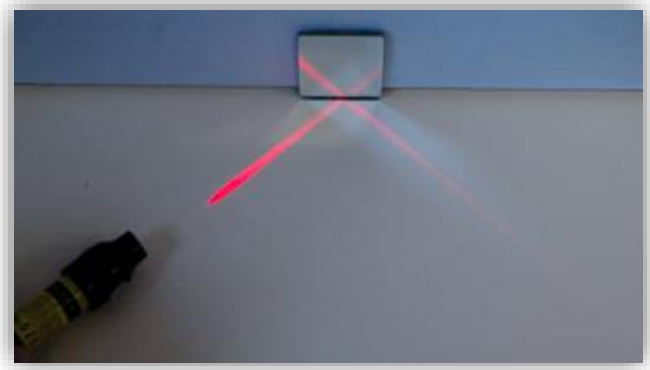
Expansion
Use salt water
Use multiple cups
Move the distance the paper is from the cup
Cut out paper and place it on the CD

Why?

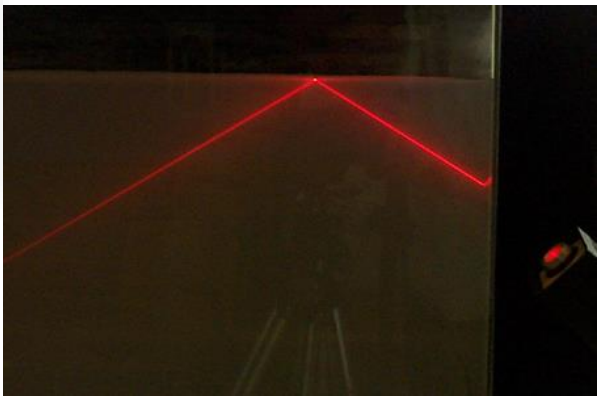
Light travels in straight line waves.
When the light moves through the water it is bent, changing what we see.
Key Point – Light is refracted when moving through a medium
When the light hits the CD, it bounces off the CD
Key Point – Light is reflected off smooth and shiny surfaces.

Waves – Light

First - Waves
Fourth - Waves
Eighth - Waves



Cast a beam of light with a laser pointer or a flashlight onto a mirror. Use the mirror to reflect the light into different directions.



Shine the laser pointer light beam through various materials

Expansion
Use multiple mirrors
Use multiple laser pointers
Hit a target with mirrors

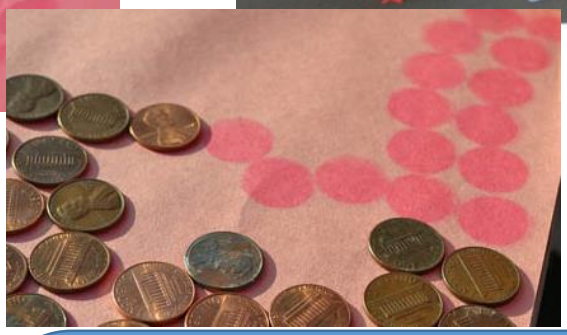
Why?

Light travels in straight line waves.
When the light moves through the water it is bent, changing what we see.
Key Point – Light is refracted when moving through a medium
When the light hits the mirror, it bounces off the mirror
Key Point – Light is reflected off smooth and shiny surfaces.

Waves – Light

Kindergarten – Weather and Climate
First – Waves, Space Systems
Fourth – Waves
Fifth – Energy in Ecosystem
Sixth - Energy
Eighth - Waves

Put pennies and other objects on construction paper. Place in the sun. Remove the pennies and other objects after a period time (an hour or more).



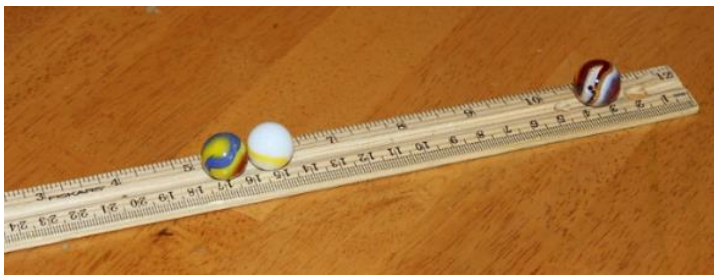
Expansion
Use multiple items
Move some objects after a short time and others a long time
Use different SPF sunscreens

Why?

Light travels in straight line waves. The objects block the light from hitting specific parts of the paper. When the light hits the paper the heat of the light slightly changes the molecular structure of the object. This small change in the structure of the molecules absorbs light at a different wavelength then the previous structure. We see the new wavelength as a new color.
Key Point – Light can be absorbed by materials

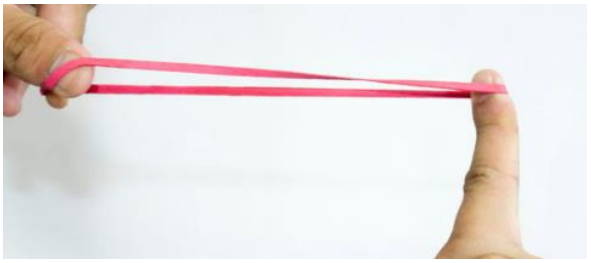
Energy – Potential/Kinetic

Kindergarten – Forces
Third - Forces
Fourth – Energy
Sixth - Energy
Eighth - Energy



Line 2 or marbles in the middle of a wooden ruler. Hit another marble towards the other marbles. The marble on the end will move.

Pull a rubber band as far back as you can. It has potential energy. Release the rubber band. It now has kinetic energy



Expansion
Use multiple marbles to hit the marbles in the middle
Try different size marbles
Use different sized rubber bands

Why?

The rubber band has potential energy when pulled
Key Point – Potential energy is the energy stored or possible amount of energy.
The marble transfers its energy to the other marbles causing motion.
Key Point –Kinetic energy is the energy of motion or movement

Forces – Laws of Motion

Kindergarten – Forces
Third - Forces
Sixth - Energy
Eighth - Energy

Place a card on top of a cup. Place a penny on the card. Flick the card away. The penny will drop into the cup.

Make a stack of coins or dominoes. Using another coin or domino, flick it at the bottom coin/domino. The stack should stay up, but the bottom one is removed.

Expansion
Try different coins
Use different papers
Try large stacks of coins/dominoes and small stacks

Why?

The objects will fall straight down, because the only force acting on them is gravity.
Key Point – Newton's First Law of Motion states that an object at rest wants to stay at rest unless acted on by an outside force.