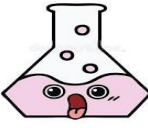


SIMPLE SCIENCE FROM A-Z



**TAKE A JOURNEY OF
FACT-FILLED FUN TO DISCOVER
SIMPLE SCIENCE
FROM  -Z**

*We strive to make learning fun,
so for that reason we ask that an adult be present to help
the children with these simple experiments.*

*While not all the A-Z projects require safety equipment,
we ask that you take the necessary precautions to keep
your little Smarty Pants safe when executing the tasks.*

*HAVE FUN
&
HAPPY LEARNING!*



SIMPLE SCIENCE FROM A-Z

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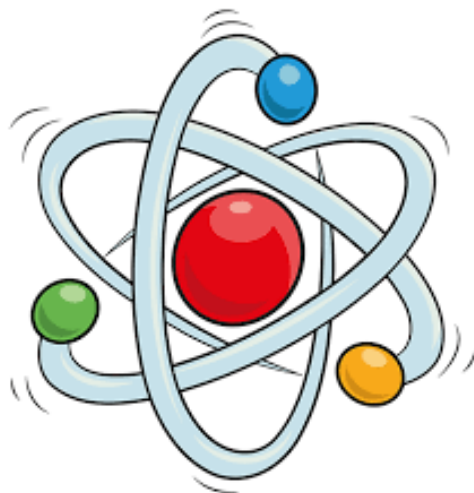
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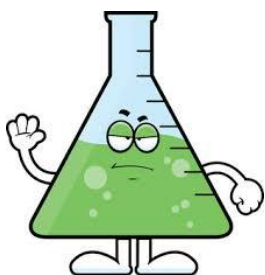
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A is for Atom



What is an Atom?

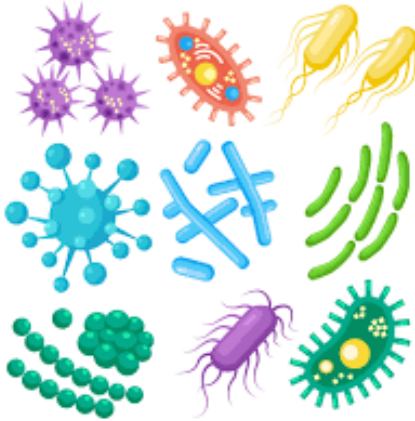
Atoms are the smallest building blocks of matter. They make up everything around us. Every atom has a center called a *nucleus*, which is made of particles called *protons* (positive electric charge) and *neutrons* (negative electric charge). *Electrons* move in *electron shells* around the nucleus. Atoms can bind to one another to form solids, liquids, or gases.



Try This...

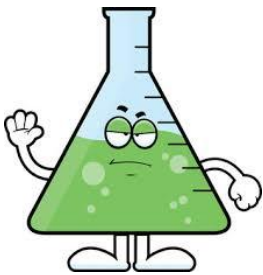
Rub a balloon on your hair. Now place a piece of paper on it. Did it stick? This is because the balloon picks up electrons from your hair. The atoms of the balloon became negatively charged. The positively charged atoms in the paper were attracted to those negatively charged atoms of the balloon, so when they got close enough to each other...tah dah!

B is for Bacteria



What is Bacteria?

Bacteria (*bak-TEER-ee-uh*) are tiny, single-celled organisms that get nutrients from their environments. That environment can be you or another living being. Some bacteria are good for our bodies. They help keep the digestive system in working order and keep harmful bacteria from moving in. Other bacteria are harmful. We call those "germs." Bacteria is easily spread from one source to another.



Try This...

Sprinkle craft glitter onto your hands (or have someone do it for you). Be sure to get it under your nails and even on your wrists. Now shake hands with other kids or family members. Do you see glitter on them? This is how germs spread!

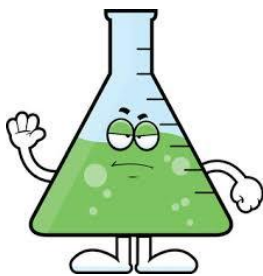
Now wash your hands. It probably takes some real effort to remove all those "glitter-germs!"

C is for Condensation



What is Condensation?

Condensation is the process where water vapor becomes liquid. It is the reverse of *evaporation* (where liquid water becomes a vapor). Condensation happens one of two ways: Either the air is cooled to its dew point or it becomes so saturated with water vapor that it cannot hold any more water.

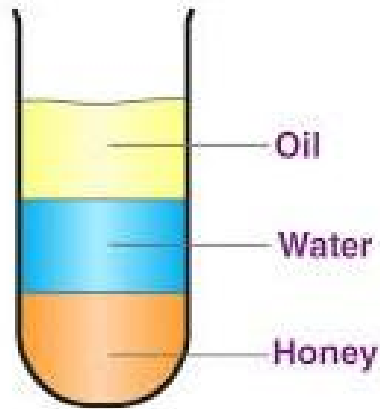


Try This...

Put ice cubes and water in a glass. Take it outside on a hot day or place it in the sunshine. Watch how water droplets form on the outside of a cold glass.

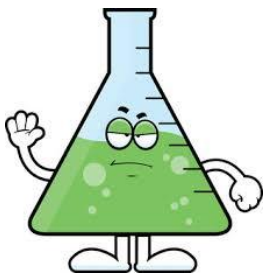
When warm air makes contact with a cold surface, water vapor in the air condenses, forming droplets of water on the cooler surface. You may also observe condensation on a bathroom mirror after a hot shower.

D is for Density



What is Density?

Density is a word we use to describe how much *volume* (space) an object or substance takes up in relation to its *mass* (the amount of matter in that object or substance). Density is the amount of mass per unit of volume. If an object is heavy and compact, it has a high density. For example, a pebble is small but is more dense than a piece of popped corn.



Try This...

Get a narrow, clear glass or jar. Now measure 2 tablespoons of oil, 2 tablespoons of honey, and 2 tablespoons of water. Pour these into the container one at a time. What happens? These ingredients will all separate according to their density (heaviest at the bottom)!

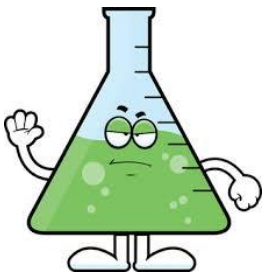
Try other liquids like dish soap, or salted water to see what happens!

E is for Electricity



What is Electricity?

Electricity is the flow of tiny particles called *electrons* and *protons*. It can also mean the energy you get when electrons flow from place to place. *Static Electricity* is the buildup of the electrical charge in an object when it is rubbed against another object. Static electricity causes objects to stick together when they have opposite charges and repel when they have the same charge.



Try This...

Place a teaspoon of salt and a teaspoon of pepper on a piece of paper. Mix them together. Now take a plastic spoon and rub it for about 10 seconds on a dish towel. Hold the spoon, rounded side down, over your salt/pepper pile.

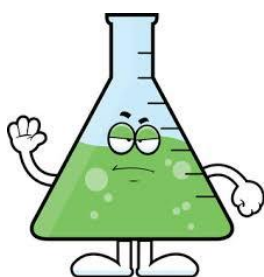
Static Electricity will draw the pepper onto the spoon first. This is because it is lighter than salt.

F is for Fire



What is Fire?

Fire is a chemical reaction that occurs when heat and a fuel source (wood, paper, material) combine with oxygen in the air, creating flames. Fire will also give off light, smoke, and heat. Fire is created by a chain reaction involving heat, oxygen, and fuel.



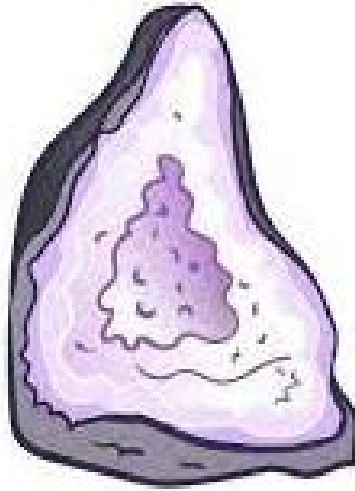
Try This...

With the help of an adult, light a candle. Now light a match or BBQ lighter again (so you have a flame ready). Blow out the candle (hope for a long streak of smoke).

Now place the lit match or lighter in the path of the smoke. The flame should travel down the smoke and relight the candle!

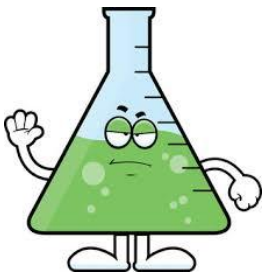
Smoke contains vapourized bits of wax that haven't been fully burnt. Placing a flame to that smoke trail allows the fire to burn its way down to relight the candle, igniting little particles of wax as it goes!

G is for Geode



What is a Geode?

Geodes are round rock structures that are hollow and lined with crystals and layers of minerals. While most geodes contain clear quartz, others have purple amethyst crystals. Geodes start as a bubble inside a layer of rock, this could be from an animal burrow, tree roots or even air inside explosive volcanic rock. Over time, minerals buildup to create the surprise crystals inside!



Try This...

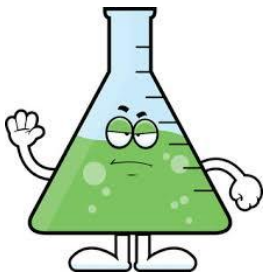
Do you want to make your own Geode? This is a lengthy process but [Feels Like Home Blog](#) does it well. [Click Here](#) to check out how to create your own Geodes.

H is for Helium



What is Helium?

Helium is a gas that doesn't have any color, taste, or smell. On the periodic table, helium's symbol is *He*. Helium is lighter than the air, so it can lift things, like balloons and blimps. Helium is the second lightest element (only hydrogen is lighter) and becomes a liquid at $-268.9\text{ }^{\circ}\text{C}$ ($-452\text{ }^{\circ}\text{F}$).



Try This...

Get a helium balloon, untie the end and suck in some helium. Now say something. Does your voice sound like a cartoon character?

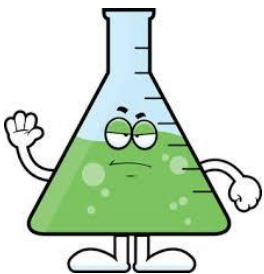
Because helium is lighter than air the sound waves in your voice can travel faster through it. About 3 times faster, in fact, which makes your voice resonate at a higher pitch.

I is for Invisibility



What is Invisibility?

Invisible means incapable by nature of being seen. It's not perceptible by vision - a movie about an invisible man, Invisible ultraviolet light or sound waves. Things are inaccessible to view or are hidden.



Try This...

Mix equal parts water and baking soda together in a small bowl. Use a paintbrush to write a secret message on a piece of paper. Let it dry.

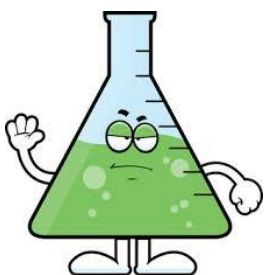
To reveal the message, dip your clean paintbrush into a small amount of grape juice and paint over the message. Watch it "magically" appear before your eyes. This happens because the acid in the juice reacts to the baking soda. Try lemon juice to see if that works, too!

J is for Joule



What is a Joule?

Joule is a unit of work or energy in the International System of Units (SI). It is equal to the work done by a force of one newton acting through 3 feet.



Try This...

Lift an apple into the air (about 3 feet) - an apple weighs approximately one Newton - this means you would have exerted one Newton upward-force to counteract its one Newton weight and you would have performed one joule of work on it.

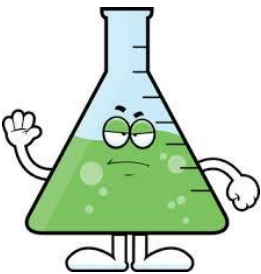
Now, how does energy fit into the picture? As you lift the apple, the energy of the apple (in this case, its potential energy) changes. At the top, the apple would have gained about one joule of potential energy. Gravity would also have gained the ability to do work on it (1 joule) when it drops to the floor.

K is for Keratin



What is Keratin?

Keratin is a protein made up of *amino acids*. Each protein contains its specific order of amino acids. While keratin can also be found in internal organs and glands, they are primarily found in *epithelial cells* (skin). Keratin is also found in hair, fingers and toenails. Keratins help form the tissues of the hair, nails, and the outer layer of the skin.



Try This...

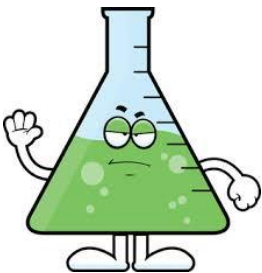
How strong is your hair? Find out in this super-cool experiment from [Science Buddies](#).

L is for Limestone



What is Limestone?

Limestone is *sedimentary rock* that is formed chiefly from animal remains (as shells or coral). It consists mainly of *calcium carbonate* and is used in building. When burned this stone gives off lime (*calcium oxide*).



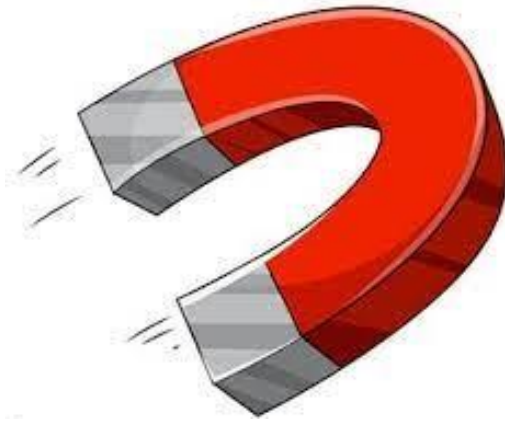
Try This...

To test to see if a rock you have is limestone you will need a clear jar (or bowl) and some vinegar. Place your rock in the jar and pour enough vinegar over to half cover it.

What do you see?

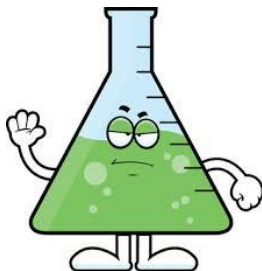
If there are bubbles forming around the rock, that means it is limestone - vinegar is an acid which reacts to the calcium carbonate found in these stones!

M is for Magnets



What are Magnets?

Magnets are rocks or metals that create an invisible field around themselves. This field attracts other magnets and certain metals. The presence of a magnetic field is why you can cover a metal refrigerator door with magnets. A magnetic field is concentrated around the ends of magnets. These ends are called *poles*.



Try This...

Fill an empty plastic bottle with water. Add "treasures" such as coins, buttons, small toys, jewellery etc. Now take a magnet and run it around the bottom of the bottle.

What is attracted to the magnet?

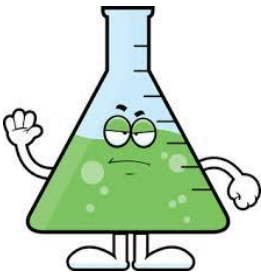
Pull it up out of the pile (still using the magnet) to get a better look at it!

N is for Nephology



What is Nephology?

The Greek root *nephos* means cloud, and is found in a variety of meteorological terms such as nephology, the study of clouds. Nephology is a specialised and complex branch of science. *Nephologists* study clouds to help people understand weather patterns.



Try This...

Make a cloud in a jar. Get a clear jar with a lid. Place ice cubes on the lid and set aside. Have an adult pour 1/3 cup of boiling water into the jar. Quickly spray hairspray into the jar and place the lid on (with the ice cubes on top). Watch as a cloud forms inside the jar before your very eyes!

What happened?

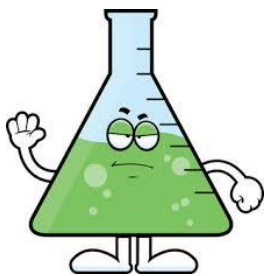
The warm, moist air in the jar began to cool down. This is because of the ice that was on the lid of the jar. The water vapors in the cooling air then condensed onto the particles of hairspray, forming a cloud in the jar!

O is for Oxygen



What is Oxygen?

Oxygen is the most common chemical element found on or in the Earth. It is one of the main elements that make up air. It's necessary for the survival of all plants and animals. Oxygen makes up about one fifth of the atmosphere. It also makes up nine tenths (by weight) of water and almost half of the rock and sand in Earth's crust. Oxygen does not have any smell, taste, or color.



Try This...

Snip a leaf off a plant. Place it in a glass of water in a sunny location. Wait for about an hour.

What do you see?

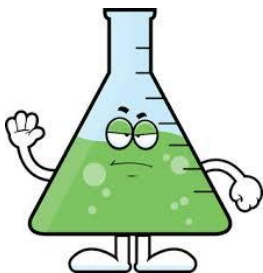
There should be tiny bubbles forming around the leaf and on the side of the glass. This is oxygen. Leaves take in carbon dioxide and through the process of photosynthesis they create food for the plant. Oxygen is a byproduct of this (which goes into the air).

P is for Photon



What is a Photon?

In physics, a photon is a bundle of *electromagnetic energy*. It is the basic unit that makes up all light and is sometimes referred to as a "*quantum*" of *electromagnetic energy*. Photons have zero mass. They have no electric charge. They are stable. They can have interactions with other particles such as electrons. They can be destroyed or created by many natural processes. When in empty space, they travel at the speed of light.



Try This...

Want to see Photons at work?

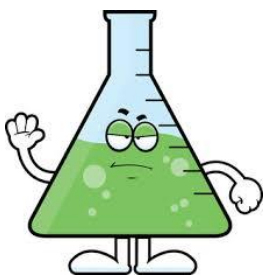
Click over to [Rosie Research](#) for a fun project on the Photoelectric Effect!

Q is for Quicksand



What is Quicksand?

Quicksand is a mixture of clay, either sand or silt, and water (mostly water). Together, the ingredients form a jelly-like mass with sand mixed throughout. When someone steps onto the quicksand, the mixture is jiggled. Then it flows like a liquid, and the sand starts sinking to the bottom. The more the person struggles, the more watery the quicksand becomes.



Try This...

Find an area that can get a little messy and is easy to clean up. Mix 2 parts cornstarch with 1 part water (you can add a few drops of food coloring to the water). Use your hands or a wooden spoon to stir the mixture.

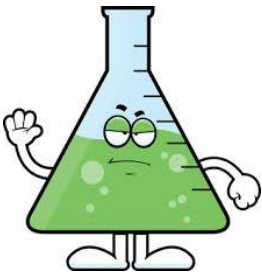
Now, try placing different sizes and weights of toys or objects on top of your quicksand. What happens? Try moving the objects around a bit to see how they sink!

R is for Rain



What is Rain?

Rain is the liquid form of water that falls from the sky in drops. Rain fills lakes, ponds, rivers, and streams. It provides the fresh water needed by humans, animals, and plants.



Try This...

Get a mason jar (or empty jam jar). Boil some water. Have an adult pour 2 to 3 inches into the jar. Now take a paper plate and place it over the top of the jar. Put several ice cubes on the plate.

What happens?

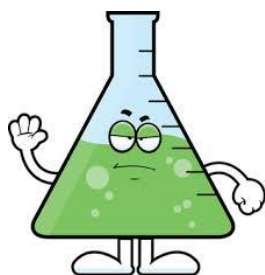
Rain (condensation) will form on the bottom of the plate. Watch for those droplets to begin to "rain" down inside the jar!

S is for Sodium



What is Sodium?

Sodium is a soft waxy silver-white metallic element that is chemically very active and is common in nature. This mineral is needed by the body to keep body fluids in balance. Sodium is found in table salt and in many processed foods. Too much sodium can be bad for you.



Try This...

Take an ice cube and place it in a bowl. Now pour some salt on it (Kosher salt and sea salt will also work).

Watch and wait.

What is happening?

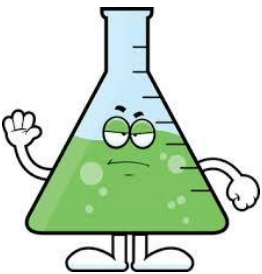
The ice should begin to melt. This process is known as exothermic reaction (a chemical reaction that involves the release of energy in the form of heat or light), which lowers the freezing point of the water in the ice, so it begins to melt.

T is for Taste Buds



What Are Taste Buds?

Taste buds are sensory organs that are found on your tongue and allow you to experience tastes that are sweet, salty, sour, and bitter. How exactly do your taste buds work? Taste buds have very sensitive microscopic hairs called *microvilli* (*mye-kro-VILL-eye*). Those tiny hairs send messages to the brain about how something tastes, so you know if it's sweet, sour, bitter, or salty. The average person has about 10,000 taste buds.



Try This...

Get a variety of foods and put them in small containers. Try lemon wedges, bitter chocolate, salted crackers or potato chips, pickles, gummy candies, sour candies etc.

Now blindfold one person and have them taste each food item.

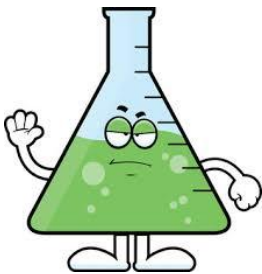
What are your taste buds telling you? Is the item sweet, salty, bitter, or sour?

U is for Underwater



What is Underwater?

Underwater is a term telling what is below the surface of a body of water such as an ocean, sea, lake, pond, or river. Most of the Earth is covered by water. The bottom of the ocean is called the *sea-bed*. Most of the sea-bed is between 13,100 and 18,000 feet below the surface of the ocean.



Try This...

Get a glass and fill it with water. Now put your ear to one side of the glass while you tap on the other side. Did you hear anything? You created sound waves. Now pour half of the water out. Listen and tap again. Is the sound different?

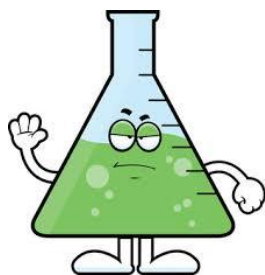
If the glass is full of water, the sound wave gets slowed travelling through the water, and the pitch of the sound is lower. If the glass has less water in it, the wave isn't slowed down as much, so it has a higher pitch.

V is for Volcano



What is a Volcano?

A volcano is a mountain or hill with an opening. When a volcano erupts, *magma* (hot liquid rock beneath the surface of the Earth) is forcibly pushed up through the opening. When magma reaches the Earth's surface, it is called *lava*. Lava can be as hot as 2,200°F (1,204°C). Some volcanic eruptions are *explosive* - lava shoots into the sky, gas and hot pieces of rock and ash are also released. Other eruptions are *effusive* - lava oozes slowly from the volcano.



Try This...

Do this experiment outside as it is very sticky and messy. Get a bottle of diet cola. Have an adult drop 2 Mentos candies directly into the bottle. **QUICKLY** get out of the way! Stand back and watch the cola-geyser shoot into the air!

As the Mentos candy sinks in the bottle, the candy causes the production of more and more carbon dioxide bubbles, and the rising bubbles react with carbon dioxide that is still dissolved in the soda to cause more carbon dioxide to be freed and create even more bubbles, resulting in the eruption.

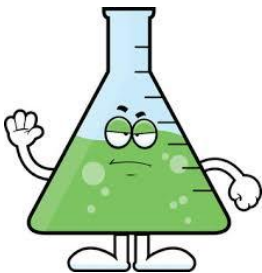
W is for Wavelength



What is a Wavelength?

Wavelength measures the distance between wave *peaks*. The closer the peaks of the waves are to each other, the more energy the waves have. The opposite is also true: when the wavelength is longer, the waves have less energy.

Light waves (like waves in water) can be described by the distance between two *successive peaks* of the wave - a length known as the *wavelength*. Different wavelengths of light appear to our eyes as different colors. Shorter wavelengths appear blue or violet, and longer wavelengths appear red.



Try This...

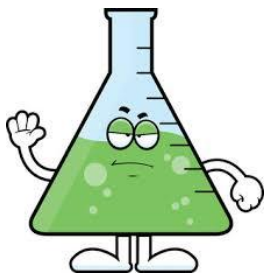
Check out this cool [YouTube Video](#) to learn more about wavelengths!

X is for X-Ray



What is an X-Ray?

X-rays are special pictures of the inside of your body. An X-ray machine, not a camera, takes these pictures. When the picture comes out, doctors can see broken bones, lung infections, and more. Superman may have X-ray vision, but your doctor has an X-ray machine!



Try This...

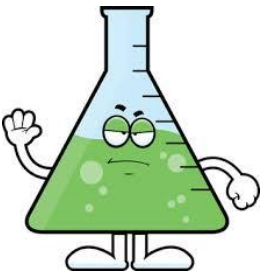
Do you want to make your own X-ray Light Box? Check out this cool experiment by [The Measured Mom](#).

Y is for Year



What is a Year?

A Year is the time taken by the earth to make one revolution around the sun. A Year consists of 365 days (or 366 days in leap years) starting from the first of January. There are 8,760 hours in a normal year and 525,600 minutes!



Try This...

Stand up straight against a door frame. Have someone mark your height using a pencil. Come back in exactly 1 year and measure yourself again to see how much you have grown.

You may also want to learn a new hobby (music, painting, writing) or a new sport. Use a journal to keep track of your progress throughout the year.

See how far you've come in 365 days!

Z is for Zinc

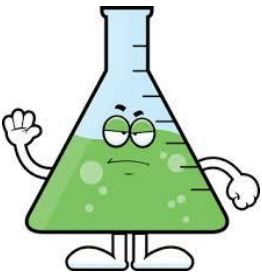


What is Zinc?

In chemistry, zinc is a brittle chemical element that appears bluish and silvery in color with atomic number 30 and symbol 'Zn.'

In the human body, zinc is the second most significant mineral that is useful in many ways to perform bodily functions. It also plays a vital role in performing many functions of the human body, such as nerve function, digestion, metabolism, etc. On the other hand, it also helps the human body's immune system invade viruses and bacteria.

Zinc is found in many foods such as meat, eggs, seafood, oysters, and dairy.



Watch This...

Watch this [amazing video](#) as a piece of metal turns into a "Zinc Hedgehog."

WORD SEARCH

U N D E R W A T E R I E Z K X
W E D O E G H P F Y C A I E G
O E X P E R I M E N T S N R R
Y N O R V Q D I E O M H C A J
F T A H D T K I M G Z H I T E
K K I C K V C S N S Z N Y I A
N Q P S L S G F O C J K X N D
K R E P N O B M X X W V B N H
O Q Z Q Y E V X P R Q N A G F
I X I K J I D I J K A S M K M
B V Y S N O T O H P K Y U D V
W J W G T R L U C C P J I E R
D S S F E N E F I Y U C D M X
F U S L F N O U E D Q D O L A
Y A Q H S N Q M W T E Z S S P

Atoms

Density

Experiments

Geode

Keratin

Oxygen

Photons

Quicksand

Rain

Science

Sodium

Underwater

Volcano

Xray

Zinc

TAKE THE SIMPLE SCIENCE QUIZ

1. Which mineral is found in some of our food?
2. What are the smallest building blocks of all matter?
3. What word means 'the studying of clouds'?
4. Why does a candle relight itself by using its smoke?
5. What machine is used to see your bones?
6. How many things does a wavelength measure?
7. How do you make a diet coke explosion?
8. What are the microscopic "hairs" called on the tongue?
9. True or False - Helium doesn't have any taste or smell?
10. What is a Joule?

HOW DID YOU DO?

10 OUT OF 10 - YOU'RE SCIENCE-TASTIC!

5-9 - IT'S BACK TO THE "LAB" FOR YOU!

**0-4: YOUR KNOWLEDGE
HAS FIZZLED OUT!**