SUMMER CAMP

Tested, edited & approved by:

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Blowing off STEAM

Grades: 3rd-5th

Each of the five days are set to three-hour periods

Allow for 5-10 minutes of clean up between each activity

DAY ONE (ATOMS):

Introduction:

Name, Age, Favorite Color. Run through expectations for the kids throughout the week, such as listening skills, being a good friend, sharing, etc.

What is an Atom:

An atom consists of 3 main parts, the proton, electron, and neutron. The proton has a positive charge, the electron has a negative charge, and the neutron has no charge. The nucleus is at the center and is a bundle of protons and neutrons. The electrons can only be found in the electron cloud which is outside the nucleus.

Atom Video:

Watch: Learn Bright - Atoms for Kids l What is an atom? l Learn about atoms and molecules with activities and worksheets

3D Atom Model:

Each kid will need a total of 15 styrofoam balls as well as five, three inch length dowels. You will need to paint five of the 15 styrofoam balls red, five yellow, and five blue. Let them fully dry then hot glue the red and yellow styrofoam balls into a bigger ball. Then take one of the three inch dowels and put one blue-painted styrofoam ball on the end, and put the other end into one of the red or yellow styrofoam balls.

Periodic Table Graham Cracker Snack:

For this snack, you will need graham crackers, colored frosting, and icing gel. Start off by giving each student an element from the periodic table and have them frost a square graham

cracker. They then can write the elements symbol as well as the atomic number with the icing gel

Periodic Table Worksheet:

Attached on page seven is the periodic table worksheet. The students can work individually or with a partner to finish the paper. There is also an answer sheet attached on page nine. Using the attached periodic table will give slightly different answers so you can round answers if needed.

Coloring Pages:

Attached are some coloring pages that the students can choose from, you can let them pick which page they want and let them color for about 20-30 minutes

DAYS TWO AND THREE (CELLS AND DNA, HUMAN BODY):

Depending on time you can continue this day for three.

What is a Cell:

All living things have cells. They are the building blocks of life. There are two types of cells **Prokaryotic (Pro-carry-otic)** and **Eukaryotic (You-carry-otic)**. Bacteria is an example of prokaryotic, they have only one cell. Prokaryotic cells also don't have a nucleus. Eukaryotic cells are what make up plants and animals. In complex organisms, cells are made up of organelles.

Cell Parts Candy Diagram:

There are multiple parts in a cell. The cell membrane is the plastic bag, it is flexible but allows things to go in and out. The cytoplasm is the jello, it is what holds all the parts of the cells. It allows things to move around inside the cell. The nucleus is the plum. The nucleus is the "brain" of the cell, it tells when to split into two cells and controls the organelles. The Rough ER (Endoplasmic Reticulum) is the fruit roll-up with nerds, the nerds are the ribosomes. They are in charge of making protein. The Fruit roll-up is the smooth ER, it is in charge of making fats, called lipids. The mitochondria is the snickers. The mitochondria is the powerhouse of the cell. It gives the cell energy. The mint M&M's is called the Lysosomes. Lysosomes get rid of waste and detoxify the cell.

For this activity, students will need to group up in pairs of 2-4. Go through each item and explain what they are. Start with the plastic bag, on top put the jello and layer the candy around the jello. Be sure to put the "NUCLEUS" in the middle of the jello. Once done with the activity kids can have it as a snack.

DNA Candy Chain:

For the candy DNA chain you will need to put toothpicks into each item, into the marshmallow on top one on the side. On the top toothpick put on a twizzler bite. On the side, toothpicks add gummy bears and make sure that the orange and green gummy bears go together and the red

and yellow gummy bears go together. Make sure that the top twizzlers are facing different directions. One set of marshmallows, gummy bear, and twizzler is called a Nucleotide.

Blood Model:

There are 4 key components to blood. White blood cells, red blood cells, platelets, and plasma. White blood cells, represented by the white lima beans, are an important part of the immune system, which helps the body defend itself against infections. Some of the white blood cells are made in the bone marrow, they are also made in the spleen and lymph nodes. There are less white blood cells than there are red blood cells. Red Blood Cells, represented by the red hot candies, are shaped like flattened disks, they contain a protein called hemoglobin that carries oxygen. The red blood cells are made in the bone marrow and live for about 4 months. Platelets, represented by the white rice, are shaped like tiny ovals. These help the blood clot. If you start bleeding, platelets rush to the area and seal off the wound. They only live for about 9 days. Plasm, represented by the corn syrup, is the fluid that carries the red and white blood cells as well as the platelets. There is one white blood cell for every 600 red blood cells. There are 40 platelets for every 600 red blood cells. Plasma makes up 55% of our blood.
For this activity fill the jar half full with the red hot candies. Then put 6-10 white lima beans into the jar, as well as 20 grains of white rice. Since the plasma is 55% of the blood. Fill the rest of the jar with clear corn syrup. After the jar is filled you can tightly screw the lid on.
https://www.123homeschool4me.com/blood-for-kids-actiivty-to-learn-about-the-human-body/

Digestion Episode:

Watch The Magic School Bus - For Lunch - Ep. 10 by Victor's Nelvana Shows
This episode will go through how the body does digestion and what happens to the food as it goes through your body.

Digestion Activity:

This simple activity will show how digestion works. You will begin with a quart size plastic bag. On one side draw a stomach shape with the bottom part of the esophagus connecting to the top of the stomach going, and the bottom of the stomach connected to the top of the small intestines running down to the bottom left side of the bag. You can then invite the kids to "fill their stomachs" with 3 crackers. As the food goes into the stomach it will be broken down from the teeth. The stomach breaks the food down even more by churning the food. Have the kids break the crackers into small pieces inside the bag. Explain that the stomach also uses acids to break down the food even more. You can now add one small paper cup worth of 7-up or sprite into the bag to act as the acid. Make sure that once all the liquid is in their bag that it is fully sealed. Have the kids continue to churn the bag and have the soda break down the crackers even more.
https://www.giftofcuriosity.com/human-body-activity-how-the-stomach-digests-food/

DAY FOUR (CHEMICAL REACTIONS):

Chemical and Physical Changes:

In a chemical reaction, new substances are created. In a physical change, no new substances are created. Some examples of chemical reactions are burning candles, baking a cake, and digesting food, there is a change that makes something new. Some examples of a physical change is ice melting, crushing a can, tearing paper. After the change you can still tell what the object was before the change.

Baking Soda and Vinegar Chemical Reaction: For this chemical reaction, you will need to to put half a table spoon of baking soda in a small paper cup, then pour one tablespoon of vinegar onto the baking soda into the cup and watch the bubbling and fizzing happen. Depending on how many kids you have you can have each kid do it separate or put them into pairs. Baking soda is a sodium bicarbonate. Vinegar contains acetic acid. When combined, the hydrogen atom in the acetic acid meets the hydrogen and oxygen atoms in the baking soda which then creates water. The acetate ion grabs onto the sodium atom and forms a salt. The carbon dioxide molecule is now able to escape, which bubbles forth as a gas.

Elephant Toothpaste:

How does this experiment work? This experiment is the decomposition of hydrogen peroxide to oxygen and water. We recommend having the instructors do this experiment and then allowing the students to watch and later play with the foam (with gloves).

1. Find a good spot to do this experiment.
2. Set bottle on a flat surface
3. Put on your gloves and safety goggles
4. Add a few squirts of dish soap to the bottom of the bottle
5. Measure ½ cup of hydrogen peroxide or 40 volume
6. Pour the hydrogen peroxide/40 volume into the bottle (use funnel to avoid spills)
7. Gently swirl the dish soap and hydrogen peroxide/40 volume together
8. Measure and pour ½ cup of very warm water into a small bowl
9. Add the yeast, and stir to dissolve it completely in the water (great step to let students do)
10. Tilt the bottle to squirt food coloring in a steam along the side, rotate the bottle and repeat for more colors
11. Pour yeast mixture into the bottle (preferably using a funnel), remove the funnel and step back
12. Enjoy watching the foam rise out of the bottle
13. After allowing the foam to cool for a few minutes, you and the students may touch the foam **with gloves on**
14. To clean up dispose of the entire tray into a trash bin with a trash bag in it or wash materials with gloves on

Safety Instructions
If you are using 40 Volume Solution Hydrogen Peroxide (**Can Cause Irritation and Burns to the skin) ALWAYS WEAR GLOVES AND SAFETY GOGGLES** when working with this solution.
The foam released is **HOT**. Do not touch it right away, wait a few minutes until it has cooled, they you and the students may touch it **WITH GLOVES ON**. If the hydrogen peroxide or the foam touches your skin, immediately wash the area with soap and water.
https://www.engineeringemily.com/elephant-toothpaste-steam-experiment-for-kids/

Rubber Egg:
This experiment will take over 24 hours to occur so you will have to do it before the last activity or before the camp ends.

To do this experiment you will need a raw egg, a glass container that can fit 2 or 3 cups of a liquid and vinegar. You will need to fill the glass or beaker halfway full with vinegar. Then you can put the egg in, make sure that the egg can be fully covered with the vinegar, but it may float. You will need to leave this experiment alone overnight for the reaction to occur. The next day, the egg shell should fully be dissolved. Once you take the egg out, rinse it under water to rub off the rest of the shell. It should leave the membrane of the egg. This is how it is a "rubber" egg. You can gently poke the egg and gently squeeze it.

Exploding Colors in Milk:
Pour milk into a bowl or plate. Have the students then squirt food coloring into the milk, one drop at a time. Once you have the desired amount of food coloring take a Q-Tip and dip it into some dish soap. Then place the Q-Tip in the center of the bowl. The food coloring should "explode" outwards to the edge of the bowl. How does this experiment work? Keep in mind that the food coloring is only there to make the reaction visible. With out the food coloring, the milk and dish soap would react the same. Milk contains fats. Dish soap bonds to fat. So the molecules in the dish soap quickly race around the milk to join with the fat molecules. It keeps racing around until the soap is evenly mixed in the milk. The food coloring moves because the molecules push around the food coloring molecules.

DAY FIVE (ENERGY):
Potential & Kinetic Energy Video:
Watch - Potential and Kinetic Energy - It's AumSum Time

Potential Energy:
Potential energy is stored energy that depends upon the relative position of different parts of a system. For example, a spring has more potential energy when it is compressed, or stretched. A steel bar has more potential energy when it is higher off the ground.

Kinetic Energy:

Kinetic energy is the opposite of potential energy. Kinetic energy is the energy an object has because of its motion. If you want to speed up an object you must push or pull against the object. Applying the energy requires us to do work. After the work has been applied, energy has been transferred to the object. That object will continue at the new constant speed until it hits a new object with potential energy

Build Your Own Catapult:

Take seven of the popsicle sticks and line them up on top of each other.
Take a rubber band and wrap it tightly around one end of the popsicle sticks. Place the last (eighth) popsicle stick between the first and second popsicle sticks, sliding it to the middle. Take a second elastic and wrap it tightly around the other end of the popsicle stick stack**.** Line up the handle of the plastic spoon with one end of the single popsicle stick. Attach the handle tightly with an elastic. You can now test out the catapult, using all kinds of different projectiles. Pull down on the spoon, place a projectile on it, and let it fly
When you pull back the catapult and hold it while it's back there is potential energy in the arm. When you release the arm of the catapult, the potential energy turns into kinetic energy which allows the aluminum foil ball to fly, which is also kinetic energy.
Popsicle Stick Ninja Stars: When making these popsicle sticks you have to remember that they are all held together and can break/burst. Each stick that is held together has potential energy. To start take two popsicle sticks and make an upside down V. Then place a third popsicle stick in middle of the V. After that slide one popsicle stick halfway up with the two outsides being on the top side, and the center being on the bottom side. Finally, put the last stick onto the ninja star, make sure to alternate the opposite sides than the previous and it will secure the ninja star.

Rube Goldberg:

A rube goldberg machine is a machine that is designed to perform a simple task that indirectly completes the task. It is a chain reaction with different parts that move to complete the final task. Some end goal tasks could be; popping a balloon, lowering a book from a high place, turning a page in a book. There are many others that you can pick from. Just have the end machine have at least five things that happen before the final task happens.

Supplies:

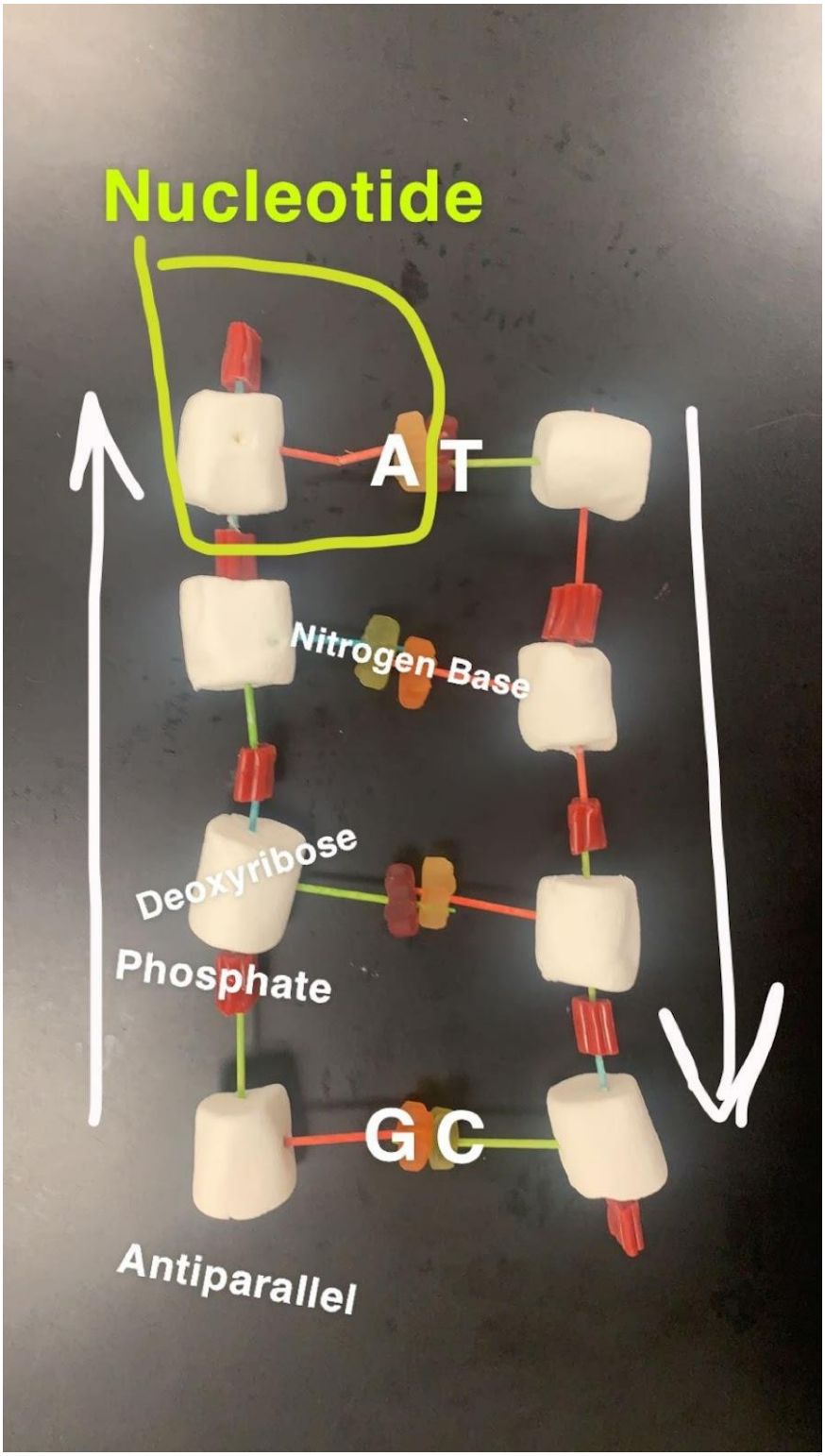
- **Day One**
  - Periodic Table Graham Cracker Snack
    - Graham Crackers
    - Frosting
    - Food Coloring
    - Icing gel
  - Atom Model
    - 1" styrofoam balls
    - Red, yellow, and blue paint
    - 1/4-inch dowels cut into 3-inch lengths
- **Day Two**
  - Candy Cell Model
    - Ziploc Bag
    - Jello
    - Plums or Oranges
    - Fruit by the foot or Fruit Roll up
    - Nerds
    - Snickers
    - Mint M&M's
  - Candy DNA Strand
    - Marshmallow
    - Toothpicks
    - Twizzler Bites
    - Gummy Bears
- **Day Three**
  - Digestion Activity
    - Quart size plastic ziploc bags
    - Dixie Cups
    - Sprite or 7-Up
    - Crackers of any kind
  - Blood Model
    - Jars (one for each kid)
    - Red Hots (Cinnamon Candies)
    - White Lima Beans
    - White Rice
    - Clear Corn Syrup
- **Day Four**
  - Baking soda and vinegar chemical reaction
    - Dixie Cups
    - Baking Soda
    - Vinegar

- Elephant Toothpaste
  - Empty plastic 2 Liter bottle
  - Food Coloring
  - Dish Soap
  - 4oz (½ cup) 40 volume/12% Hydrogen Peroxide
  - Funnel
  - 1 packet (½ Tbsp) active dry yeast
  - 4oz (½ cup) very warm water
  - Small bowl
  - Spoons
  - Large disposable roaster pan or plastic tarp
  - Safety Goggles
  - Plastic Cleaning Gloves
- Rubber Egg
  - Raw Eggs
  - Vinegar
  - Tall glass or beaker
  - Disposable plate or bowl
- Exploding colors in milk
  - Paper plate or bowl
  - Milk
  - Food coloring
  - Q-Tips
  - Dish Soap

- **Day Five**
  - Build Your own Catapult
    - Popsicle sticks
    - Rubber bands
    - Plastic spoon
    - Aluminum foil
  - Popsicle Stick Ninja Star
    - Popsicle sticks
  - Rube Goldberg Machine (Just a list of some things that you can use for the machine)
    - Peg Board
    - Ping Pong Balls
    - Wiffle Ping Pong Balls
    - Balloons
    - Push Pins
    - Clothes Pins
    - Card Board
    - Marbles

- Masking tape
- PVC Pipe
- Boom Whackers (If you have them)
- Dominos
- Wood
- Popsicle sticks
- Magnets
- String
- Books
- Foil
- Cans
- Funnels

Candy DNA Strand



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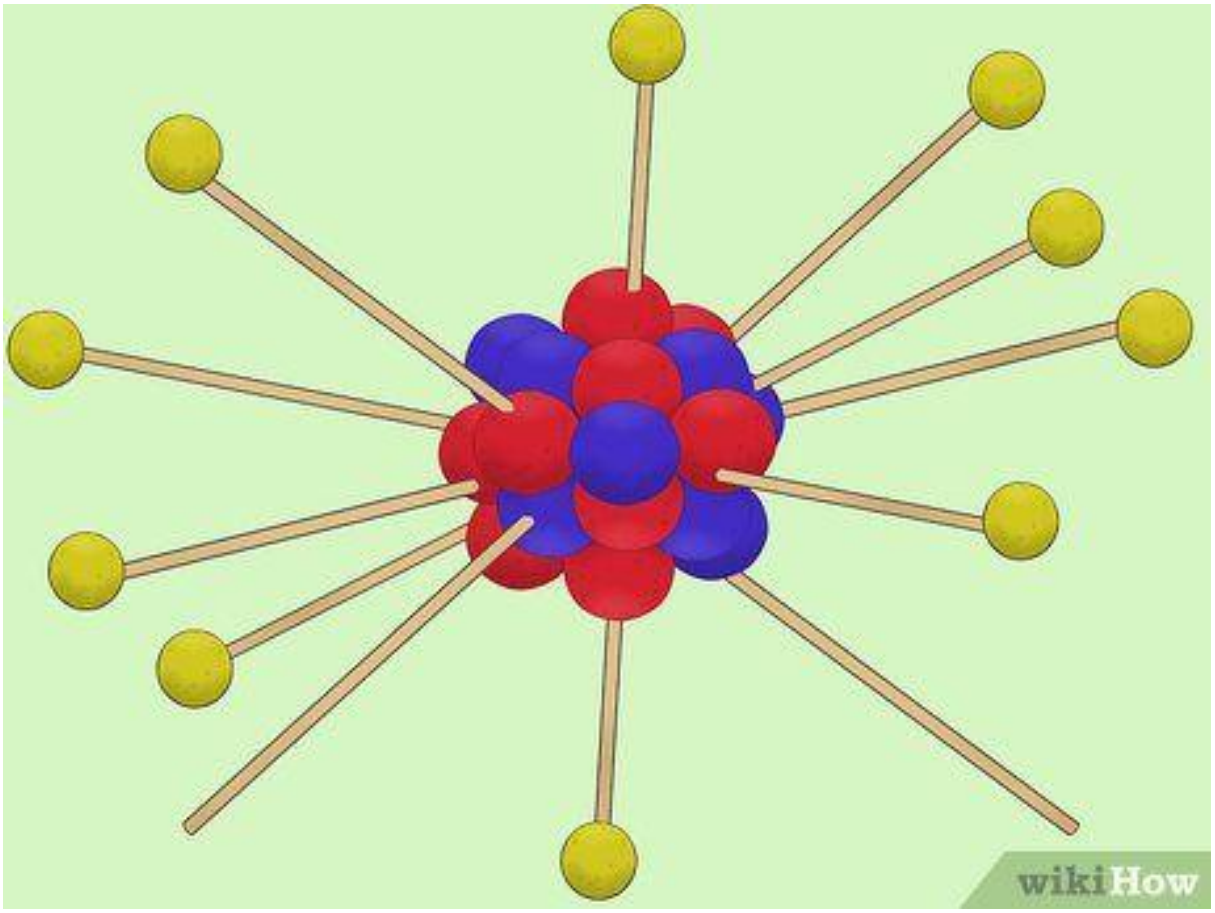
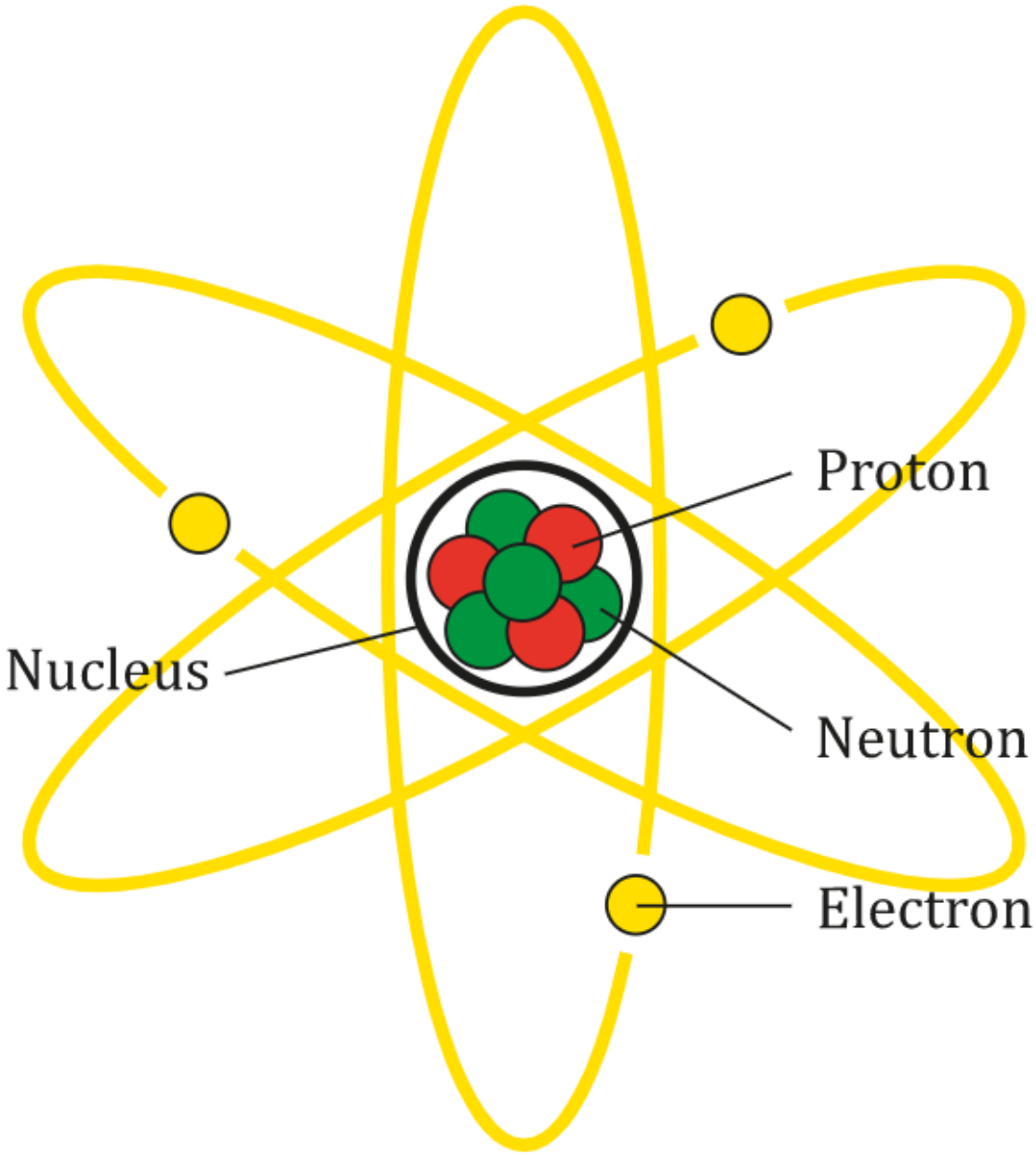
3D Atom Model



Atom Diagram



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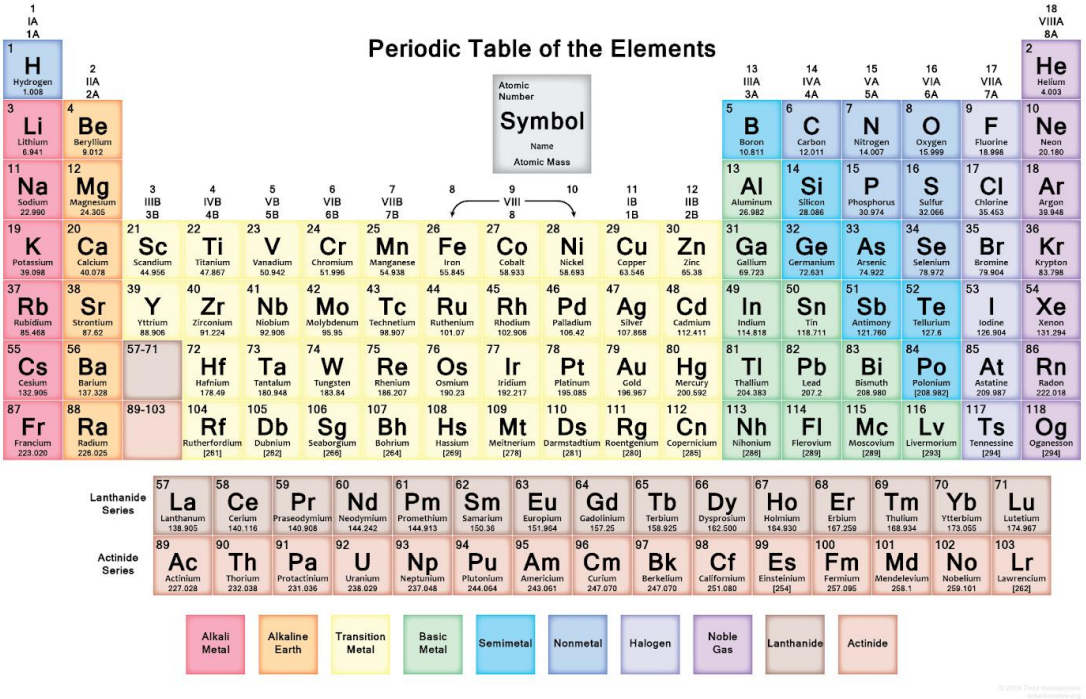
Periodic Table of Elements



Worksheet Answers

	Element Name	Symbol (Letters)	Atomic Number (Top Number)	Atomic Mass (Bottom Number)	Number of Protons (Equals Atomic Number)	Number of Electrons (Equals Atomic Number)
1	Hydrogen	H	1	1.008	1	1
2	Vanadium	V	23	50.942	23	23
3	Silver	Ag	47	107.868	47	47
4	Tin	Sn	50	118.711	50	50
5	Helium	He	2	4.003	2	2
6	Argon	Ar	18	39.948	18	18
7	Tungsten	W	74	183.84	74	74
8	Zirconium	Zr	40	91.224	40	40
9	Aluminum	Al	13	26.982	13	13
10	Xenon	Xe	54	131.294	54	54
11	Iodine	I	53	126.904	53	53
12	Oxygen	O	8	15.999	8	8
13	Iron	Fe	26	55.845	26	26
14	Potassium	K	19	39.098	19	19
15	Nickel	Ni	28	58.693	28	28
16	Sodium	Na	11	22.990	11	11
17	Germanium	Ge	32	72.631	32	32
18	Calcium	Ca	20	40.078	20	20
19	Gold	Au	79	196.967	79	79
20	Lead	Pb	82	207.2	82	82

	Element Name	Symbol	Atomic Number	Atomic Mass	Number of Protons	Number of Electrons
		(Letters)	(Top Number)	(Bottom Number)	(Equals Atomic Number)	(Equals Atomic Number)
1	Hydrogen	H	1	1.008	1	1
2		V		50.942		
3		Ag	47			47
4		Sn		118.711		50
5	Helium				2	
6		Ar			18	18
7			74		74	
8	Zirconium			91.224		
9			13			13
10		Xe		131.294		
11		I				53
12	Oxygen			15.999	8	
13			26			26
14		K		39.098		
15	Nickel		28			28
16				22.99		
17			32	72.631		
18	Calcium	Ca				20

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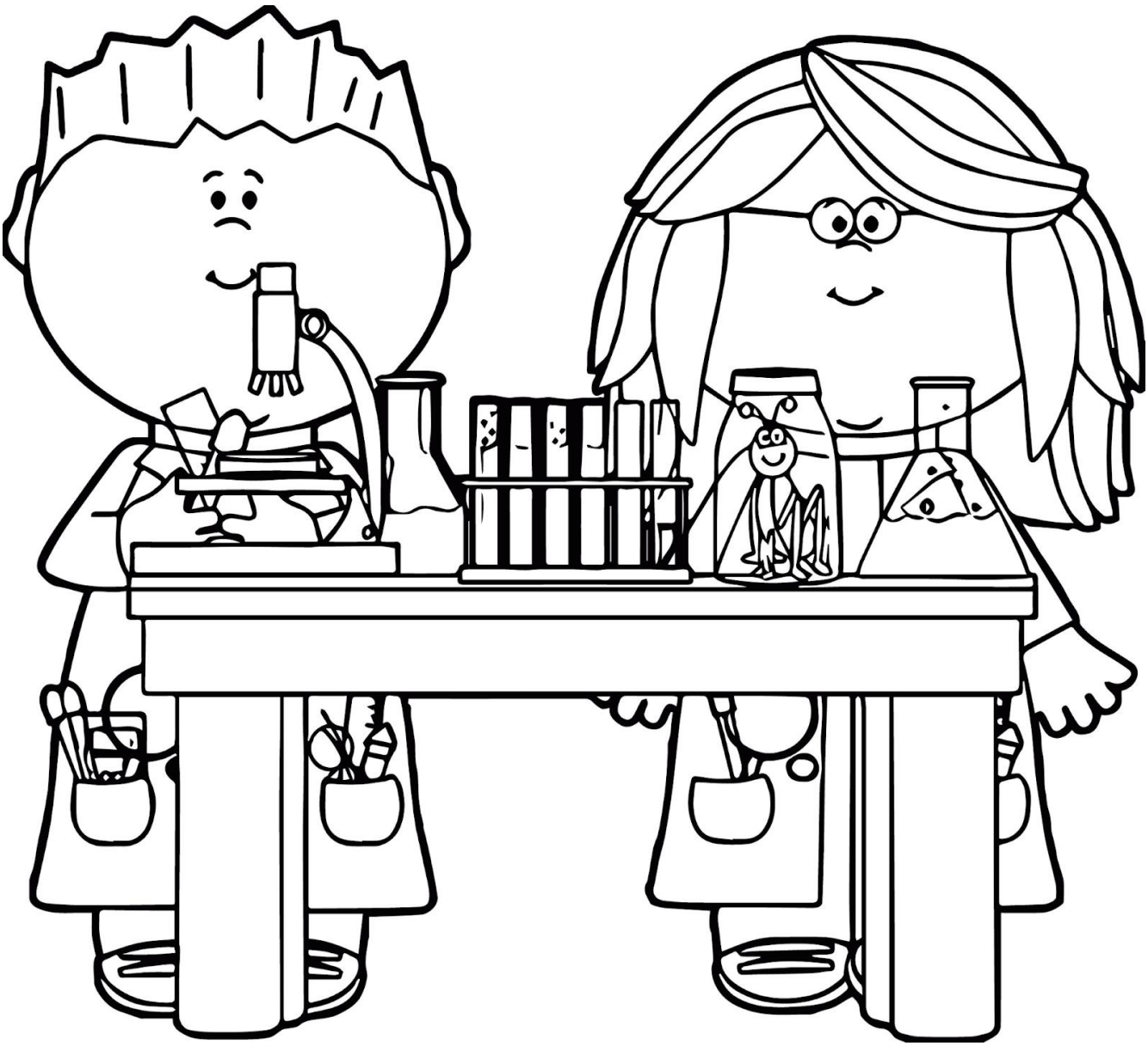

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Exploding Colors in milk example