

# EP Physics/Chemistry

## Printables:

### Levels 5-8



This book belongs to:

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Cut along the outside lines and fold in half. Write the name of the element and information about the element inside the booklet.

Glue this side to the correct periodic table group section.

H

1

Cut along the outside lines and fold in half. Write the name of the element and information about the element inside the booklet.

Glue this side to the correct periodic table group section.

He

2

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Glue this side to the correct periodic table group section.

C

6

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O

8

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Ne

10

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Na

11

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Mg

12

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Al

13

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Si

14

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Glue this side to the correct periodic table group section.

Cl

17

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K

19

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Glue this side to the correct periodic table group section.

Ca

20

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Glue this side to the correct periodic table group section.

Fe

26

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Glue this side to the correct periodic table group section.

Ni

28

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Glue this side to the correct periodic table group section.

Cu

29

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Glue this side to the correct periodic table group section.

Zn

30

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Glue this side to the correct periodic table group section.

Ag

47

Cut along the outside lines and fold in half. Write the name of the element and information about the element inside the booklet.

Glue this side to the correct periodic table group section.

Ar

18

Cut along the outside lines and fold in half. Write the name of the element and information about the element inside the booklet.

Glue this side to the correct periodic table group section.

I

53

Cut along the outside lines and fold in half. Write the name of the element and information about the element inside the booklet.

Glue this side to the correct periodic table group section.

Au

79

Cut along the outside lines and fold in half. Write the name of the element and information about the element inside the booklet.

Glue this side to the correct periodic table group section.

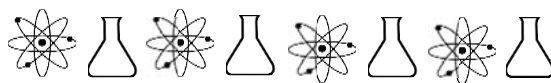
Pb

82



# Periodic Table of the Elements

| Group→      | 1        | 2        | 3        | 4         | 5         | 6         | 7         | 8         | 9         | 10        | 11        | 12        | 13         | 14        | 15         | 16        | 17         | 18         |
|-------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|------------|-----------|------------|------------|
| ↓Period     |          |          |          |           |           |           |           |           |           |           |           |           |            |           |            |           |            |            |
| 1           | 1<br>H   |          |          |           |           |           |           |           |           |           |           |           | 5<br>B     | 6<br>C    | 7<br>N     | 8<br>O    | 9<br>F     | 2<br>He    |
| 2           | 3<br>Li  | 4<br>Be  |          |           |           |           |           |           |           |           |           |           |            | 14<br>Si  | 15<br>P    | 16<br>S   | 17<br>Cl   | 10<br>Ne   |
| 3           | 11<br>Na | 12<br>Mg |          |           |           |           |           |           |           |           |           |           | 13<br>Al   |           |            |           |            | 18<br>Ar   |
| 4           | 19<br>K  | 20<br>Ca | 21<br>Sc | 22<br>Ti  | 23<br>V   | 24<br>Cr  | 25<br>Mn  | 26<br>Fe  | 27<br>Co  | 28<br>Ni  | 29<br>Cu  | 30<br>Zn  | 31<br>Ga   | 32<br>Ge  | 33<br>As   | 34<br>Se  | 35<br>Br   | 36<br>Kr   |
| 5           | 37<br>Rb | 38<br>Sr | 39<br>Y  | 40<br>Zr  | 41<br>Nb  | 42<br>Mo  | 43<br>Tc  | 44<br>Ru  | 45<br>Rh  | 46<br>Pd  | 47<br>Ag  | 48<br>Cd  | 49<br>In   | 50<br>Sn  | 51<br>Sb   | 52<br>Te  | 53<br>I    | 54<br>Xe   |
| 6           | 55<br>Cs | 56<br>Ba |          | 72<br>Hf  | 73<br>Ta  | 74<br>W   | 75<br>Re  | 76<br>Os  | 77<br>Ir  | 78<br>Pt  | 79<br>Au  | 80<br>Hg  | 81<br>Tl   | 82<br>Pb  | 83<br>Bi   | 84<br>Po  | 85<br>At   | 86<br>Rn   |
| 7           | 87<br>Fr | 88<br>Ra |          | 104<br>Rf | 105<br>Db | 106<br>Sg | 107<br>Bh | 108<br>Hs | 109<br>Mt | 110<br>Ds | 111<br>Rg | 112<br>Cn | 113<br>Uut | 114<br>Fl | 115<br>Uup | 116<br>Lv | 117<br>Uus | 118<br>Uuo |
| Lanthanides |          |          | 57<br>La | 58<br>Ce  | 59<br>Pr  | 60<br>Nd  | 61<br>Pm  | 62<br>Sm  | 63<br>Eu  | 64<br>Gd  | 65<br>Tb  | 66<br>Dy  | 67<br>Ho   | 68<br>Er  | 69<br>Tm   | 70<br>Yb  | 71<br>Lu   |            |
| Actinides   |          |          | 89<br>Ac | 90<br>Th  | 91<br>Pa  | 92<br>U   | 93<br>Np  | 94<br>Pu  | 95<br>Am  | 96<br>Cm  | 97<br>Bk  | 98<br>Cf  | 99<br>Es   | 100<br>Fm | 101<br>Md  | 102<br>No | 103<br>Lr  |            |



## Changing States of Matter

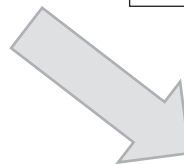
Use the words in the box to fill in the blanks below.

0° cool heat 100° freeze melt 32° condense evaporate 212°

When you \_\_\_\_\_ water  
to \_\_\_\_\_ C or \_\_\_\_\_ F,  
it will \_\_\_\_\_ to  
form steam.



When you \_\_\_\_\_ steam  
to \_\_\_\_\_ C or \_\_\_\_\_ F,  
it will \_\_\_\_\_ to  
form water.

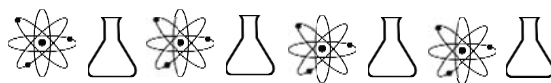


When you \_\_\_\_\_ ice  
to \_\_\_\_\_ C or \_\_\_\_\_ F,  
it will \_\_\_\_\_ to  
form water.



When you \_\_\_\_\_ water  
to \_\_\_\_\_ C or \_\_\_\_\_ F,  
it will \_\_\_\_\_ to  
form ice.





## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

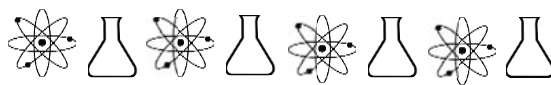
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Vocabulary

Define these terms.

atom\_\_\_\_\_

\_\_\_\_\_

molecule\_\_\_\_\_

\_\_\_\_\_

matter\_\_\_\_\_

\_\_\_\_\_

state of matter\_\_\_\_\_

\_\_\_\_\_

liquid\_\_\_\_\_

\_\_\_\_\_

gas\_\_\_\_\_

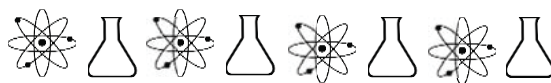
\_\_\_\_\_

solid\_\_\_\_\_

\_\_\_\_\_

periodic table\_\_\_\_\_

\_\_\_\_\_



## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

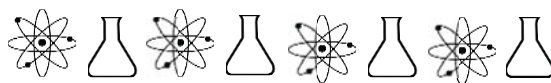
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Matter

Use this notebooking page as you watch the video to write down any new vocabulary words and to take general notes on the content of the video. Then label the atom at the bottom.

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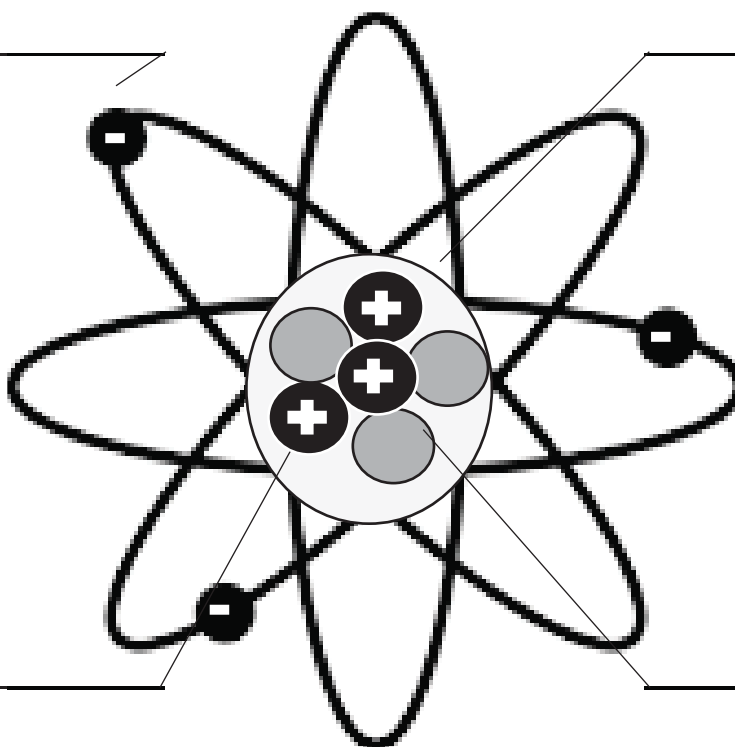
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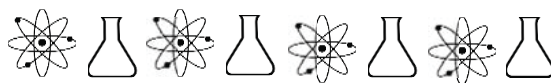
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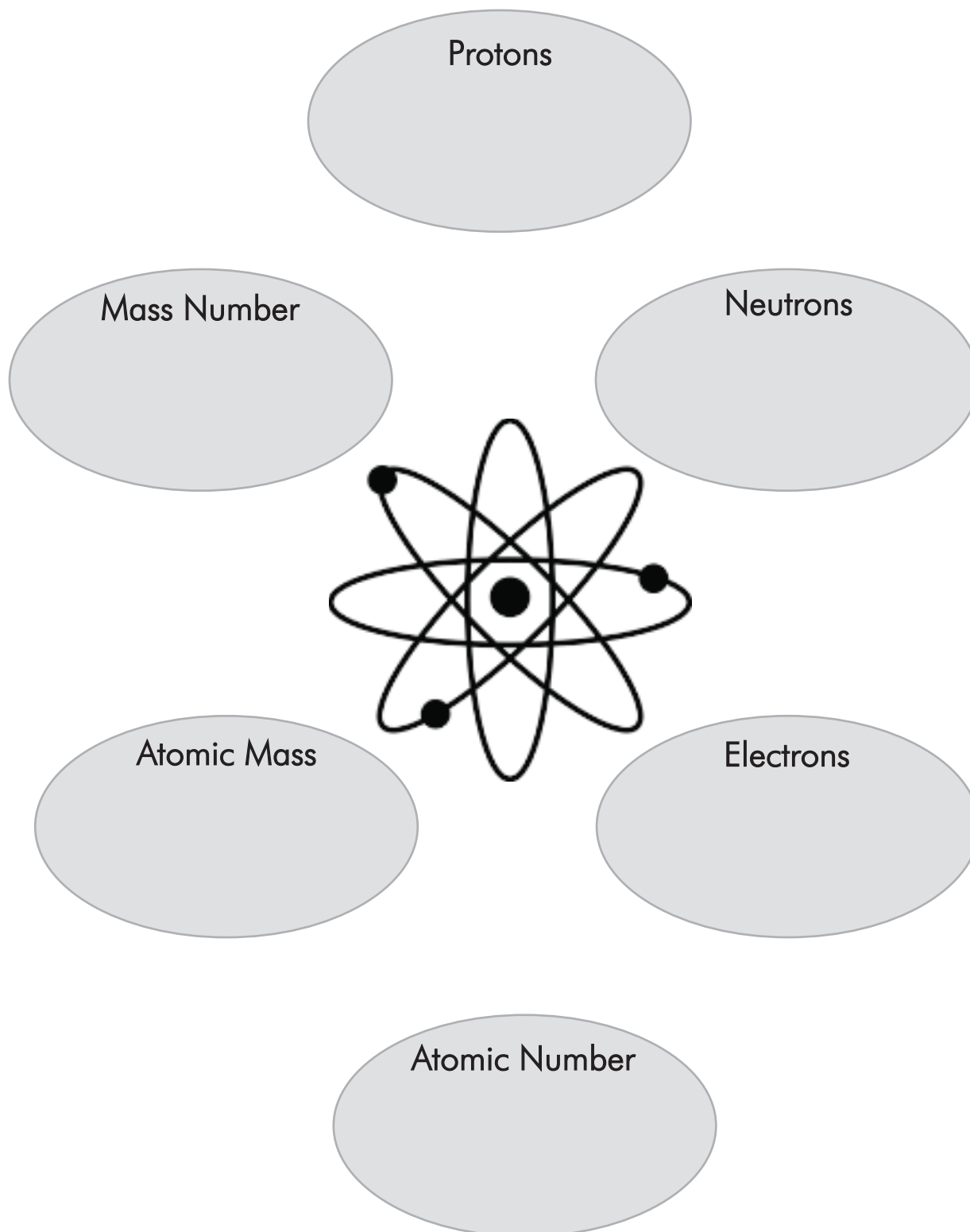
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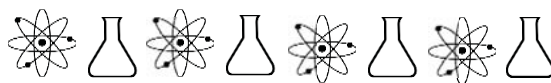




## Helium

Fill in this chart for helium.





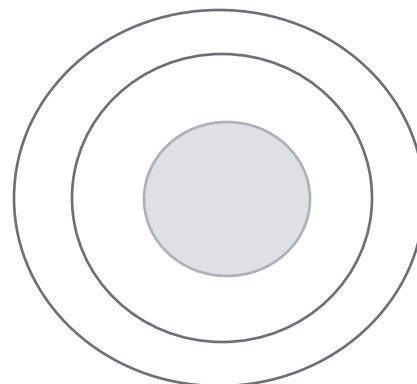
## Atoms

Draw 6 protons in the nucleus of the atom and label them with their charge.

Draw 6 neutrons in the nucleus of the atom.

Draw 2 electrons on the inner ring and label them with their charge.

Draw 4 electrons in the outer ring and label them with their charge.

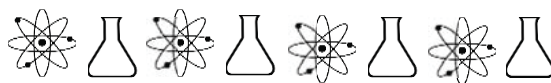


What is the atom? \_\_\_\_\_

Fill in the missing information from the chart.

| Element | Atomic Mass | Atomic Number | Protons | Neutrons | Electrons |
|---------|-------------|---------------|---------|----------|-----------|
| Be      | 9           | 4             |         |          |           |
| N       | 14          |               |         |          | 7         |
| Mn      |             | 25            | 25      | 30       |           |
| Au      | 197         |               |         |          | 79        |
| Cr      |             | 24            |         | 28       |           |
| H       | 1           |               | 1       |          |           |

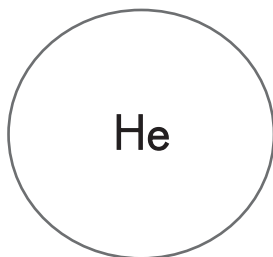




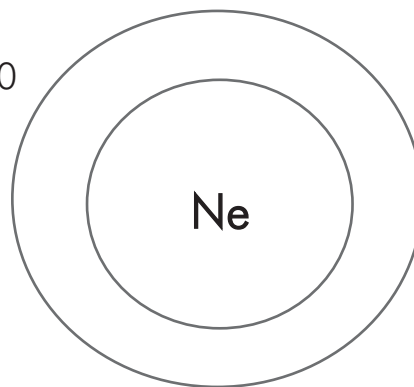
## Electrons

Fill out how many protons, neutrons, and electrons each atom has using the information given. Then draw the electrons in each shell, remembering that the first shell can hold 2 electrons, the second can hold 8 electrons, and the third can hold 18 electrons. Finally, answer the questions at the bottom.

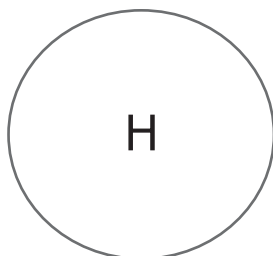
Atomic No: 2  
Mass No: 4  
Protons:  
Neutrons:  
Electrons:



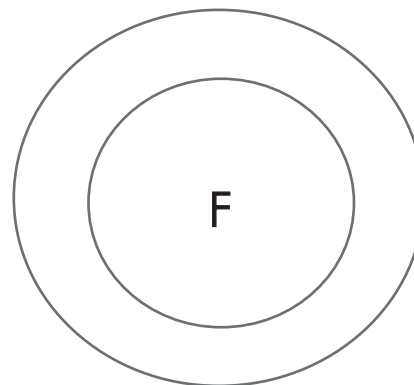
Atomic No: 10  
Mass No: 20  
Protons:  
Neutrons:  
Electrons:



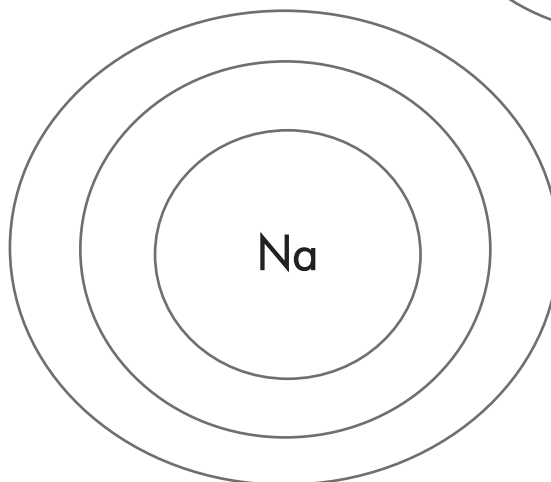
Atomic No: 1  
Mass No: 1  
Protons:  
Neutrons:  
Electrons:



Atomic No: 9  
Mass No: 19  
Protons:  
Neutrons:  
Electrons:



Atomic No: 11  
Mass No: 23  
Protons:  
Neutrons:  
Electrons:



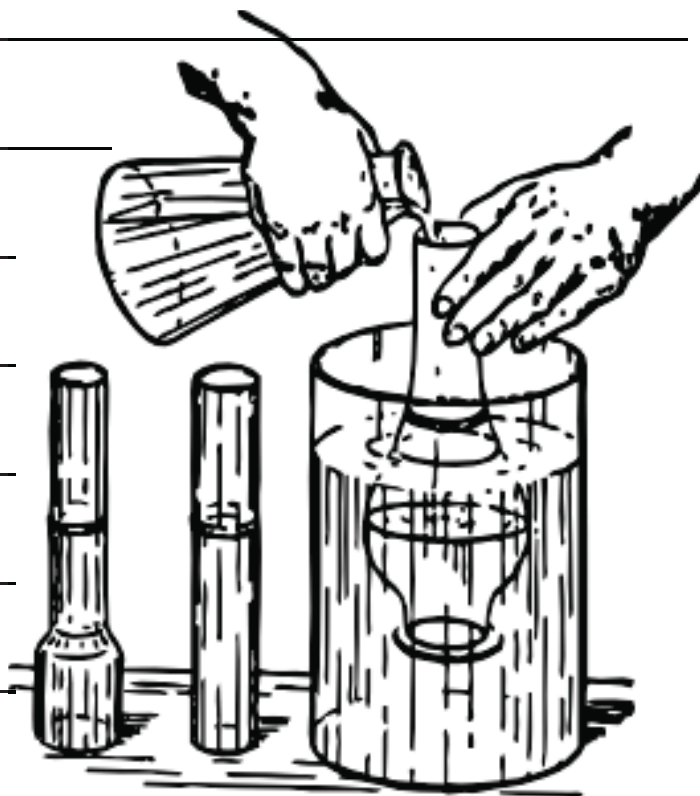
Which elements would be most likely to lose electrons in a chemical bond? \_\_\_\_\_

Which elements would be most likely to gain electrons in a chemical bond? \_\_\_\_\_

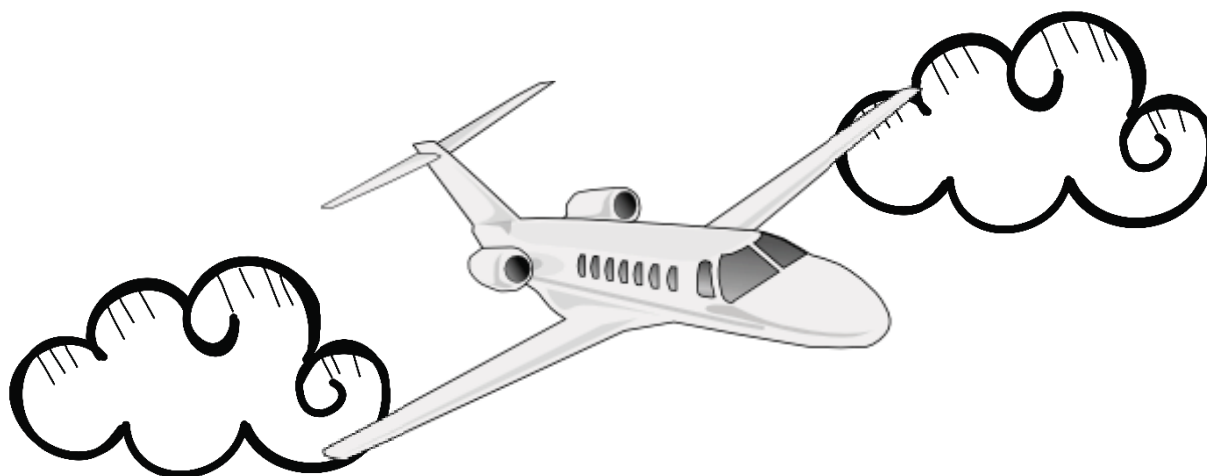
Use this notebooking page to explain why a cup of water that's too full doesn't spill over immediately.

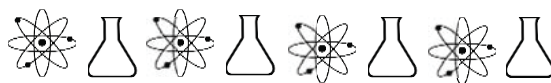
[illegible]

Use this notebooking page to describe the chemical reaction from the experiment.



Use this notebooking page to take notes.

[illegible]



## Weight on Other Planets

The surface gravity of each planet relative to earth is in its box. Find out your weight on other planets by writing your weight on earth on the line and multiplying it by the surface gravity of the planet.

|         |
|---------|
| Mercury |
| _____   |
| x .38   |

|       |
|-------|
| Venus |
| _____ |
| x .91 |

|       |
|-------|
| Earth |
| _____ |
| x 1   |

|       |
|-------|
| Mars  |
| _____ |
| x .38 |

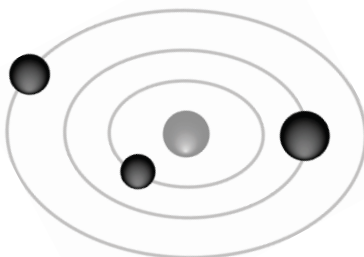
|         |
|---------|
| Jupiter |
| _____   |
| x 2.36  |

|        |
|--------|
| Saturn |
| _____  |
| x 1.05 |

|        |
|--------|
| Uranus |
| _____  |
| x .94  |

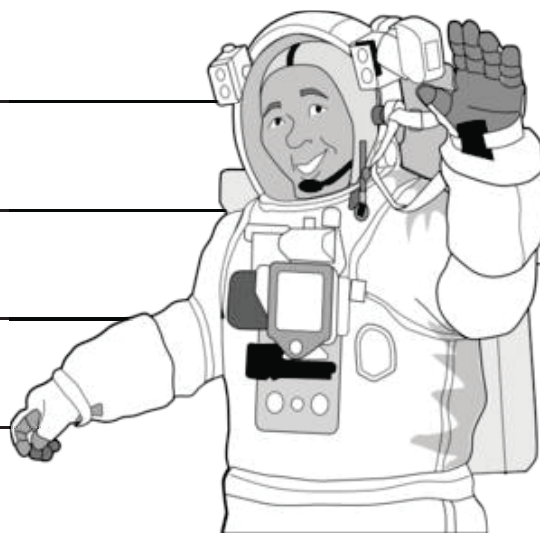
|         |
|---------|
| Neptune |
| _____   |
| x 1.13  |

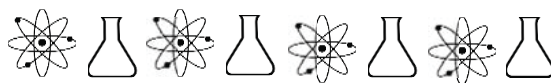
|       |
|-------|
| Pluto |
| _____ |
| x .07 |



(continued on next page)

Use this notebooking page to explain how weight, mass, and gravity are connected.





## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

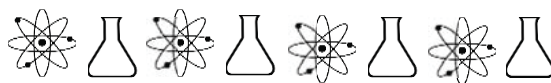
\_\_\_\_\_

\_\_\_\_\_

Objective: to find out if liquids are acid, neutral, or base

[illegible]





## Acids and Bases

Answer the following questions about acids and bases.

What is a characteristic of an acid? \_\_\_\_\_  
\_\_\_\_\_

What is a characteristic of a base? \_\_\_\_\_  
\_\_\_\_\_

List some acids: \_\_\_\_\_

List some bases: \_\_\_\_\_

What is the pH of a strong acid? \_\_\_\_\_

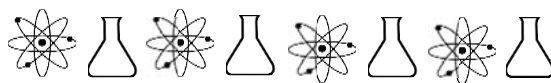
What color does a strong acid turn when tested for its pH level? \_\_\_\_\_

What is the pH of a strong base? \_\_\_\_\_

What color does a strong base turn when tested for its pH level? \_\_\_\_\_

What atom is abundantly present in an acid? \_\_\_\_\_

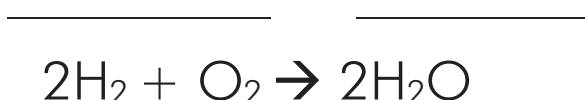
What atom is abundantly present in a base? \_\_\_\_\_



## Chemical Reactions

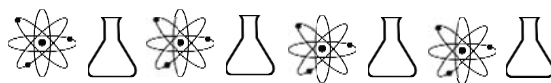
Fill in the blanks as you watch the video.

1. A chemical reaction is the process of one or more substances \_\_\_\_\_ to form new substances with different properties.
2. In chemical reactions, a new substance is formed from chemicals \_\_\_\_\_ with each other.
3. \_\_\_\_\_ are substances that enter a chemical reaction, while \_\_\_\_\_ are substances that are produced by a chemical reaction.
4. A chemical \_\_\_\_\_ is an expression using chemical symbols to represent a chemical reaction.
5. A plus sign is used to show that substances \_\_\_\_\_.
6. An \_\_\_\_\_ is used to show products yielded by reactants.
7. Label the reactants and the products in this chemical equation:



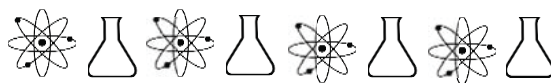
8. The law of the \_\_\_\_\_ of mass says that mass cannot be gained or lost in a chemical reaction.
9. The number of \_\_\_\_\_ of each element must be the same before and after a chemical reaction.
10. A \_\_\_\_\_ reaction is where two or more simple substances combine to form a more complex substance.

(continued on next page)



## Chemical Reactions cont.

11. A \_\_\_\_\_ reaction is where a substance breaks down into two or more simple substances.
12. A \_\_\_\_\_ - \_\_\_\_\_ reaction is where atoms of one element replace atoms of another element in a compound.
13. A \_\_\_\_\_ - \_\_\_\_\_ reaction is where atoms in two different compounds trade places with each other.
14. Chemical reactions involve \_\_\_\_\_ being given off or being absorbed.
15. An \_\_\_\_\_ reaction releases energy and gives off heat.
16. An \_\_\_\_\_ reaction absorbs energy resulting in the lowering of temperature.
17. Variables such as temperature, surface area, and concentration affect the \_\_\_\_\_ of chemical reactions, or the speed with which reactants turn into products.
18. The \_\_\_\_\_ \_\_\_\_\_ is the amount of material that comes in contact with other reactants.
19. \_\_\_\_\_ is the amount of substance in a given unit of volume.
20. A \_\_\_\_\_ is a substance that increases the reaction rate but is not changed by the reaction.



## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

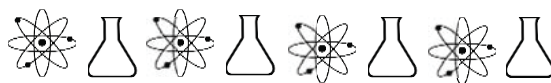
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

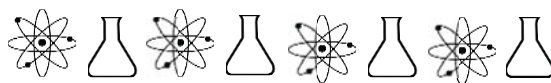
\_\_\_\_\_



## Density Worksheet

Answer the questions about density. You can use a calculator. Remember that  $\text{Density} = \text{Mass} / \text{Volume}$ . You can reverse that to be  $V = M/D$  and  $M = D \cdot V$ .

1. A container has a capacity of 1 400 milliliters. If the density of ethanol is .789 g/mL, what mass of ether can the bottle hold?
2. 200 grams of a liquid fills a 400 mL container. What is the density of the liquid?
3. If a block of iron measures 1 cm x 2 cm x 3 cm and weighs 47.16 grams, what is its density?
4. The density of mercury is 13.6 g/mL. What is the mass of 10 mL of mercury?
5. If a solution has a density of 2.5 g/mL, how many grams are needed to obtain 10 mL of solution?
6. A piece of silver has a mass of 3360 grams and occupies a volume of 320 cm<sup>3</sup>. What is the silver's density?



## Properties of Water

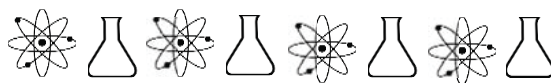
Define these terms.

Viscosity: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Density: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Buoyancy: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Capillary Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Endothermic Reaction

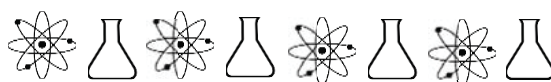
Use these sheets to conduct your endothermic and exothermic experiments.

### Endothermic Reaction Procedure:

1. Measure 10 ml of vinegar and pour it into a clear container.
2. Place a thermometer in the container. Measure and record the temperature of the vinegar on the chart.
3. Leaving the thermometer in the cup, add  $\frac{1}{2}$  teaspoon of baking soda.
4. Watch the thermometer and observe the changes in temperature. When the thermometer stops moving, record the temperature on the chart.

| Temperature                 |  |
|-----------------------------|--|
| Vinegar without baking soda |  |
| Vinegar with baking soda    |  |
| Total change in temperature |  |
| Increase or decrease?       |  |

(continued on next page)



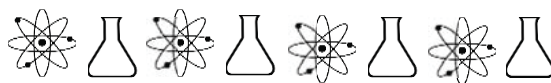
## Exothermic Reaction

### Exothermic Reaction Procedure:

1. Measure 10 ml of baking soda solution and pour it into a clear container.
2. Place a thermometer in the container. Measure and record the temperature of the baking soda on the chart.
3. Leaving the thermometer in the cup, add  $\frac{1}{2}$  teaspoon of calcium chloride.
4. Watch the thermometer and observe the changes in temperature. When the thermometer stops moving, record the temperature on the chart.
5. Now add another  $5^{\circ}\text{C}$  or  $10^{\circ}\text{F}$  to the temperature you achieved. This is your target temperature for your next three trials. Fill it in on the chart in all three columns.
6. Try changing the amount of baking soda solution or calcium chloride in each trial to reach the target temperature.

| Trials  | As written        | 1 <sup>st</sup> Trial | 2 <sup>nd</sup> Trial | 3 <sup>rd</sup> Trial |
|---|-------------------|-----------------------|-----------------------|-----------------------|
| Baking soda solution                            | 10 ml             |                       |                       |                       |
| Initial temperature                             |                   |                       |                       |                       |
| Calcium chloride                                | $\frac{1}{2}$ tsp |                       |                       |                       |
| Final temperature                               |                   |                       |                       |                       |
| Target temperature                              |                   |                       |                       |                       |
| Difference between final and target temperature |                   |                       |                       |                       |





## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

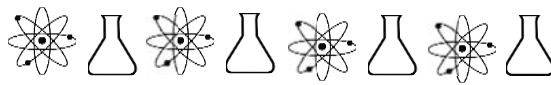
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

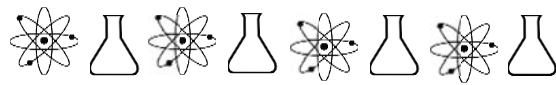
\_\_\_\_\_



## Electricity Timeline

Use the blanks to fill in a timeline of electricity events you want to remember. Be sure to include the year.

A vertical timeline for electricity events. A central vertical line is flanked by lightning bolt icons on both sides. On each side, there are four horizontal lines for text entry, corresponding to the four lightning bolts. The lightning bolts are positioned at the top, middle, and bottom of each side, with a fourth line at the very bottom.



# Circuits

Write any notes about circuits from your assignments today.

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Explain an open circuit.  
Draw an example.

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Explain a closed circuit.  
Draw an example.

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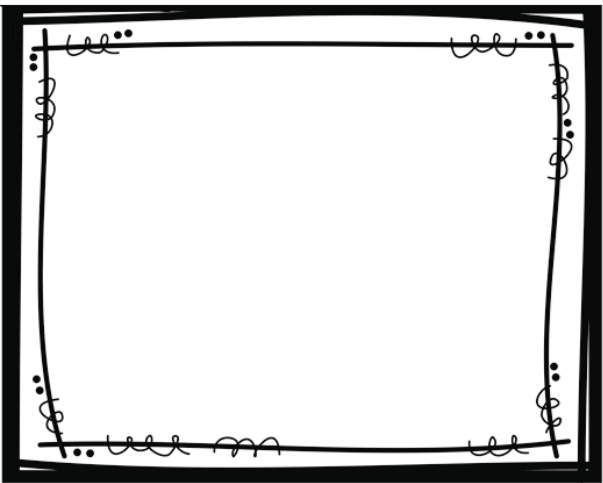
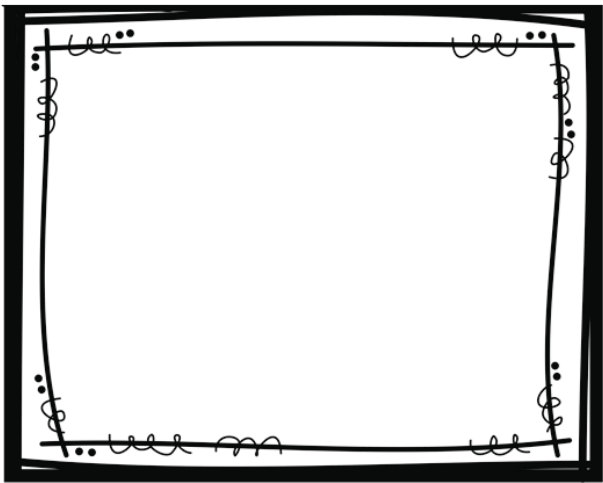
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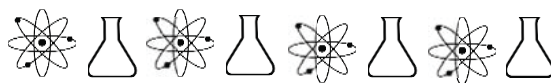
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## Static Electricity

Do the following experiment and take notes on what happens and why.

Materials: two balloons, two 3-foot pieces of string, tape.

Procedure: Blow up the balloons and tie the strings to the ends. Hang them beside each other in a doorway so that they are close but not touching each other. From their hanging position, rub each balloon on your hair and then let go. Record what happens.

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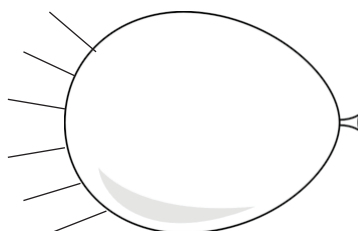
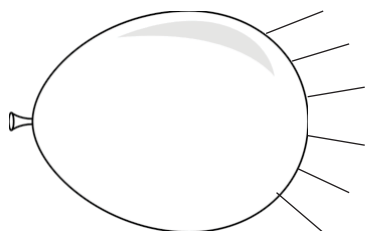
The balloons should have pushed away from each other. Why did that happen? The balloons became similarly charged. What do you know about like charges?

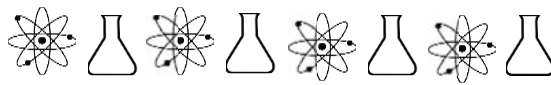
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# Magnets

What are magnets?

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What have you learned about magnets? Make notes here.

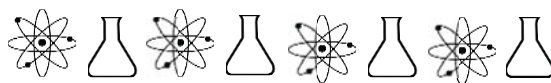
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## AC/DC Power

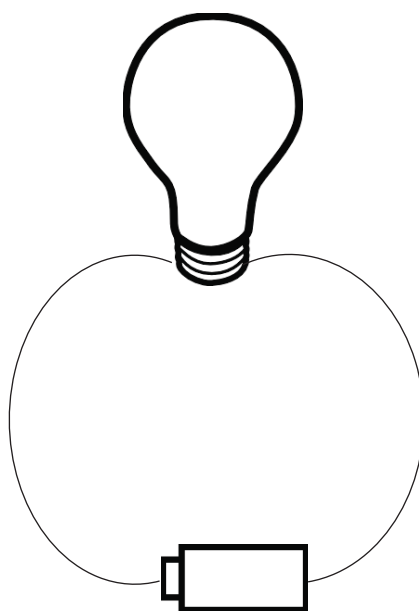
What is the difference between AC and DC power? Fill in what each letter stands for and then explain what the difference is.

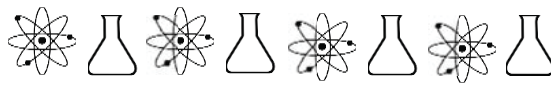
A

C

D

C





## GFCI Outlet

What is a GFCI outlet? What do the letters stand for?

G

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F

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C

---

I

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What are benefits of GFCI outlets? Where are they used?

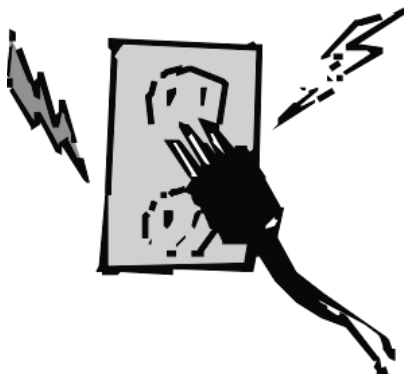
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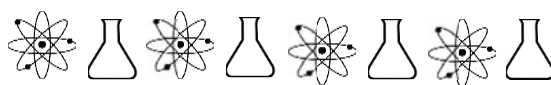
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## Vocabulary

Define these terms.

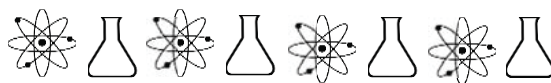
Energy Source

Conductor

Electron

Energy





## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

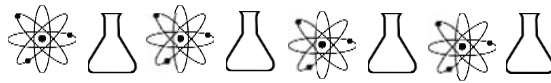
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Magnetism

Define these terms.

AC \_\_\_\_\_  
\_\_\_\_\_

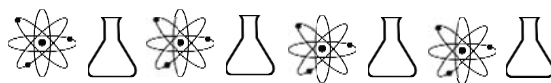
domain \_\_\_\_\_  
\_\_\_\_\_

electromagnet \_\_\_\_\_  
\_\_\_\_\_

electron \_\_\_\_\_  
\_\_\_\_\_

geographic pole \_\_\_\_\_  
\_\_\_\_\_

magnetic field \_\_\_\_\_  
\_\_\_\_\_



## Electromagnets

Answers these questions about electromagnets.

An electromagnet runs on \_\_\_\_\_.

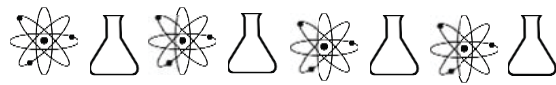
The strength of an electromagnet **can** / **cannot** be changed.

In an electromagnet, electric current produces a \_\_\_\_\_  
\_\_\_\_\_.

The magnetic field of an electromagnet can be strengthened  
by wrapping this around a core. \_\_\_\_\_.

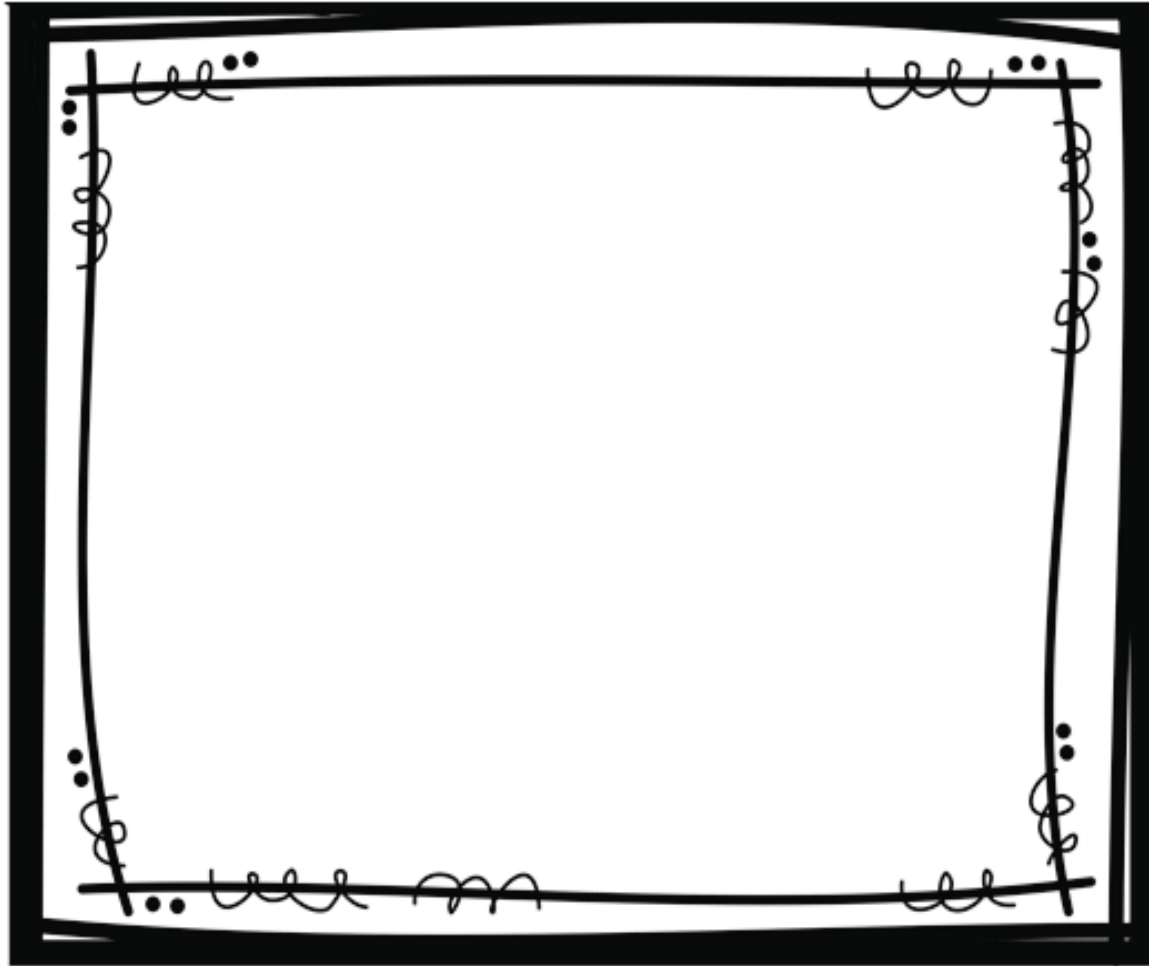
As the current in an electromagnet strengthens, the magnetic  
field gets **stronger** / **weaker**.

An electric current flowing towards you will create a magnetic  
field that will circulate **clockwise** / **counter-clockwise**.



## Magnetic Grippers

Draw a gripper in action. Explain what's happening in your picture.

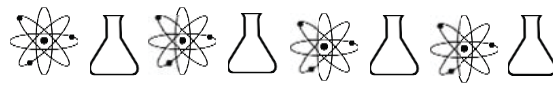


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## Earth's Magnetic Field

What creates the  
Earth's magnetic field?

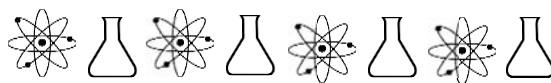
What does a  
compass needle do?

Are the magnetic and  
geographic poles the  
same?



Objective: to find out if objects conduct or carry electricity.

[illegible]



## Chemistry Review

Define these terms as you work through lessons 96-99.

Lesson 96:

**physical change**\_\_\_\_\_

\_\_\_\_\_

**ionic bond**\_\_\_\_\_

\_\_\_\_\_

**solubility**\_\_\_\_\_

\_\_\_\_\_

Lesson 97:

**solute**\_\_\_\_\_

\_\_\_\_\_

**solvent**\_\_\_\_\_

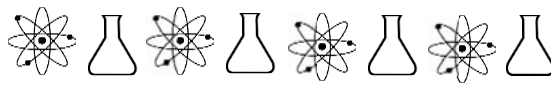
\_\_\_\_\_

Lesson 98:

**chemical reactions**\_\_\_\_\_

\_\_\_\_\_

(continued on next page)



## Chemistry Review continued

Lesson 98 continued:

**concentrations**\_\_\_\_\_

\_\_\_\_\_

Lesson 99:

**freezing**\_\_\_\_\_

\_\_\_\_\_

**heat**\_\_\_\_\_

\_\_\_\_\_

**evaporation**\_\_\_\_\_

\_\_\_\_\_

**condensation**\_\_\_\_\_

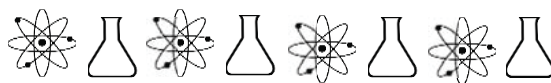
\_\_\_\_\_

**temperature**\_\_\_\_\_

\_\_\_\_\_

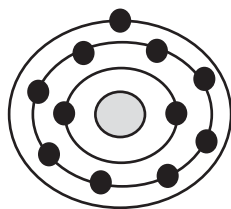




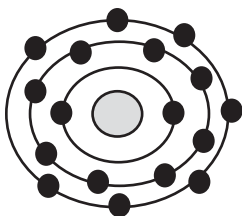


## Ionic Bonds

Write a short description beside each picture to show the process of ionic bonding. The first one is done for you.

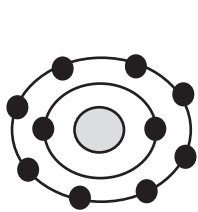
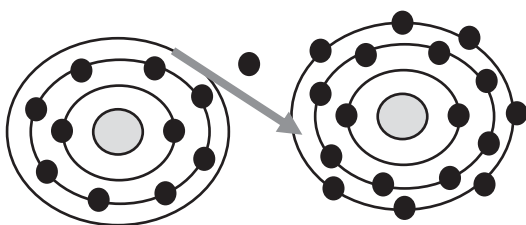
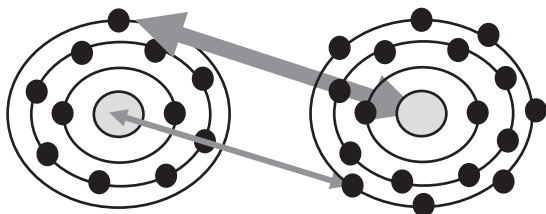


Sodium

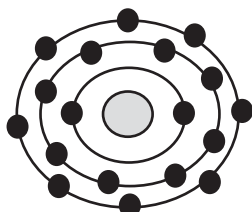


Chlorine

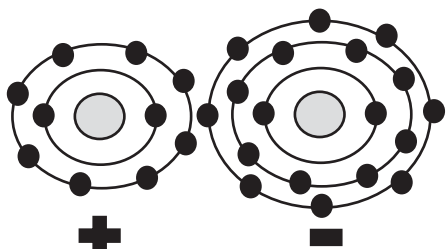
An atom of sodium and an atom of chlorine are near each other.



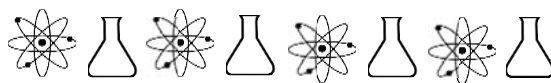
$+$   
Sodium ion



$-$   
Choloride ion



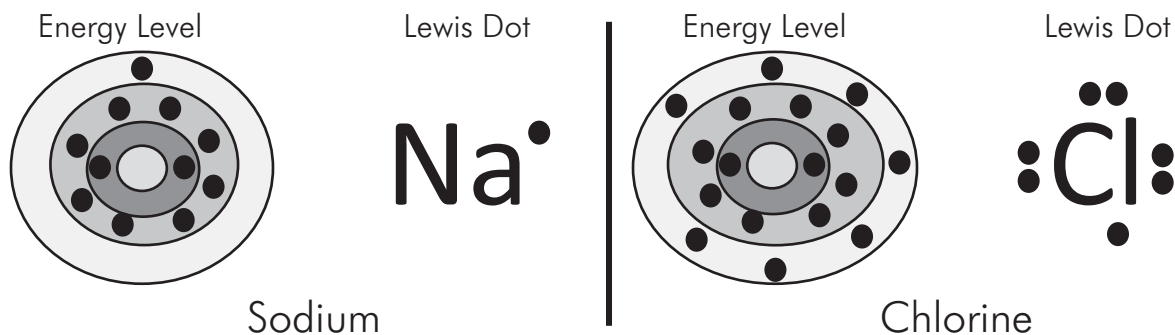
$+$   $-$   
Sodium Choloride (NaCl)



## Lewis Dot Diagrams

Answer the following questions about Lewis dot diagrams.

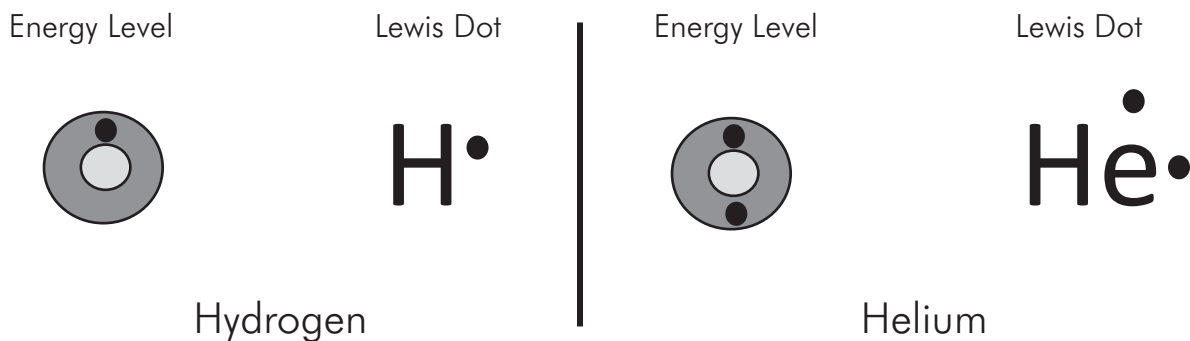
Compare the energy level diagrams to the Lewis dot diagrams.



What do you notice about the dots in each diagram? \_\_\_\_\_

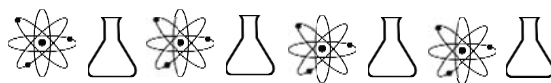
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Why are the number of dots associated with hydrogen and helium the same on each type of diagram? \_\_\_\_\_

(continued on next page)



Compare the energy level diagram for a covalent bond in the hydrogen molecule  $H_2$  with the Lewis dot diagram of the same bond.

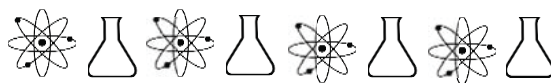


What do the two dots represent between the Hs? \_\_\_\_\_

What do the two lines represent? \_\_\_\_\_

Draw a Lewis dot diagram for the covalent bond of two hydrogen atoms to one oxygen atom in a water molecule. Use dots in the first diagram and lines in the second.





# Force

For the following pictures, tell whether the force at work is a push or a pull.



\_\_\_\_\_

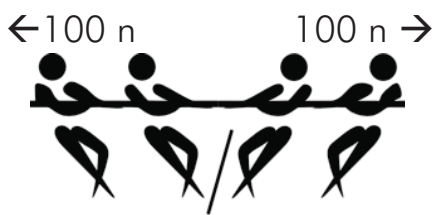


\_\_\_\_\_



\_\_\_\_\_

Circle the answer that fits with each picture.



The forces shown are \_\_\_\_\_ forces.

pushing      pulling

pushing      pulling

The forces shown are \_\_\_\_\_.

working together      opposite

working together      opposite

The forces are \_\_\_\_\_.

equal      not equal

equal      not equal

The forces \_\_\_\_\_ balance each other.

do      do not

do      do not

The resultant force is \_\_\_\_\_.

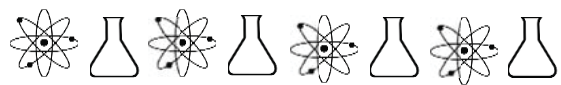
100 n left      100 n right      zero

100 n left      100 n right      zero

There \_\_\_\_\_ motion.

is      is not

is      is not

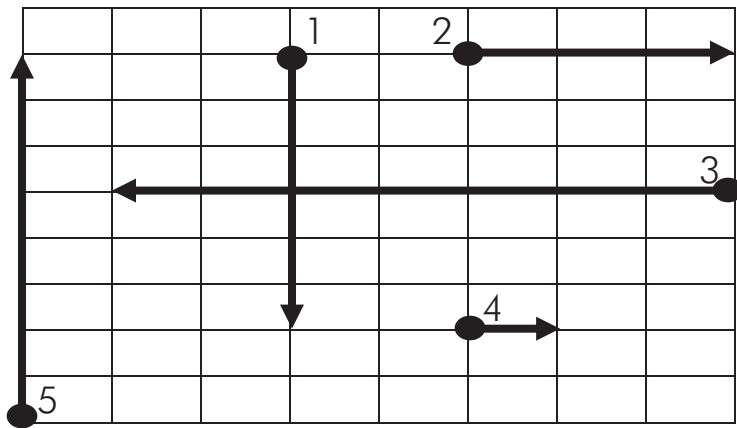


# Force

Sometimes force is shown as a **vector**. The dot shows where the force begins. The length shows the amount of force. The arrow shows the direction of the force. This vector shows a force of 3 n to the right.

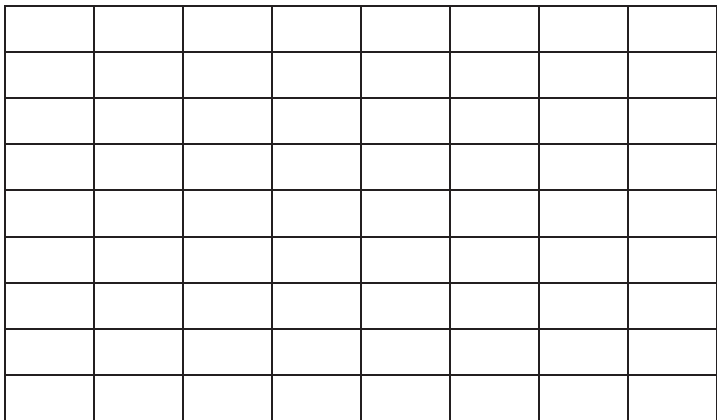


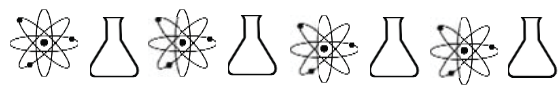
Fill in the chart with the information about the vectors below. Each square is 1 n.



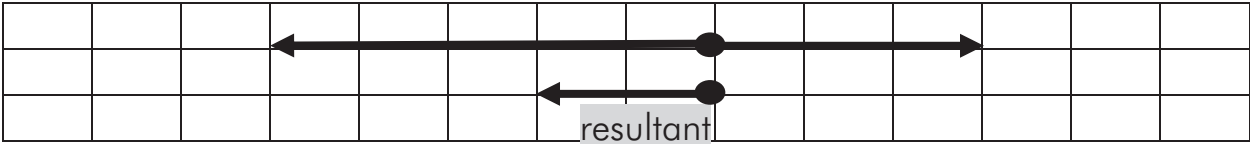
|   | Force | Direction |
|---|-------|-----------|
| 1 |       |           |
| 2 |       |           |
| 3 |       |           |
| 4 |       |           |
| 5 |       |           |

Draw the following vectors on the grid below. 1) 7 n right; 2) 3 n up; 3) 4 n down; 4) 6 n left; 5) 1 n down.

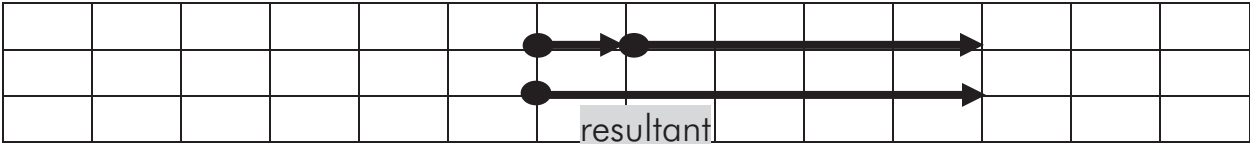




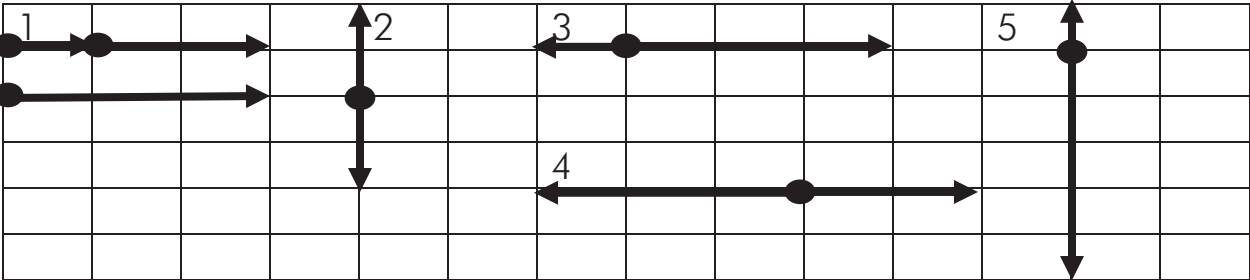
Here are two more examples of vectors showing force. The first chart shows two forces acting in opposite directions. One force is 5 n to the left. One force is 3 n to the right. The resultant force is 2 n to the left as shown.



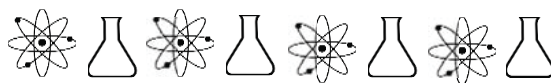
The second chart shows two forces acting in the same direction. One force is 1 n to the right. One force is 4 n to the right. The resultant force is 5 n to the right as shown.



Draw the resultant vector for each set of vectors below. Then fill in the chart for each set. The first one is done for you.



|   | Original forces      | Resultant force |
|---|----------------------|-----------------|
| 1 | 1 n right, 2 n right | 3 n right       |
| 2 |                      |                 |
| 3 |                      |                 |
| 4 |                      |                 |
| 5 |                      |                 |



## Newton's Laws of Motion

Write about Newton's three Laws of Motion.

1<sup>st</sup> Law:

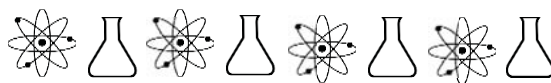
Inertia

2<sup>nd</sup> Law:

Acceleration

3<sup>rd</sup> Law:

Action/Reaction



## Newton's Laws of Motion

Write about your demonstration of each law on the lines.

### 1<sup>st</sup> Law: Inertia

An object in motion tends to stay in motion; an object at rest tends to stay at rest.

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### 2<sup>nd</sup> Law: Acceleration

The acceleration of an object is directly related to the force applied and inversely related to the object's mass ( $F=MA$ ).

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### 3<sup>rd</sup> Law: Action/Reaction

For every action there is an equal and opposite reaction.

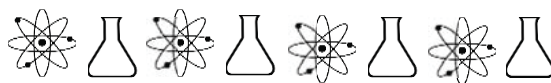
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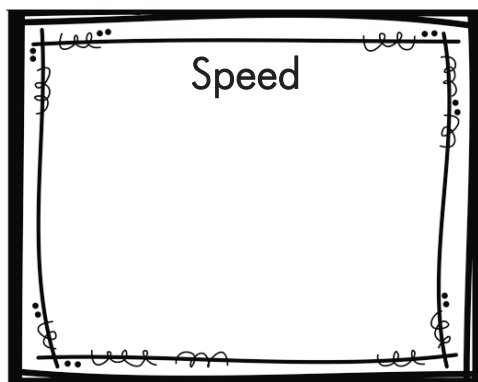
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## Vocabulary

Fill in the definition for each word, draw a picture of it, and tell what it reminds you of.

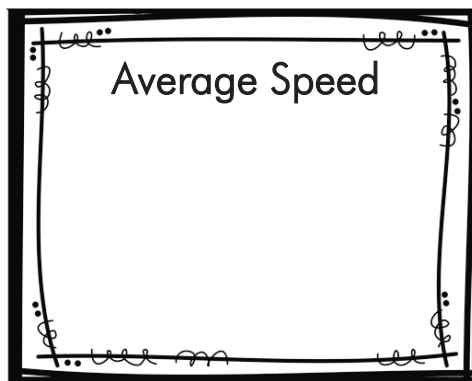


Definition \_\_\_\_\_

Reminds me of \_\_\_\_\_

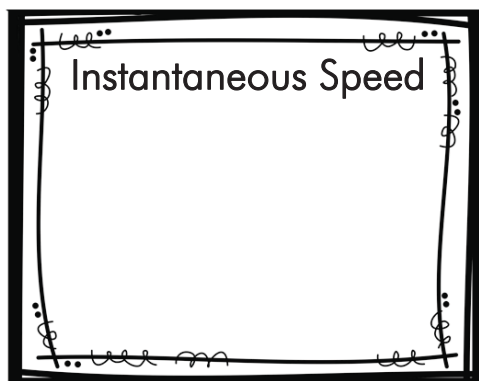
Definition \_\_\_\_\_

Reminds me of \_\_\_\_\_



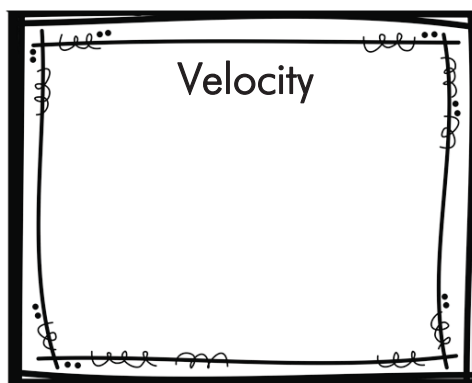
Definition \_\_\_\_\_

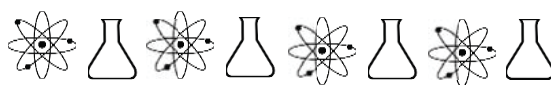
Reminds me of \_\_\_\_\_



Definition \_\_\_\_\_

Reminds me of \_\_\_\_\_





## Newton's Laws of Motion

For each given scenario, write in the blank whether it illustrates Newton's first, second, or third Law of Motion.

1<sup>st</sup> Law: Inertia

2<sup>nd</sup> Law: Acceleration

3<sup>rd</sup> Law: Action/Reaction

My family went on a vacation. We strapped our luggage to the top of the van. One suitcase apparently wasn't under the strap, and the first time my dad hit the brakes hard, the suitcase went flying forward and spilled clothes all over the highway!

\_\_\_\_\_

A bird was flapping his wings. Each time it pushed its wings down, the bird would go up higher in the air.

\_\_\_\_\_

William was riding a high speed roller coaster that took a banked turn to the right, and he ended up with a bruise on his left shoulder.

\_\_\_\_\_

My brother was lifting a box labeled "books." He didn't know my mom had already emptied the box, so he heaved on it, and it went flying through the air. We all had a good laugh.

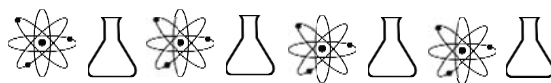
\_\_\_\_\_

Jaylen was rowing a canoe. Every time she pushed the oar backward, the boat would propel forward.

\_\_\_\_\_

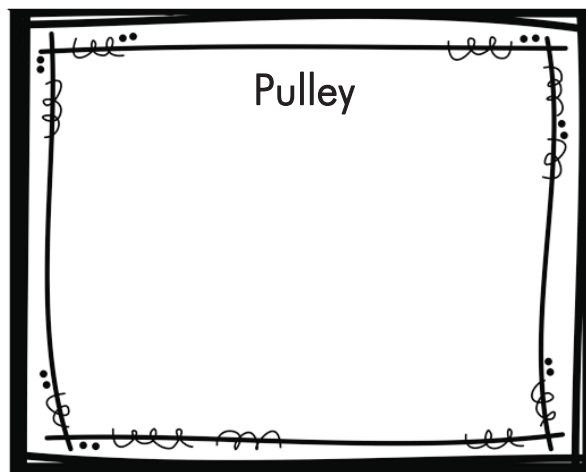
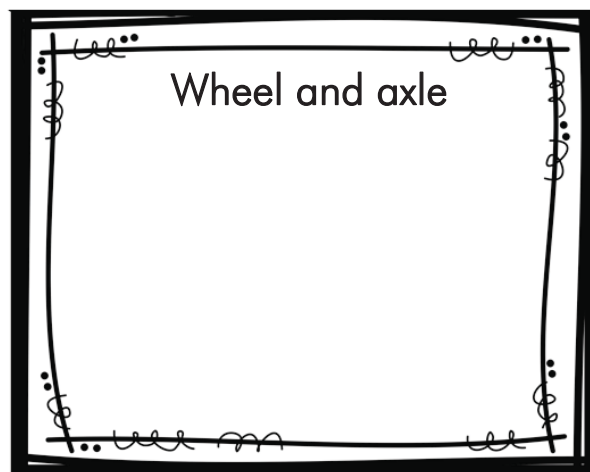
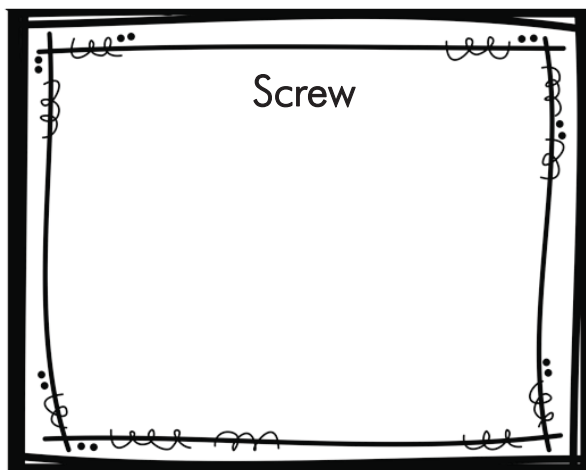
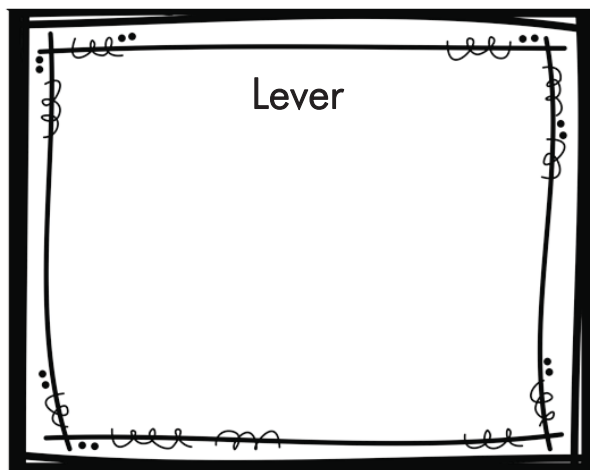
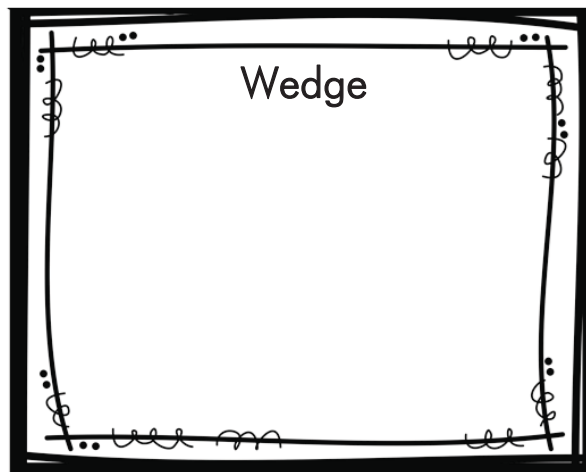
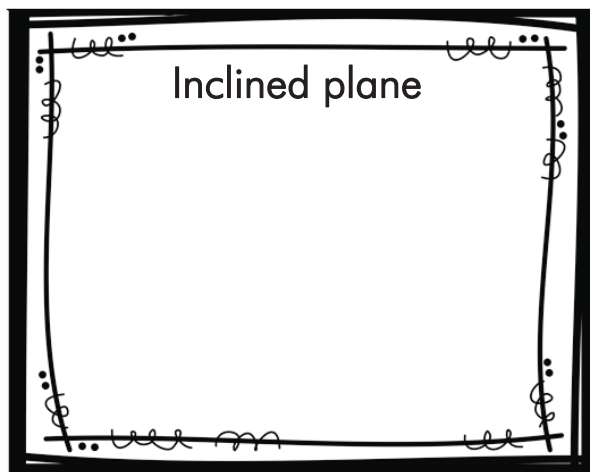
Connor was playing baseball in his yard. He noticed that no matter how hard he swung, he couldn't hit the real baseball as far as he could hit the foam one.

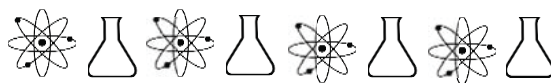
\_\_\_\_\_



## Simple Machines

Use this page to draw examples of these simple machines as they are assigned.





## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

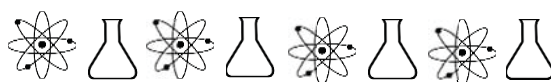
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

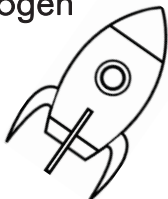
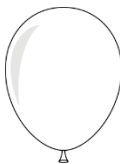
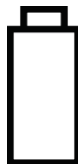





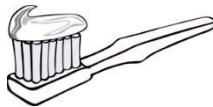
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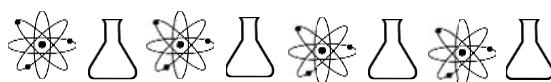


## Element Go Fish


Carefully tear out these pages and cut out the cards (there are 3 sets of 18 cards). Use them to play a game of element "Go Fish." Ask any information on the card to learn more about the elements as you play. You need 3 cards for a set.

|   |  |   |
|---|--|---|
| <div>H1</div> <div>Hydrogen</div> <div></div> <div><ul style="list-style-type: none"><li>- No neutrons</li><li>- Most common element</li><li>- Used in rocket fuel</li></ul></div> | <div>He2</div> <div>Helium</div> <div></div> <div><ul style="list-style-type: none"><li>- Used in balloons, blimps, and scuba gear</li><li>- Lighter than oxygen</li></ul></div>                  | <div>Li3</div> <div>Lithium</div> <div></div> <div><ul style="list-style-type: none"><li>- Used in batteries</li><li>- Never found in nature outside of a compound</li></ul></div>         |
| <div>Be4</div> <div>Beryllium</div> <div></div> <div><ul style="list-style-type: none"><li>- Found in emeralds</li><li>- One of the lightest metals</li></ul></div>              | <div>B5</div> <div>Boron</div> <div></div> <div><ul style="list-style-type: none"><li>- Used in sports gear</li><li>- Used in heat-resistant glass and nuclear plants</li></ul></div>           | <div>C6</div> <div>Carbon</div> <div></div> <div><ul style="list-style-type: none"><li>- Basic element of life</li><li>- Coal, diamonds, and plastics are made of carbon</li></ul></div> |
| <div>N7</div> <div>Nitrogen</div> <div></div> <div><ul style="list-style-type: none"><li>- Most plentiful gas in the atmosphere</li><li>- Used in explosives</li></ul></div>     | <div>O8</div> <div>Oxygen</div> <div></div> <div><ul style="list-style-type: none"><li>- Necessary for breathing</li><li>- Found in air and water</li><li>- Used for combustion</li></ul></div> | <div>F9</div> <div>Fluorine</div> <div></div> <div><ul style="list-style-type: none"><li>- Used as a coolant</li><li>- Used in toothpaste to fight cavities</li></ul></div>              |

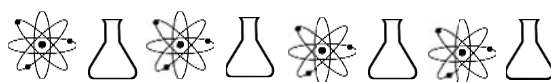
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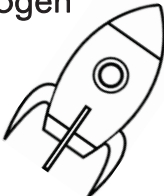
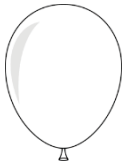






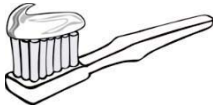
# Element Go Fish

|  |  |   |
|--|--|---|
| <p>Ne 10</p> <p>Neon</p> <p>OPEN</p> <ul style="list-style-type: none"> <li>- Used in lights, lasers</li> <li>- Never bonds to other elements</li> </ul>   | <p>Na 11</p> <p>Sodium</p>  <ul style="list-style-type: none"> <li>- Bonds with chlorine to make table salt</li> <li>- Never found alone</li> </ul>         | <p>Mg 12</p> <p>Magnesium</p>  <ul style="list-style-type: none"> <li>- Necessary for plants and animals</li> <li>- Found in sparklers</li> </ul>              |
| <p>Al 13</p> <p>Aluminum</p>  <ul style="list-style-type: none"> <li>- Used in airplanes for its weight and strength</li> <li>- Used in foil, cables</li> </ul> | <p>Si 14</p> <p>Silicon</p>  <ul style="list-style-type: none"> <li>- Found in sand, stone, and soil</li> <li>- Used in computer chips</li> </ul>         | <p>P 15</p> <p>Phosphorus</p>  <ul style="list-style-type: none"> <li>- Used in matches, detergents, fertilizers</li> <li>- Found in bones</li> </ul>         |
| <p>S 16</p> <p>Sulfur</p>  <ul style="list-style-type: none"> <li>- Found in matches, fireworks, egg yolks</li> <li>- Creates air pollution</li> </ul>          | <p>Cl 17</p> <p>Chlorine</p>  <ul style="list-style-type: none"> <li>- Combines with hydrogen to digest food</li> <li>- Used in swimming pools</li> </ul> | <p>Ar 18</p> <p>Argon</p>  <ul style="list-style-type: none"> <li>- Found in light bulbs</li> <li>- Does not react or bond with any other element</li> </ul> |

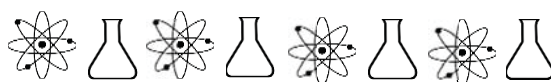
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## Element Go Fish

|   |  |   |
|---|--|---|
| <p><b>H</b> 1</p> <p>Hydrogen</p>  <ul style="list-style-type: none"><li>- No neutrons</li><li>- Most common element</li><li>- Used in rocket fuel</li></ul> | <p><b>He</b> 2</p> <p>Helium</p>  <ul style="list-style-type: none"><li>- Used in balloons, blimps, and scuba gear</li><li>- Lighter than oxygen</li></ul>                  | <p><b>Li</b> 3</p> <p>Lithium</p>  <ul style="list-style-type: none"><li>- Used in batteries</li><li>- Never found in nature outside of a compound</li></ul>         |
| <p><b>Be</b> 4</p> <p>Beryllium</p>  <ul style="list-style-type: none"><li>- Found in emeralds</li><li>- One of the lightest metals</li></ul>              | <p><b>B</b> 5</p> <p>Boron</p>  <ul style="list-style-type: none"><li>- Used in sports gear</li><li>- Used in heat-resistant glass and nuclear plants</li></ul>            | <p><b>C</b> 6</p> <p>Carbon</p>  <ul style="list-style-type: none"><li>- Basic element of life</li><li>- Coal, diamonds, and plastics are made of carbon</li></ul> |
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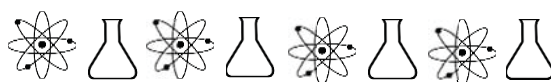


# Element Go Fish

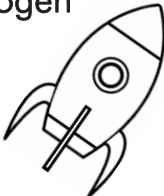
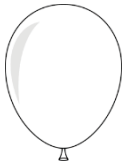






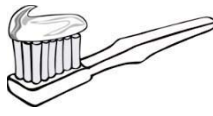
|  |  |   |
|--|--|---|
| <p>Ne 10</p> <p>Neon</p>  <ul style="list-style-type: none"> <li>- Used in lights, lasers</li> <li>- Never bonds to other elements</li> </ul>                     | <p>Na 11</p> <p>Sodium</p>  <ul style="list-style-type: none"> <li>- Bonds with chlorine to make table salt</li> <li>- Never found alone</li> </ul>         | <p>Mg 12</p> <p>Magnesium</p>  <ul style="list-style-type: none"> <li>- Necessary for plants and animals</li> <li>- Found in sparklers</li> </ul>              |
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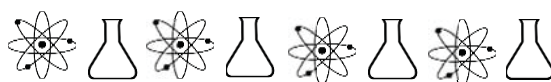




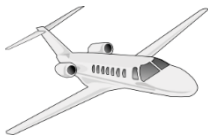
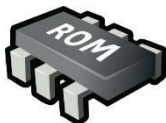
## Element Go Fish

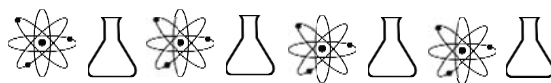
|   |  |   |
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## Experiment Worksheet

Fill out this worksheet as you work through the experiment.

Question: \_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Materials: \_\_\_\_\_

\_\_\_\_\_

Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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Observations/data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

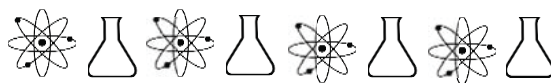
\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Research Notes

Use these pages to make notes on your topic.

Topic: \_\_\_\_\_

Resource 1: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Resource 2: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Resource 3: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

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Resource 4: \_\_\_\_\_

Info: \_\_\_\_\_

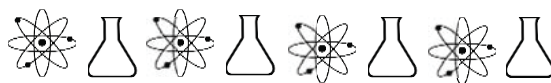
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Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_



Resource 5: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Resource 6: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

Resource 7: \_\_\_\_\_

Info: \_\_\_\_\_

Info: \_\_\_\_\_

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Resource 8: \_\_\_\_\_

Info: \_\_\_\_\_

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Resource 9: \_\_\_\_\_

Info: \_\_\_\_\_

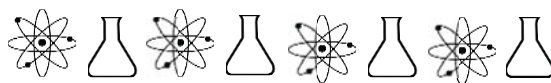
Info: \_\_\_\_\_

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Info: \_\_\_\_\_



## Science Report Checklist

Use this checklist to help you as you finish up your science project. Aim for a checkmark in each box.

### Research

- ☐ Facts
- ☐ Sources
- ☐ Bibliography

### Project

- ☐ 3D
- ☐ Neat
- ☐ Teaches all about your topic; shows off all you learned
- ☐ Self-explanatory: someone could look at it and understand what it's all about without you explaining it to them
- ☐ Bibliography displayed with project

### Experiment

- ☐ Demonstrates your topic
- ☐ Neatly written up with all parts of the experiment worksheet
- ☐ Able to be done over and over with the same results

### Demonstration

- ☐ Clearly state what your project is about
- ☐ Tell about what they will learn from your project
- ☐ Explain how the experiment relates to your topic
- ☐ Demonstrate the experiment
- ☐ State your conclusion
- ☐ Ask if anyone has questions

