

Introduction to Chemistry

7th Grade Science

Ch 1 - Lessons 1 & 2: Read pages 4-13 to answer these questions.

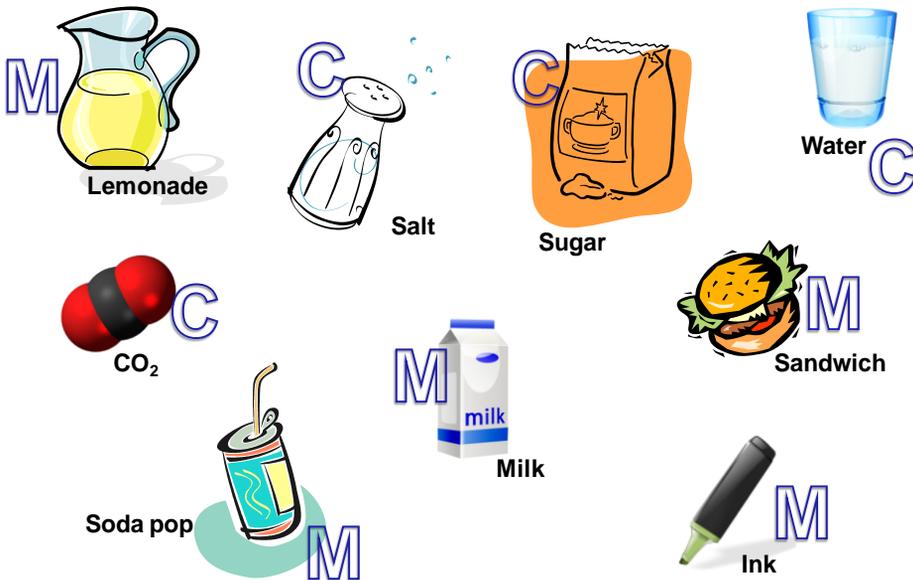
1. Anything that has mass and takes up space is called **MATTER**.
2. The study of matter and how it changes is called **CHEMISTRY**.
3. **PHYSICAL** properties are those that can be observed without changing a substance chemically, while **CHEMICAL** properties describes a substance's ability to change into another substance.

Add to notes - Properties = Description

4. A pure substance that cannot be broken down into any other substances are called **ELEMENTS**, which are represented by one- or two-letter **SYMBOLS**.

5. ATOMS are the basic particles from which all elements are made and form chemical BONDS when they join together.
6. A COMPOUND is a substance made of two or more elements that are chemically combined. They are represented by chemical FORMULAS.
7. A MIXTURE is two or more substances that are mixed together, but not chemically combined.

Classify each item as a **COMPOUND** or a **MIXTURE**.



Mystery Matter - Each white bag has some type of matter in it.



- (1) Number from #1-12 on the page (under your notes)
- (2) You will have 1 minute to examine each bag. You cannot open or rip the bag.
- (3) Work with your partner to write down at least 3 physical properties of the matter. If you think you know what it is, write it down on your paper.

Work quietly and do not give away the answers to other groups around you!

We will go over the answers when everyone is done.

8. What are the four ways to separate a mixture into its parts?

Distillation

Evaporation

Filtration

Magnetic attraction

Which diagram goes with each word above?

Separating Mixtures Since the substances in a mixture keep their properties, you can use those properties to separate a mixture into its parts. Methods used to separate the parts of a mixture, including distillation, evaporation, filtration, and magnetic attraction, are shown in Figure 4.

FIGURE 4
Separating a Mixture
Different methods can be used to separate mixtures. **Identify** Name the type of separation method being used in each photo.



Ch 1 - Lesson 3: Read pages 14-19 to complete this section.

1. What is the difference between mass and weight?

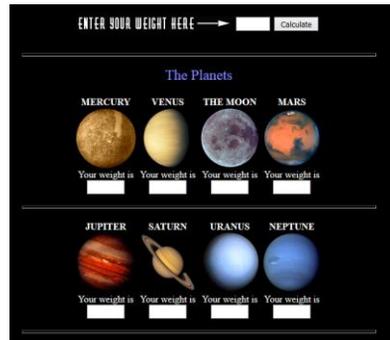
Mass is the amount of matter in an object, while weight is a measure of the force of gravity on you. Your weight will change as gravity changes, but mass remains the same.

Take a guess ...

Where would you weigh the most:
Earth or moon? On which planet
would you be the heaviest?

Click the picture to find out →

What is wrong with the statement:
“I need to lose weight”?



2. What do we call the amount of space an object takes up? **VOLUME**

3. The measure of the mass of a material in a given volume is called **DENSITY**.

4. An object with a density greater than 1.0 g/mL will **SINK** in water, while one with a density less than 1.0 g/mL will **FLOAT** in water.

5. Complete the Virtual Lab activity on page 19. Calculate the density for each rock.

Which rock is gold? _____
HINT: It has a density of 19.3 g/cm³

A
Mass = 108 g
Volume = 12 cm³
Density = _____

B
Mass = 126 g
Volume = 15 cm³
Density = _____

C
Mass = 386 g
Volume = 20 cm³
Density = _____

What terms do we know?

Vocabulary List

- | | | |
|---|---|---|
| <input type="checkbox"/> Acid | <input checked="" type="checkbox"/> Density | <input type="checkbox"/> Nucleus |
| <input checked="" type="checkbox"/> Atom | <input type="checkbox"/> Electron | <input type="checkbox"/> Period |
| <input type="checkbox"/> Atomic Mass | <input checked="" type="checkbox"/> Element | <input type="checkbox"/> Periodic Table ? |
| <input type="checkbox"/> Atomic Number | <input type="checkbox"/> Energy level | <input type="checkbox"/> Phase |
| <input type="checkbox"/> Base | <input type="checkbox"/> Evaporation ? | <input type="checkbox"/> Physical change |
| <input type="checkbox"/> Boiling | <input type="checkbox"/> Family | <input checked="" type="checkbox"/> Physical property |
| <input type="checkbox"/> Boyle's Law | <input type="checkbox"/> Freezing | <input type="checkbox"/> Proton |
| <input type="checkbox"/> Charles' Law | <input type="checkbox"/> Isotope | <input type="checkbox"/> Quark |
| <input type="checkbox"/> Chemical change | <input checked="" type="checkbox"/> Mass | <input type="checkbox"/> Solution |
| <input type="checkbox"/> Chemical equation | <input checked="" type="checkbox"/> Matter | <input type="checkbox"/> Sublimation |
| <input checked="" type="checkbox"/> Chemical formula | <input type="checkbox"/> Melting | <input type="checkbox"/> Vaporization |
| <input checked="" type="checkbox"/> Chemical property | <input type="checkbox"/> Metal | <input checked="" type="checkbox"/> Volume |
| <input checked="" type="checkbox"/> Chemical symbol | <input type="checkbox"/> Metalloid | <input checked="" type="checkbox"/> Weight |
| <input type="checkbox"/> Colloid | <input checked="" type="checkbox"/> Mixture | |
| <input checked="" type="checkbox"/> Compound | <input type="checkbox"/> Neutron | |
| <input type="checkbox"/> Condensation | <input type="checkbox"/> Nonmetal | |

Front = Term + Picture/Examples



Smallest part of an atom;
building blocks of matter

Back = Scientific Definition



Need help? Look in your notes/worksheets.
You can also go to mrstomm.com → 7th Science
and click *Quizlet Chemistry Unit Vocab*

Review & Reinforce
Quizlet - Chemistry Unit Vocab

Assignment: Finish the vocab cards for the words we checked and then do Part C notes! (Glue on pg ___ FAF)

Part C: Lesson 1.4 - Read pages 20-29 to answer these questions.

1. A physical change alters the form or appearance a change in FORM or APPEARANCE. Add to notes - Change in size, shape, or state
2. A change in matter that produces one or more new substances is a CHEMICAL change.
3. The law of conservation of mass states that matter is not created or destroyed during a chemical reaction. The atoms involved in the reaction are not LOST or GAINED, only REARRANGED.
4. Every CHANGE in matter includes a change in ENERGY, which is conserved in a chemical reaction and TRANSFORMED from one form to another.

5. **TEMPERATURE** is a measure of how hot or cold something is, while **THERMAL** energy is the total energy of the motion of the particles in an object.

6. What is the difference between endothermic and exothermic reactions? Give examples for each.

**Energy is absorbed during endothermic, such as when ice melts.
Energy is released during exothermic, such as when wood burns.**

7. What is chemical energy?

It is the energy stored in chemical bonds.

Add to notes -

Eating food – Food → Chemical energy

Burning fuels – Chemical energy → Thermal energy



Physical/Chemical Changes

Part A: Watch the Study Jams: Changes in Matter to answer these questions.

1. A physical change is a change when the **SIZE**, **SHAPE**, or **STATE** of matter changes.

2. Physical changes can be caused by **MOTION**, pressure, and **TEMPERATURE**, but it doesn't change the molecules that make up the substance.

3. In a **CHEMICAL** change, the molecules of matter are changed and usually cannot be reversed. Clues that it has occurred are a **GAS** forms, light or **HEAT** appears, or the **COLOR** changes.

Part B: Click "Test Yourself" to take the quiz and answer these questions.



Physical/Chemical Changes

Part B: Click "Test Yourself" to take the quiz and answer these questions.

When does a physical change occur?

What type of change can be reversed?

What could cause the molecules in matter to change?

What has likely happened when a substance changes color?

Stepping on a bag of potato chips would cause which type of change?

What is a clue that a chemical change has taken place?

What is the difference between a physical and chemical change?



Physical & Chemical Changes

Use your knowledge of physical and chemical changes to identify at least one way to change each substance.

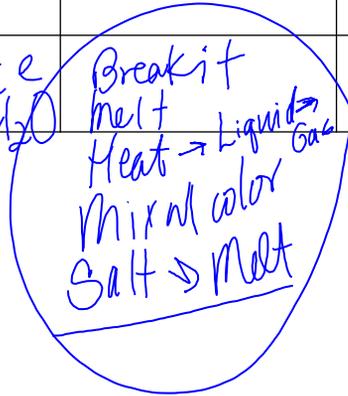
Substance	Physical Change	Chemical Change
Baking Soda	Food coloring Mix w/ H ₂ O	Vinegar-Bubbles
Rocks	Smash them Chop them Cut them Paint	CO ₂ react w/ HCl acid Acid rain
Wood	Chop it Paint/stain	Burn it
Apple	Cut it Cover w/ caramel	Brown → oxidation Eat it
Iron Nail	Pound into wood Bend it	Let it rust

Challenge: Think of a 3 other substances and challenge your classmates to come up with ways to change it physically and chemically. Write their responses in the space below.



Substance	Physical Change	Chemical Change
Brownie	Cut them Decorate them	Eat it Bake it
Ice H ₂ O	Break it melt Heat → Liquid → Gas	Break the bonds → H & O ?

Soap
Gas expands

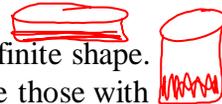


Part D: Lesson 2.1 - Read pages 40-55 to answer these questions.

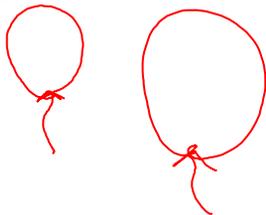
1. A **SOLID** has a definite shape and volume. They can be classified as **CRYSTALLINE** (made up of crystals) or **AMORPHOUS** (particles are not in a regular pattern.)



2. A **LIQUID** has a definite volume, but not a definite shape. Liquids with **HIGH** viscosity flow slowly, while those with **LOW** flow quickly.



3. A gas has neither definite **SHAPE** nor definite **VOLUME** as its particles fill all the **SPACE** available.



4. Write a description of each type of phase change and include specific examples.

Melting - **Solid (ice) → Liquid (water)**



Freezing - **Liquid (water) → Solid (ice)**



Vaporization - **Liquid (water) → Gas (steam or water vapor)**



Sublimation - **Solid (ice) ↔ Gas (steam or water vapor)**



Condensation - **Gas (steam or water vapor) → Liquid (water)**



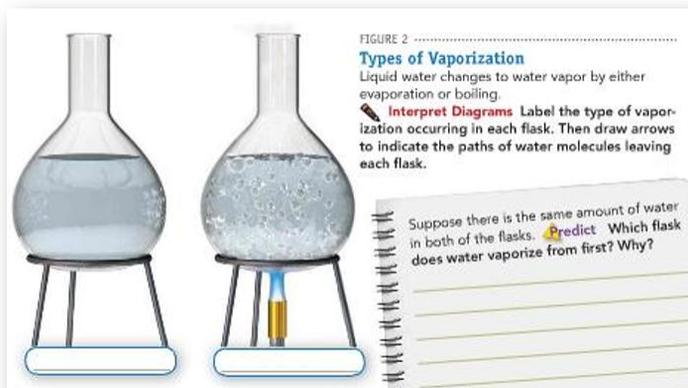
ADD TO NOTES → Identify using ↑ or ↓ to show if the phase changes involves a gain or loss of thermal energy.

Write down three things you learned about water as you watch the video on the page under your notes →



5. What is the difference between evaporation and boiling?

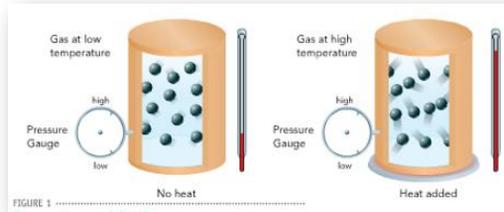
Vaporization at the surface of a liquid is evaporation, while boiling is when it occurs at all levels in a liquid.



Glue the Part E note worksheet on page ____ and complete for class tomorrow.

Part E: Lesson 2.3 - Read pages 56-61 to answer these questions.

1. If you increase the **TEMPERATURE** of the gas at a constant volume, its particles will move **FASTER** and collide with the walls of the container with greater **FORCE**.



2. Explain how temperature and pressure relate to each other using a car's tire.

What did you write?

3. Complete these statements about Charles' Law:

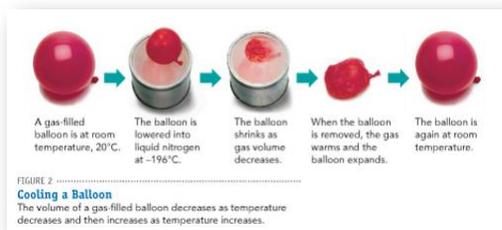
When the temperature of a gas (at a constant pressure) is increased, its volume will **INCREASE**.

If the temperature is decreased, its volume will **DECREASE**.

ADD TO NOTES:

The variables are **DIRECTLY** proportional to **As one ↑, the other ↑.**
As one ↓, the other ↓.

Give an example. **THE GAS INSIDE A BALLOON EXPANDS WHEN IT HEATS UP AND DECREASES WHEN IT COOLS DOWN.**



Do you remember this from last year?

4. Complete these statements about Boyle's Law:

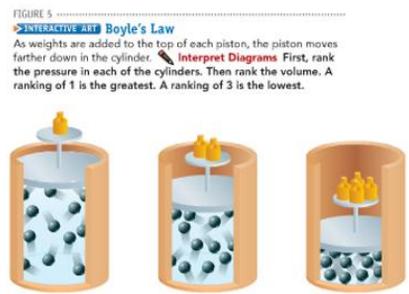
When the pressure of a gas (at a constant temperature) is increased, the volume of gas **DECREASES**. When the pressure is decreased, the volume **INCREASES**.

When the volume of a gas (at a constant temperature) is increased, the pressure of the gas **DECREASES**. When the pressure **INCREASES**.

The variables are **INVERSELY** proportional.

Give an example.

THE WEIGHT IN A PISTON MOVES TO INCREASE AND DECREASE THE SPACE (VOLUME) AVAILABLE, WHICH AFFECTS THE PRESSURE OF THE GAS (AIR)



ADD TO NOTES:

As one ↑, the other ↓.

As one ↓, the other ↑.

Boyle's Law Lab – Glue the worksheet on page ____ (4C)

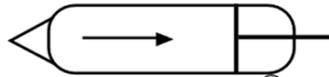
(1) What is a marshmallow? Describe its physical properties & composition.

According to **Merriam-Webster's Collegiate Dictionary**, a marshmallow is a confection made from the root of the marshmallow or from corn syrup, sugar, albumen (egg whites), and gelatin beaten to a light spongy consistency.

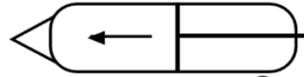
Homemade Marshmallows
→



(2) How are the volume and pressure of a gas related if the temperature is constant? Draw arrows in the circles to show the relationship.



If the volume of a gas ,
then the pressure .



If the volume of a gas ,
then the pressure .

(3) What do you think will happen to the marshmallow in each situation?

When the volume of the air (space) is increased, the marshmallow will _____.

When the volume of the air (space) is decreased, the marshmallow will _____.

Directions:

1st - Get a syringe and 3 marshmallows from the teacher.

2nd - Pull the plunger out of the syringe and place the marshmallows inside the tube.

3rd - Replace the plunger, but keep it at end of the syringe.

4th - Place the end of the plunger on the table and put your fingers over the end of the syringe.

5th - Push down slowly to decrease the volume. What do you observe?

DO NOT ALLOW THE PLUNGER TO SQUISH THE MARSHALLOWS IN THE END OF THE SYRINGE!

6th - Stop pushing on the plunger and remove your finger from the end. What do you observe?

7th – Push the plunger as far into the syringe as you can without squishing the marshmallows into the tip.

8th – Put your finger on the tip of the syringe and pull the plunger slowly out of the end to increase the volume of air. What do you observe?

TRY NOT TO PULL THE PLUNGER ALL THE WAY OUT OF THE SYRINGE SO YOU DON'T DAMAGE THE SEAL.

(4) Follow your teacher's directions to complete the lab. Fill in the blanks to show your observations.

Where do these words go?

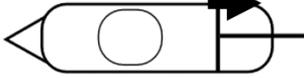
High →

Low

Shrink

Expand

Volume ↑



Air inside the syringe is under
___ pressure, causing the
marshmallow to _____.

Volume ↓



Air inside the syringe is under
___ pressure, causing the
marshmallow to _____.

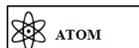
(5) Write a summary of this activity on your notebook page that includes all of these terms: volume, pressure, temperature, and marshmallow.

THINGS TO DO ...

Create cards for the words marked with a RED checkmark.

Remember to write the term and draw a picture or example on the front. Write a good definition on the back.

Front = Term + Picture/Examples

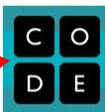


Smallest part of an atom; building blocks of matter

Back = Scientific Definition

Finish any cards you haven't done (red or black checkmarks) and finish up any note pages that are not done!

Done with everything?
Go to the school website,
click Student Zone, and
then click the CODE logo
to begin!



Vocabulary List

- | | | |
|---|---|---|
| <input type="checkbox"/> Acid | <input checked="" type="checkbox"/> Density | <input type="checkbox"/> Nucleus |
| <input checked="" type="checkbox"/> Atom | <input type="checkbox"/> Electron | <input type="checkbox"/> Period |
| <input type="checkbox"/> Atomic Mass | <input checked="" type="checkbox"/> Element | <input type="checkbox"/> Periodic Table |
| <input type="checkbox"/> Atomic Number | <input type="checkbox"/> Energy level | <input checked="" type="checkbox"/> Phase |
| <input type="checkbox"/> Base | <input checked="" type="checkbox"/> Evaporation | <input checked="" type="checkbox"/> Physical change |
| <input checked="" type="checkbox"/> Boiling | <input type="checkbox"/> Family | <input checked="" type="checkbox"/> Physical property |
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| <input checked="" type="checkbox"/> Chemical formula | <input checked="" type="checkbox"/> Melting | <input checked="" type="checkbox"/> Vaporization |
| <input checked="" type="checkbox"/> Chemical property | <input type="checkbox"/> Metal | <input checked="" type="checkbox"/> Volume |
| <input checked="" type="checkbox"/> Chemical symbol | <input type="checkbox"/> Metalloid | <input checked="" type="checkbox"/> Weight |
| <input checked="" type="checkbox"/> Colloid | <input checked="" type="checkbox"/> Mixture | |
| <input checked="" type="checkbox"/> Compound | <input type="checkbox"/> Neutron | |
| <input checked="" type="checkbox"/> Condensation | <input type="checkbox"/> Nonmetal | |

Group 1

Group 2

Group 3

Review & Reinforce

Quizlet - Chemistry Unit Vocab

Look on mrstomm.com → 7th Science to find this list & a list of vocabulary for this unit!

Need more cards? Check the counter in Mr. B's room!