

CHAPTER 2

Lesson 1: Matter and Its Properties

Standards

- 7.PS1.5 - Use the periodic table as a model to analyze and interpret evidence relating to physical and chemical properties to identify a sample of matter.

Essential Questions

- How do particles move in solids, liquids, and gases?
- How are physical properties different from chemical properties?
- How are properties used to identify a substance?

I can...

- Use the periodic table as a model to analyze and interpret evidence relating to physical and chemical properties to identify a sample of matter.

Vocabulary

- Chemical property - ability or inability of a substance to combine with or change into one or more new substances
- Density - mass per unit volume of a substance
- Gas - state of matter with no definite shape or volume

Vocabulary

- Liquid - state of matter with definite volume but not definite shape
- Mass - amount of matter in an object
- Matter - anything that has mass and takes up space

Vocabulary

- Physical property - any characteristic of a material that you can observe without changing the identity of the material
- Solid - state of matter with definite shape and volume
- Solubility - ability of one material to dissolve in another

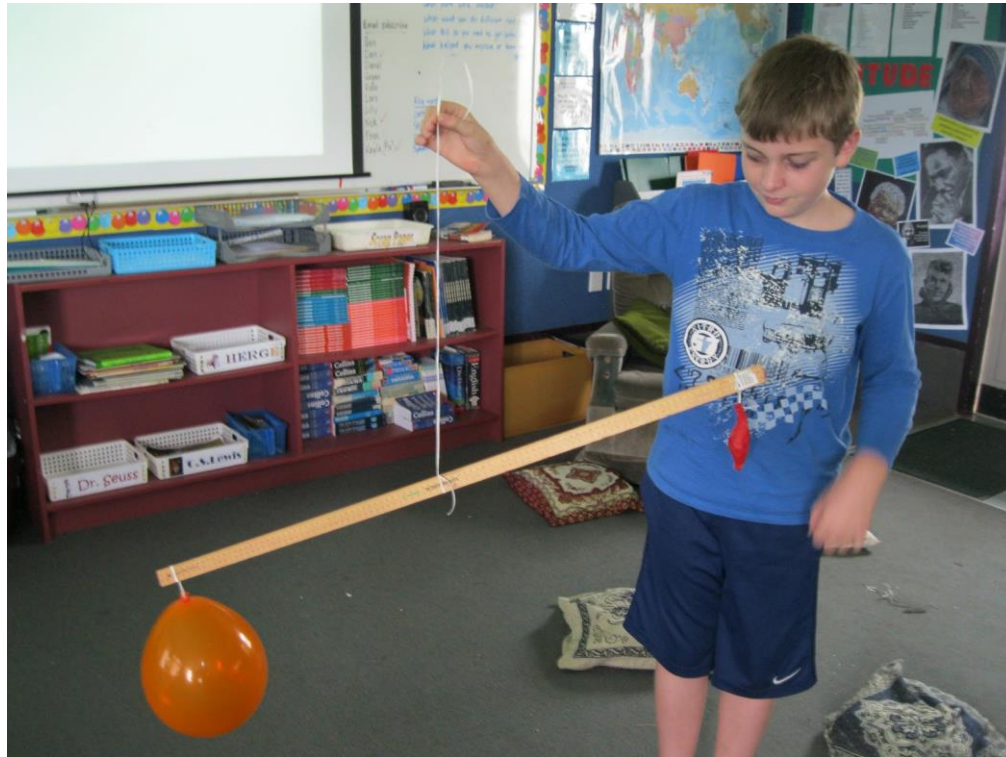
Vocabulary

- State - condition or physical property of matter
- Volume - amount of space a material occupies

What are the properties?

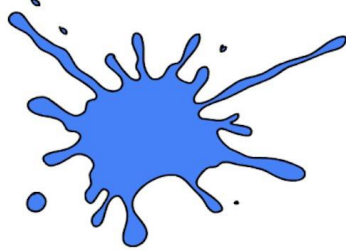
- What are the properties of this ball?
- Raise your hand please!

What is Matter?



- Anything that takes up space and has mass is matter. (A1)
- Air is considered matter because it takes up space and has mass.
- Light from the sun is not matter, although you can see it. (A2)
- Remember that sounds, forces, and energy are also not matter because they do not have mass or take up space.

States of **MATTER**



- One useful way to describe a substance is its state of matter.
- Does the object have a definite shape and volume?
- The amount of space a material occupies is its volume. (B1)

States of

Table 1 Solids, Liquids, and Gases

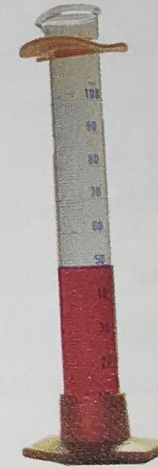
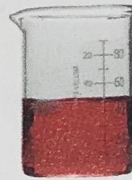
Solid

Solids, such as rocks, do not change shape or volume regardless of whether they are inside or outside a container.



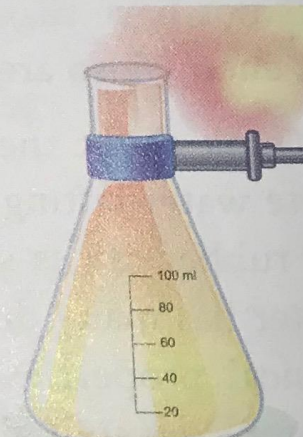
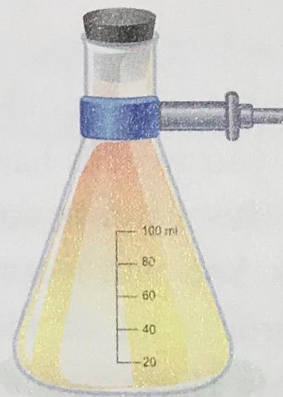
Liquid

A liquid, such as fruit juice, changes shape if it is moved from one container to another. Its volume does not change.



Gas

A gas, such as nitrogen dioxide, changes both shape and volume if it is moved from one container to another. If the container is not closed, the gas spreads out of the container.



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States of Matter

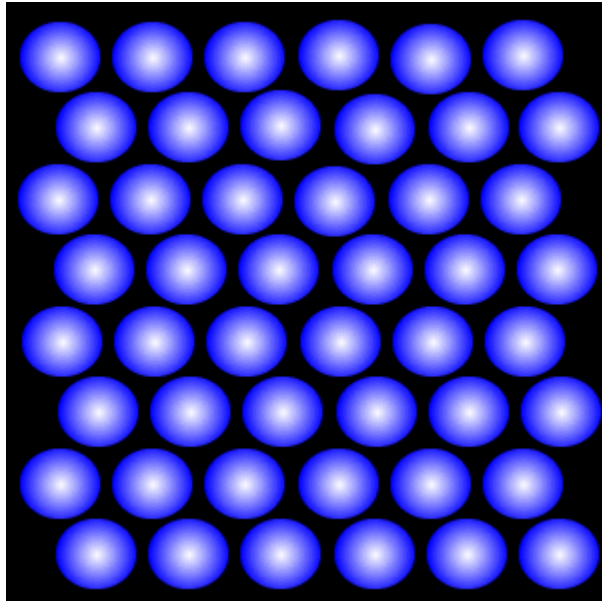


States of Matter

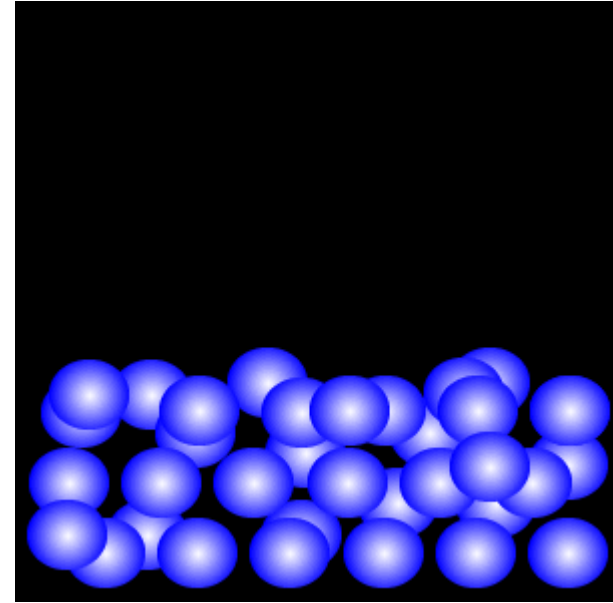
- All matter is formed of tiny particles that are constantly moving. (B5)
- The particles in a solid stay in one place but move quickly back and forth in all directions. (B5a)
- The particles in a liquid can slide past one another. (B5b)
- The particles in a gas move freely. (B5c)
- The particles in matter attract one another. (B6)

States of Matter

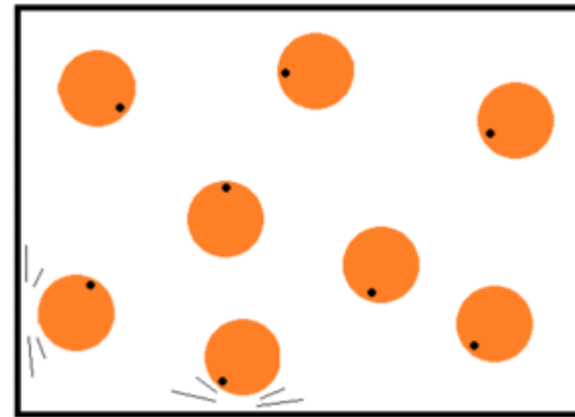
Solid



Liquid



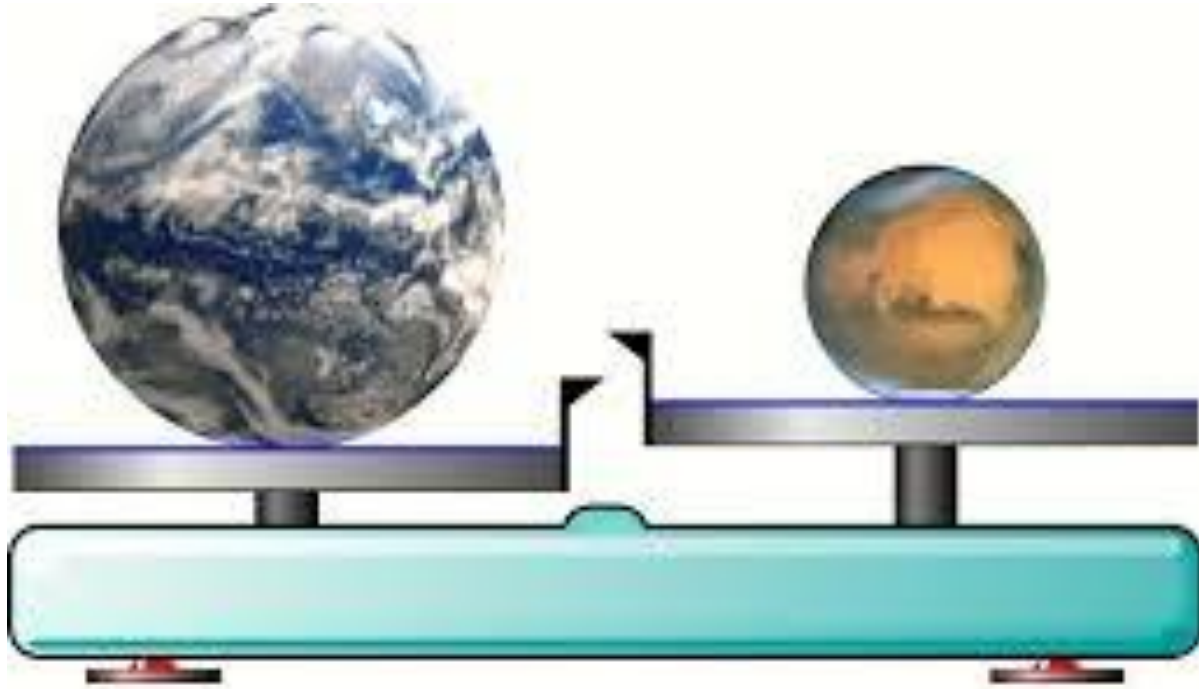
Gas



States of Matter



What are Physical Properties?



The Earth has 9.3 times more mass than Mars

- A physical property is any characteristic of a material that you can observe without changing the identity of the material. (C1)
- One physical property is mass, which is the amount of matter in an object. (C2)

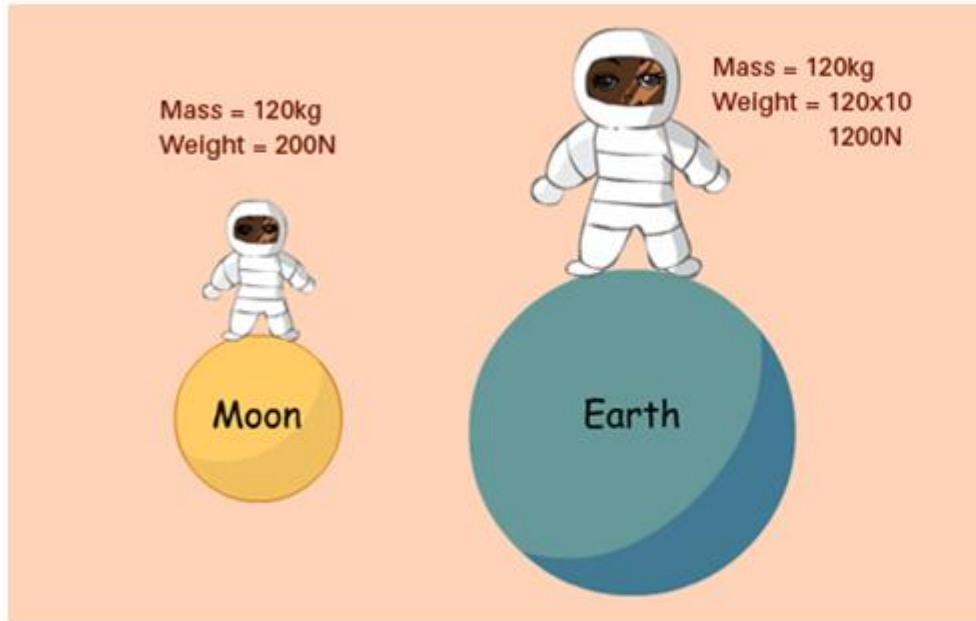
WHAT IS THE DIFFERENCE BETWEEN MASS AND WEIGHT?



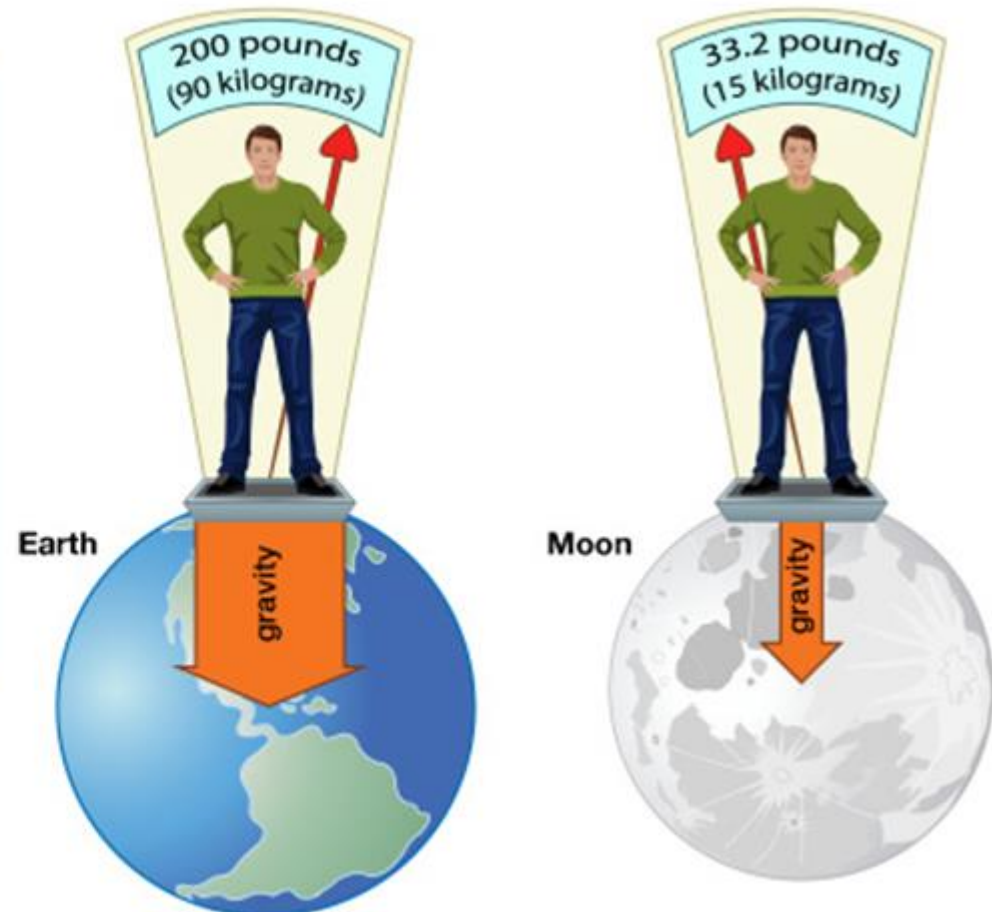
HEIGHT
06 00
FEET INCHES
WEIGHT
250
POUNDS
BMI
33.9



What are Physical Properties?



Effect of gravity on Earth versus on the Moon



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Images of the Moon and Earth are not to scale

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What are Physical Properties?

The ability of one material to dissolve in another is solubility. (C7)

The melting point is the temperature at which a solid changes to a liquid. (C8)

The boiling point is the temperature at which a liquid changes to a gas. (C9)

Magnetism is a property that allows some materials to attract certain metals. (C10)

What are chemical properties?

- A chemical property is a characteristic of a material that you can observe as it changes to a different substance. (D1)
- Flammability is the ability of a material to burn easily. (D2)
- Iron changes to rust when it reacts with water and oxygen in the air. (D3)



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WHAT'S MY PROPERTY?

KIDS

Identifying Matter Using Physical Properties

- Melting and boiling points do not depend on the amount of the material, so they are good properties for identifying unknown substances. (E1)
- Sometimes you have to observe more than one property to identify an unknown material. (E2)

Sorting Materials Using Properties

- Physical properties and chemical properties are useful for sorting materials. (F1)
- An example of a chemical property is the tendency for milk or yogurt to spoil. (F2)

Separating Mixtures Using Physical Properties

- You can separate mixed materials by melting or boiling the mixture. (G1)
- You can separate some mixed materials using a magnet to attract some materials and not others. (G2)

CHAPTER 2

Lesson 2: Matter and Its Changes

Standards

- 7.PS1.5 - Use the periodic table as a model to analyze and interpret evidence relating to physical and chemical properties to identify a sample of matter.

Essential Questions

- How are physical changes different from chemical changes?
- How do physical and chemical changes affect mass?

Vocabulary

- Chemical property - ability or inability of a substance to combine with or change into one or more new substances
- Density - mass per unit volume of a substance
- Gas - state of matter with no definite shape or volume

Vocabulary

- Liquid - state of matter with definite volume but not definite shape
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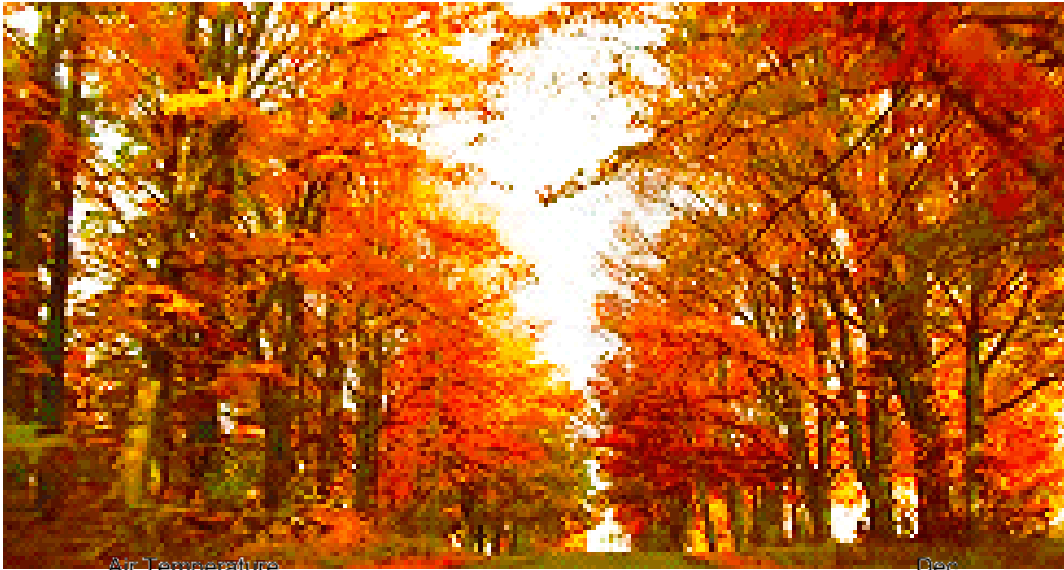
Vocabulary

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Vocabulary

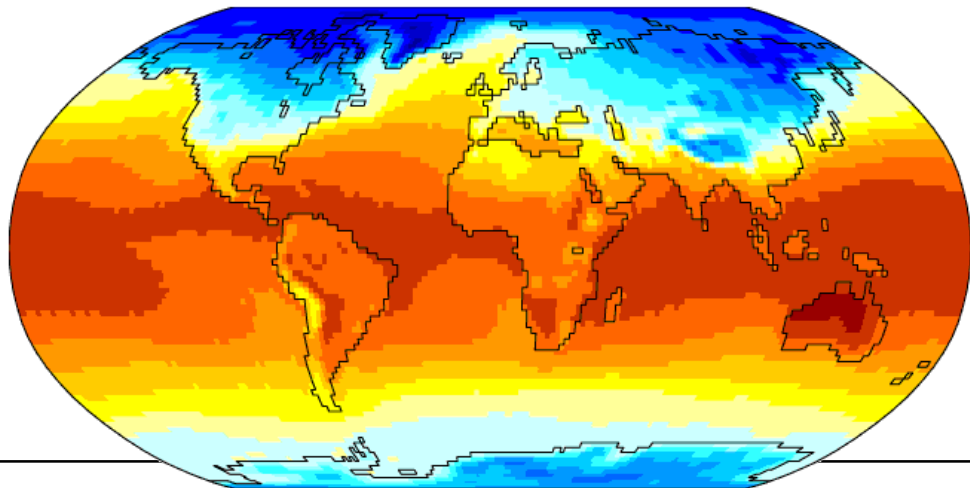
- State - condition or physical property of matter
- Volume - amount of space a material occupies

Changes of Matter



Air Temperature

Dec



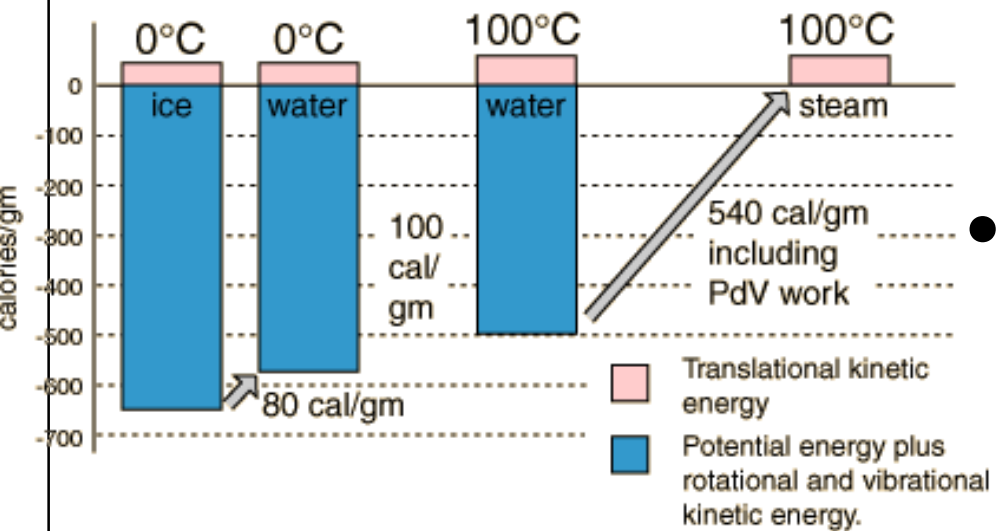
- Matter changes with the season, including changes in the color of leaves and in the temperature of the air. (A1)
- Matter can change in many ways, including physical changes or chemical changes. (A2)

What are Physical Changes?



- In a physical change, the identity of the substance does not change. (B1)
- Dissolving one substance in another does not change the identities of the substances. (B2)
- The formation of ice on the surface of a lake is an example of a change in state. (B3)

What are Physical Changes?



- Changes in state involve changes in the amount of energy that the particles in a substance have. (B₄)
- The rate at which one state of matter changes into another depends on how much energy is added or taken away from the substance. (B₅)

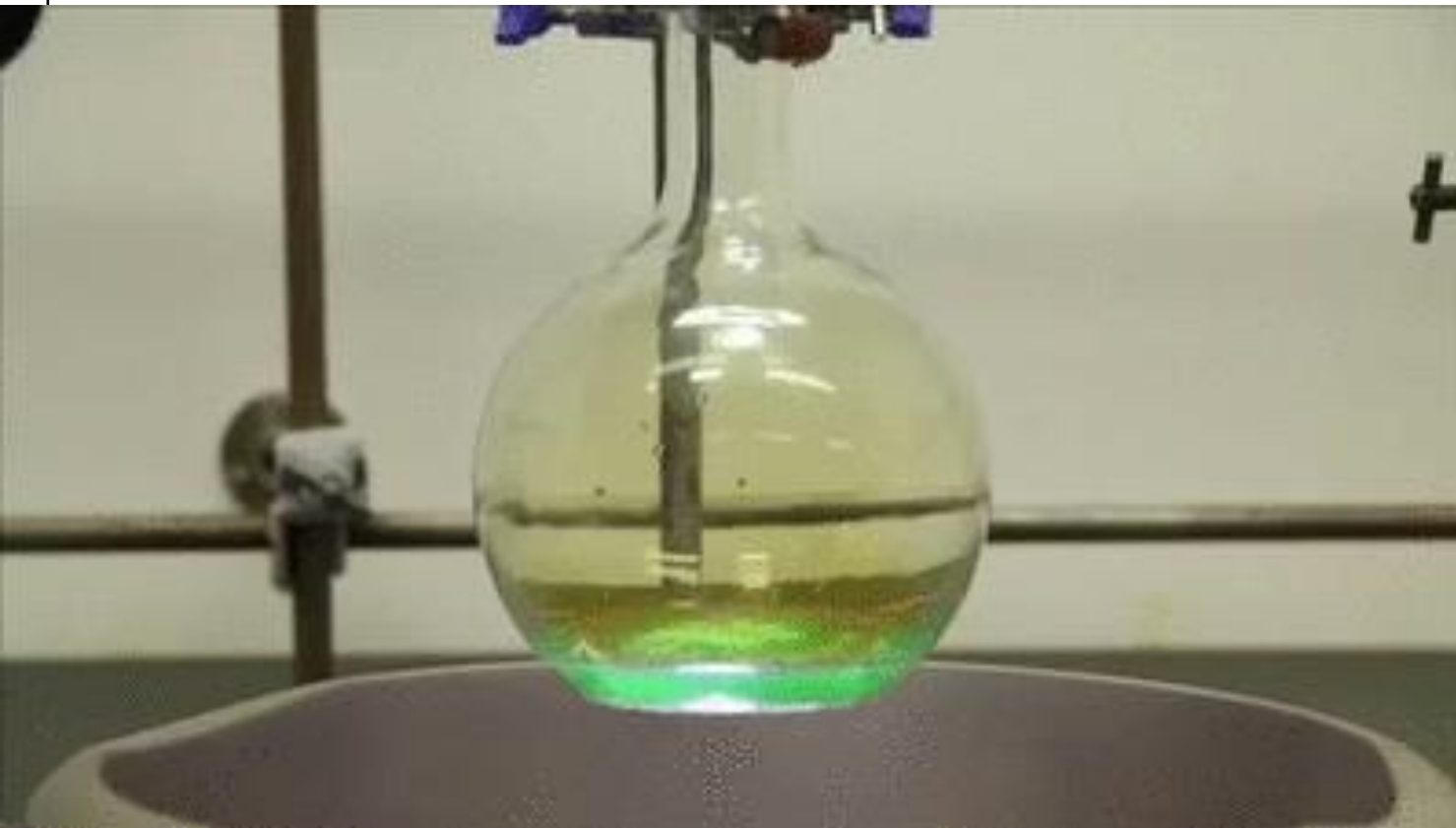
What are Chemical changes?

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What are Chemical changes?



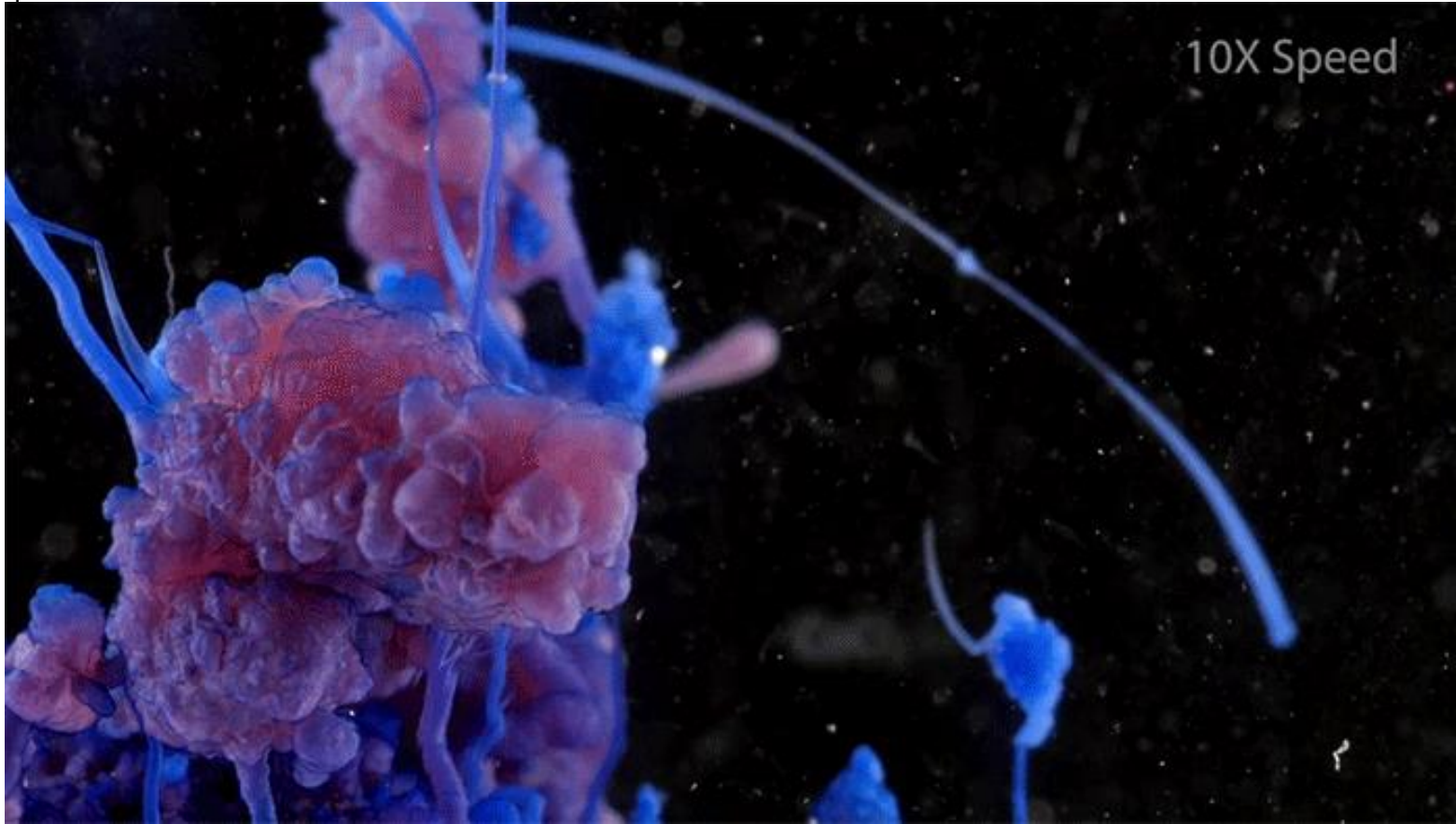
- The formation of a new substance is the only sure sign of a chemical change. (C₃)
- Formation of a gas might be signaled by bubbles or an odor. (C_{3a})

What are Chemical changes?



- Formation of a precipitate, a solid that sometimes forms when two liquids combine, is a sign of a chemical change. (C3b)

What are Chemical changes?



- A change of color might or might not be a sign of a chemical change. It depends on whether a precipitate forms. (C₃c)

What are Chemical changes?

- Energy change is a sign that chemical change is involved. (C₄)
- Energy in the form of light is needed for chemical reactions such as photosynthesis. (C₅)
- Photosynthesis is a chemical reaction that only occurs if plants are exposed to light. (C₆)
- Many changes cannot be reversed. (C₇)

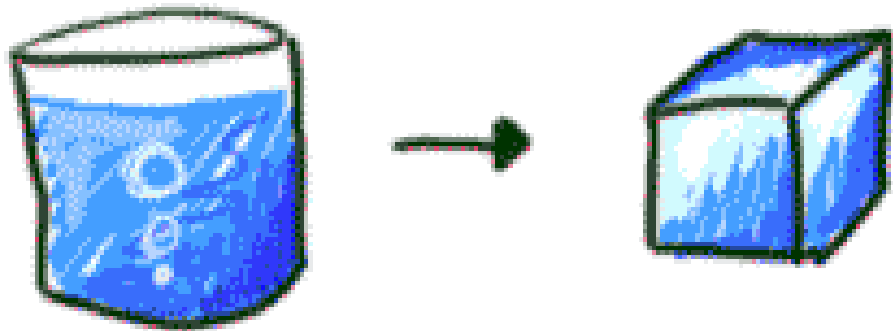
What are Chemical changes?

- Mass is always conserved during physical and chemical changes. (C8)
- The law of conservation of mass states that the total mass before a chemical reaction is the same as the total mass after it. (C9)
- The mass of an unburned match plus the mass of the oxygen it reacts with equals the mass of the ashes and of all the gases given off when the match burns. (C10)

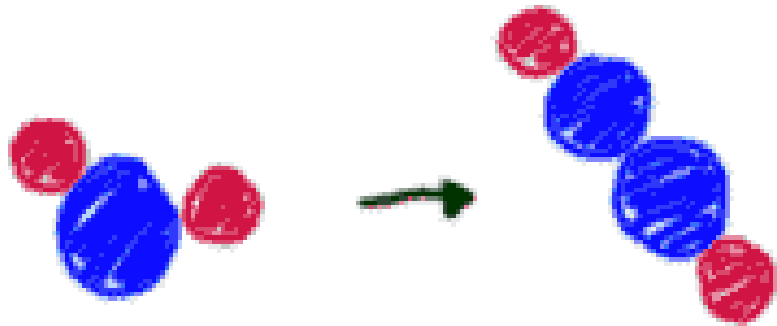
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Comparing Physical and Chemical Changes



PHYSICAL CHANGE OF
WATER INTO ICE



CHEMICAL CHANGE OF
WATER INTO
HYDROGEN PEROXIDE

- Changing the shape of a piece of clay is a _____ change.

(D1)

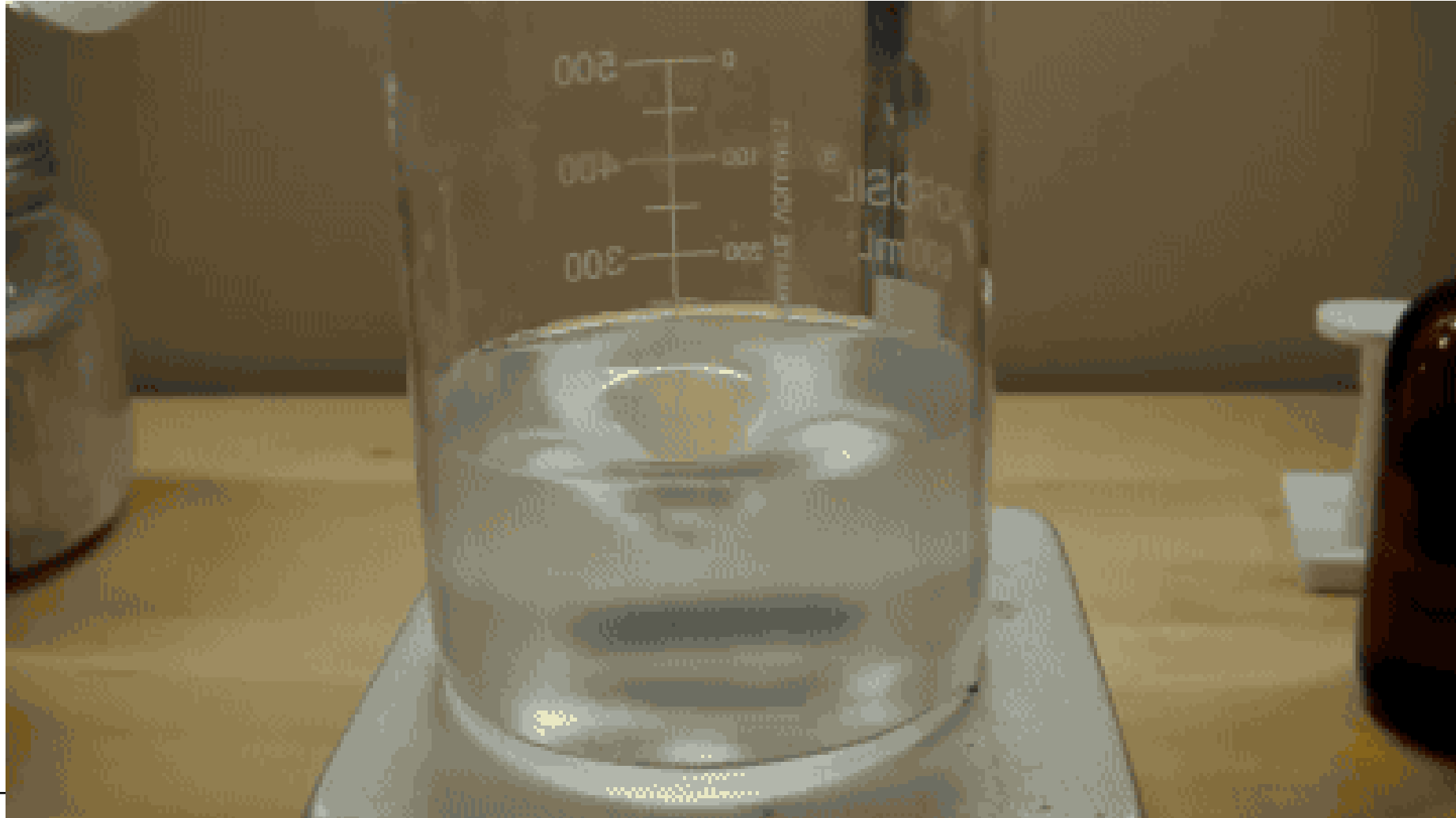
- Spoiling foods are examples of _____ change.

(D2)

Exit Slip

- In your binder, write:
 - Chapter 2, Lesson 2 Exit Slip.
- Number 1-5
- Answer with either physical change or chemical change based on your knowledge. You may use notes.

Chemical or Physical Change?



Chemical or physical change?



Chemical or physical change?



Chemical or physical change?



Chemical or physical **change?**

