

NTI DAY 3

8th Grade

Science

Social Studies

Lesson 3

8th - NTI Day 3

Physical and Chemical Changes in Matter

Everyday, the matter surrounding us undergoes transformations. An example can be seen in an egg: When you crack an egg open, it changes. Similarly, when you fry that egg in a pan, it transforms again. So, how do we classify these changes? Are they physical changes or chemical ones?

A **physical change** refers to alterations in a substance's position, shape, size, or state. But it's crucial to note that in a physical change, a new substance doesn't form. Let's consider a few examples. You can take a piece of paper and tear it, you could crush a pretzel, or chop a carrot into fine slices. These actions result in a physical change because even though the substance's appearance alters, its identity doesn't change.

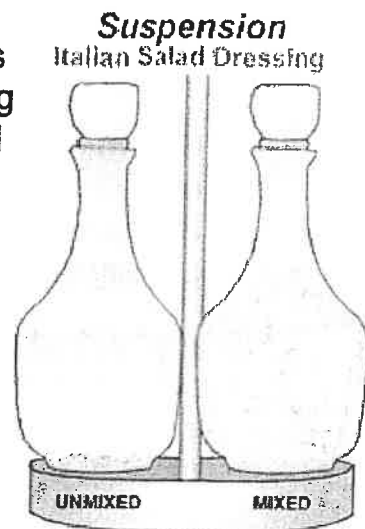
One common type of physical change is the change in states of matter - from solid to liquid to gas, and back. This transformation doesn't alter the chemical composition of the substance. Every substance undergoes a state change at different temperatures. The transition from a solid state to a liquid state occurs at a specific temperature known as the **melting point**. For instance, ice, which is the solid state of water, has a melting point of 0°C. On the other hand, sugar, which is a different kind of substance, has a melting point of 185°C.

A liquid can transform into either a solid (through freezing) or a gas (through evaporation). **Evaporation** is the process where molecules at the surface of a liquid become gaseous. When you increase the temperature of the liquid, evaporation becomes faster. At a certain high temperature, the liquid starts to boil, causing the molecules under the surface to convert into gas and rise to the surface as bubbles. This specific temperature is known as the **boiling point**, and it's different for every substance. Water, for instance, has a boiling point of 100°C, while acetic acid boils at 118°C. If the gas particles formed from boiling encounter a cold surface, they convert back into a liquid - a process known as **condensation**, which is another physical change.

Another way to bring about a physical change is by mixing substances. For example, if you combine lemon juice, water, and sugar, you get a **mixture** known as lemonade. Each substance retains its properties, and no new chemical compound is formed.

Sometimes, mixtures can be suspensions. A **suspension** is a kind of mixture in which the particles separate after staying still for a while. Think about Italian salad dressing. You need to shake it before pouring it over your salad to ensure the ingredients that have separated mix together again. Over time, you can see the components like oil, vinegar, and seasonings separate out once more.

Another type of mixture is a **solution**. This is when one substance dissolves in another. For example, if you mix a powdery drink mix with water, or dissolve salt in water, you get a solution. The substance that dissolves (like the salt) is called the solute, and the substance that does the dissolving (like the water) is called the solvent.



While cutting a loaf of bread into slices is a physical change, toasting a slice is a chemical change because the bread's substances change chemically and display different properties. **Chemical changes** can often be accompanied by heat, light, color changes, or fizzing. For instance, in autumn, leaves change color - this is due to a chemical change happening within them. Rust on an iron object or mold on food are other examples of chemical changes, visible through color change.

When you burn a piece of wood, it undergoes a chemical change known as **combustion**. This process releases energy in the form of heat and light. Similarly, during baking, cookies absorb energy, indicating another chemical change.

END OF TEXT

Name: _____

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1. What is a physical change?

- A. A change in which a new substance is formed
- B. A change in position, shape, size, or state without a new substance forming
- C. A change that is always associated with color change
- D. A change that is always associated with heat release

2. What is the boiling point?

- A. The temperature at which a liquid changes into a solid
- B. The temperature at which a substance changes from a solid to a liquid
- C. The temperature at which a liquid changes into a gas
- D. The temperature at which a gas changes into a solid

3. What does a solvent do in a solution?

- A. It is the substance that dissolves
- B. It is the substance that gets dissolved
- C. It is the part of the solution that dissolves another substance
- D. It is the substance that does not dissolve

4. What happens during evaporation?

- A. Solid changes into gas
- B. Liquid changes into solid
- C. Gas changes into liquid
- D. Liquid changes into gas

5. What is the process in which gas particles change back into a liquid called?

- A. Condensation
- B. Evaporation
- C. Boiling
- D. Melting

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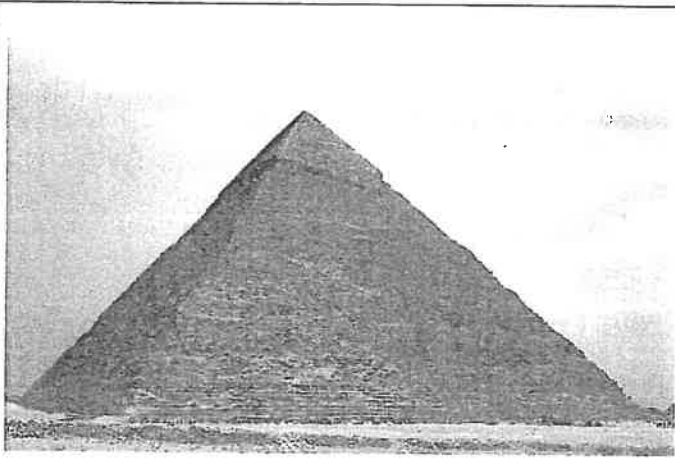
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Physical and Chemical Changes in Matter

6. What is an example of a chemical change?
- A. Tearing a sheet of paper
 - B. Toasting a slice of bread
 - C. Cutting a carrot
 - D. Mixing lemon juice and water
7. What happens in a suspension?
- A. Particles completely dissolve
 - B. Particles separate after a while
 - C. Particles combine to form a new substance
 - D. Particles change their state
8. What is the melting point of sugar?
- A. 0°C
 - B. 100°C
 - C. 185°C
 - D. 118°C
9. What is a solute in a solution?
- A. The substance that dissolves another substance
 - B. The substance that does not dissolve
 - C. The substance that becomes dissolved
 - D. The substance that stays at the bottom
10. What kind of energy is released when wood burns?
- A. Electrical energy
 - B. Chemical energy
 - C. Heat and light energy
 - D. Solar energy

VISUAL LITERACY

Directions: Use the included images and captions to answer each of the questions.



There are over 100 Egyptian pyramids but the most famous are found at Giza. Including the Pyramid of Khufu, these are among the largest structures ever built.

What was the purpose of the pyramids?

What is the difference between a tomb and a shrine?



This is an artist's rendition of what a Harappan city looked like in the Indus Valley between 2,600 BC – 1,900 BCE.

What did the Harappans invent that allowed them to build multi-level houses?

Harappan cities were designed in a grid pattern. What is this called? What modern US cities were also built and designed this way?



This artifact was recovered from the Shang Dynasty period of ancient China.

What type of written language is shown? How does that style differ from an alphabet?

What is this language written on?

Why did the ancient Chinese use this?

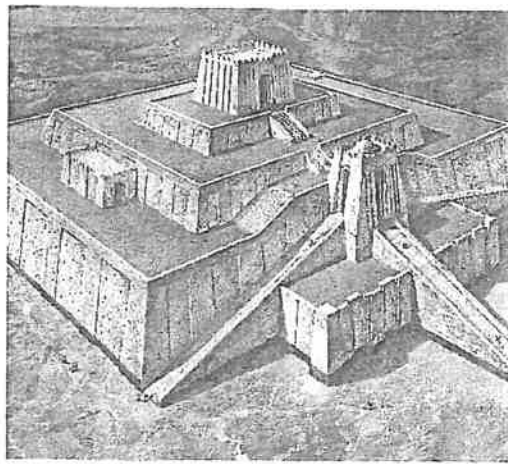


This is a rendition of what an ancient farming village might have looked like during this era.

What farming technique is being used here?

What did this technique allow people to do?

Why was this technique so important, especially for the ancient Egyptians and Sumerians?



These structures were built by the Sumerians.

What were these structures called?

What is significant about the way they were constructed?

What type of structure is this? What was it used for?



This famous artifact was found completely by chance by a French soldier in 1799.

What is this artifact called?

What did it allow people to do?

Why was this so significant?