

Chemical and Physical Properties and Changes

Physical & Chemical Properties

All substances have properties that we can use to identify them.

For example we can identify a person by their face, their voice, height, finger prints, DNA etc.. The more of these properties that we can identify, the better we know the person. In a similar way matter has properties - and there are many of them.

There are two basic types of properties that we can associate with matter.

These properties are called Physical properties and Chemical properties:

Physical properties are properties of an element or compound that can be observed without a chemical reaction of the substance.

Examples : A substance's color and density are physical properties.

Chemical properties are properties of an element or compound in chemical reactions.

For example, the fact that sodium reacts with water is a chemical property.

Physical Properties

Physical properties: Properties that do not change the chemical nature of matter

Physical properties can be observed or measured without changing the composition of matter. Physical properties are used to observe and describe matter.

Physical properties include:

appearance
texture
color
odor
melting point
boiling point
density
solubility
and many others

Chemical Properties

Chemical properties of matter describes its "potential" to undergo some chemical change or reaction by virtue of its composition. What elements, electrons, and bonding are present to give the potential for chemical change.

It is quite difficult to define a chemical property without using the word "change". Eventually you should be able to look at the formula of a compound and state some chemical property. At this time this is very difficult to do and you are not expected to be able to do it.

Chemical properties: Properties that change the chemical nature of matter

Examples of chemical properties are:

- heat of combustion
- reactivity with water
- PH

Physical Changes

A physical change takes place without any changes in molecular composition.

The same element or compound is present before and after the change.

The same molecule is present through out the changes.

Physical changes are related to physical properties since some measurements require that changes be made.

Chemical Changes

Chemical change results in one or more substances of entirely different composition from the original substances. The elements and/or compounds at the start of the reaction are rearranged into new product compounds or elements.

A CHEMICAL CHANGE alters the composition of the original matter. Different elements or compounds are present at the end of the chemical change. The atoms in compounds are rearranged to make new and different compounds.

Physical OR Chemical
You Decide

PHYSICAL CHANGE OR CHEMICAL CHANGE?



GLASS BREAKING

PHYSICAL CHANGE OR CHEMICAL CHANGE?

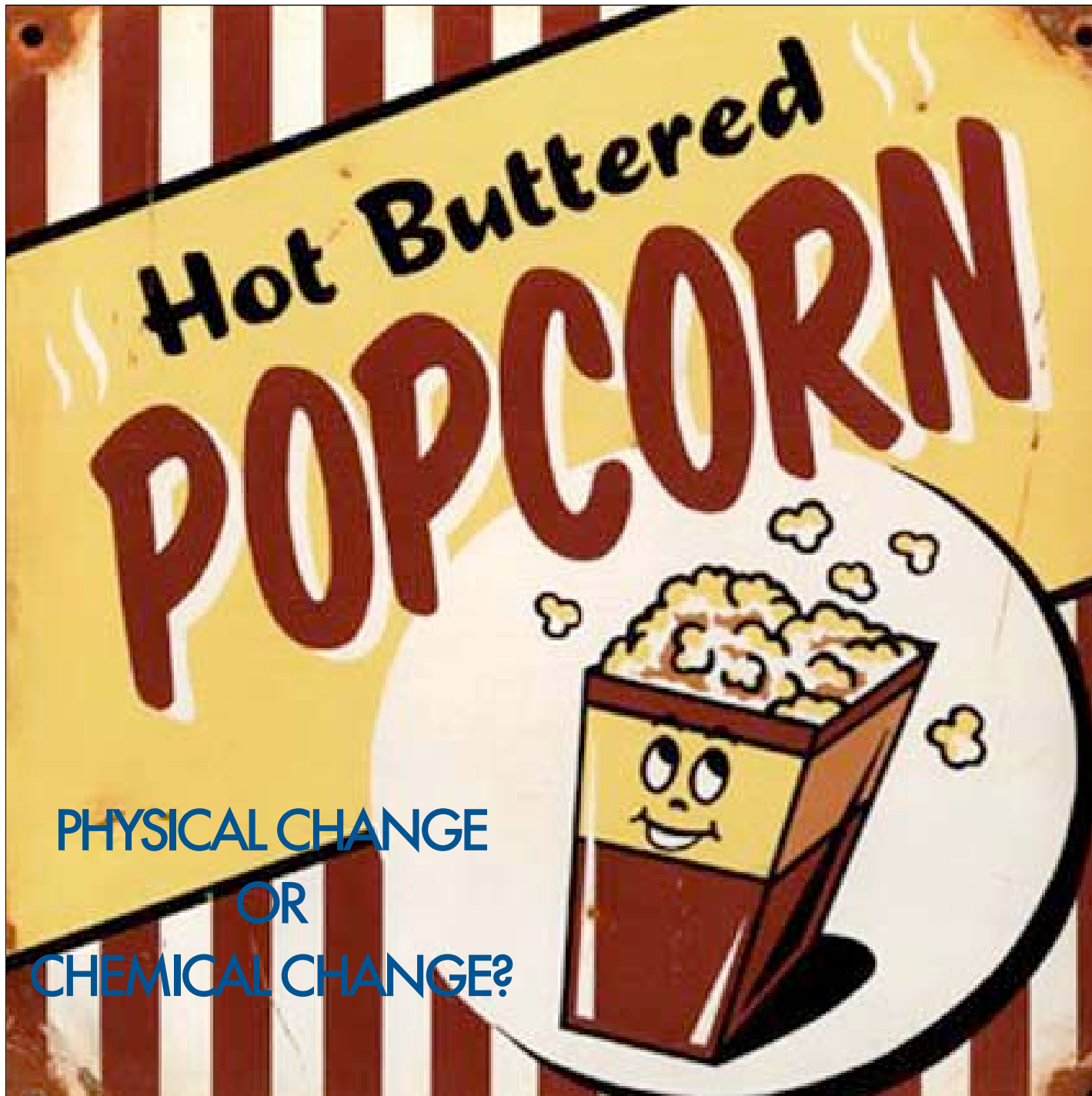


HAMMERING WOOD TOGETHER

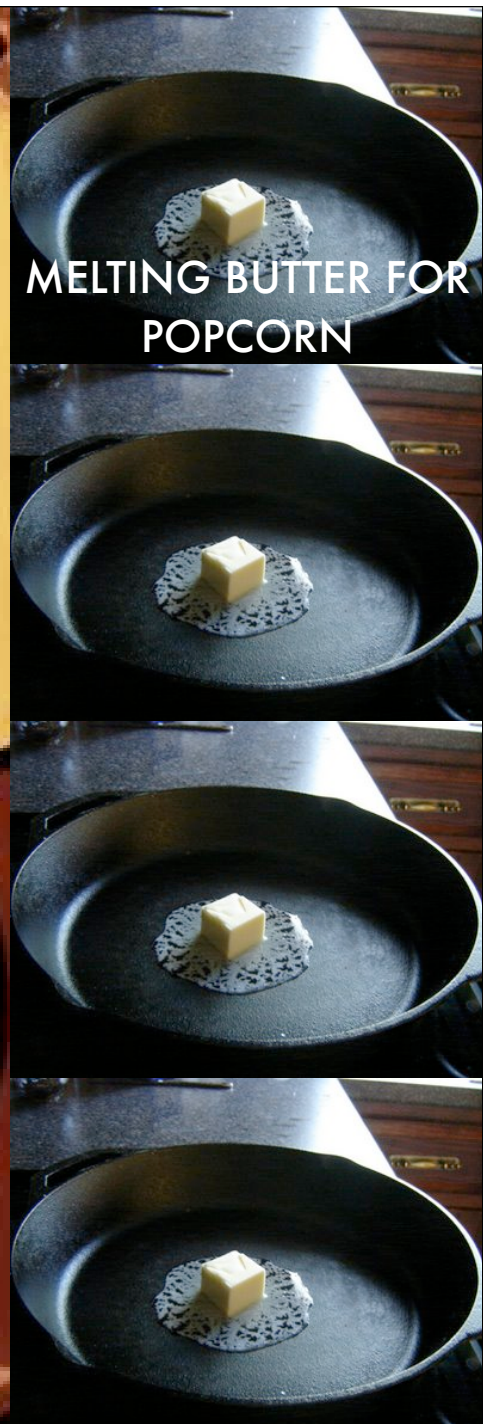
PHYSICAL CHANGE OR CHEMICAL CHANGE?

RUSTY OLD BIKE





PHYSICAL CHANGE
OR
CHEMICAL CHANGE?



MELTING BUTTER FOR
POPCORN

SEPARATING SAND FROM GRAVEL

PHYSICAL
CHANGE OR
CHEMICAL
CHANGE?





PHYSICAL CHANGE OR
CHEMICAL CHANGE?

ROTTING FOOD




PHYSICAL
CHANGE
OR
CHEMICAL
CHANGE?

MIXING KOOL-AID POWDER IN WATER

PHYSICAL CHANGE OR CHEMICAL CHANGE?



MOWING THE GRASS



PHYSICAL
CHANGE OR
CHEMICAL
CHANGE?

CORRODING METAL



**PHYSICAL
CHANGE OR
CHEMICAL
CHANGE?**

BLEACHING YOUR HAIR

PHYSICAL CHANGE OR CHEMICAL CHANGE?



FIREWORKS EXPLODING

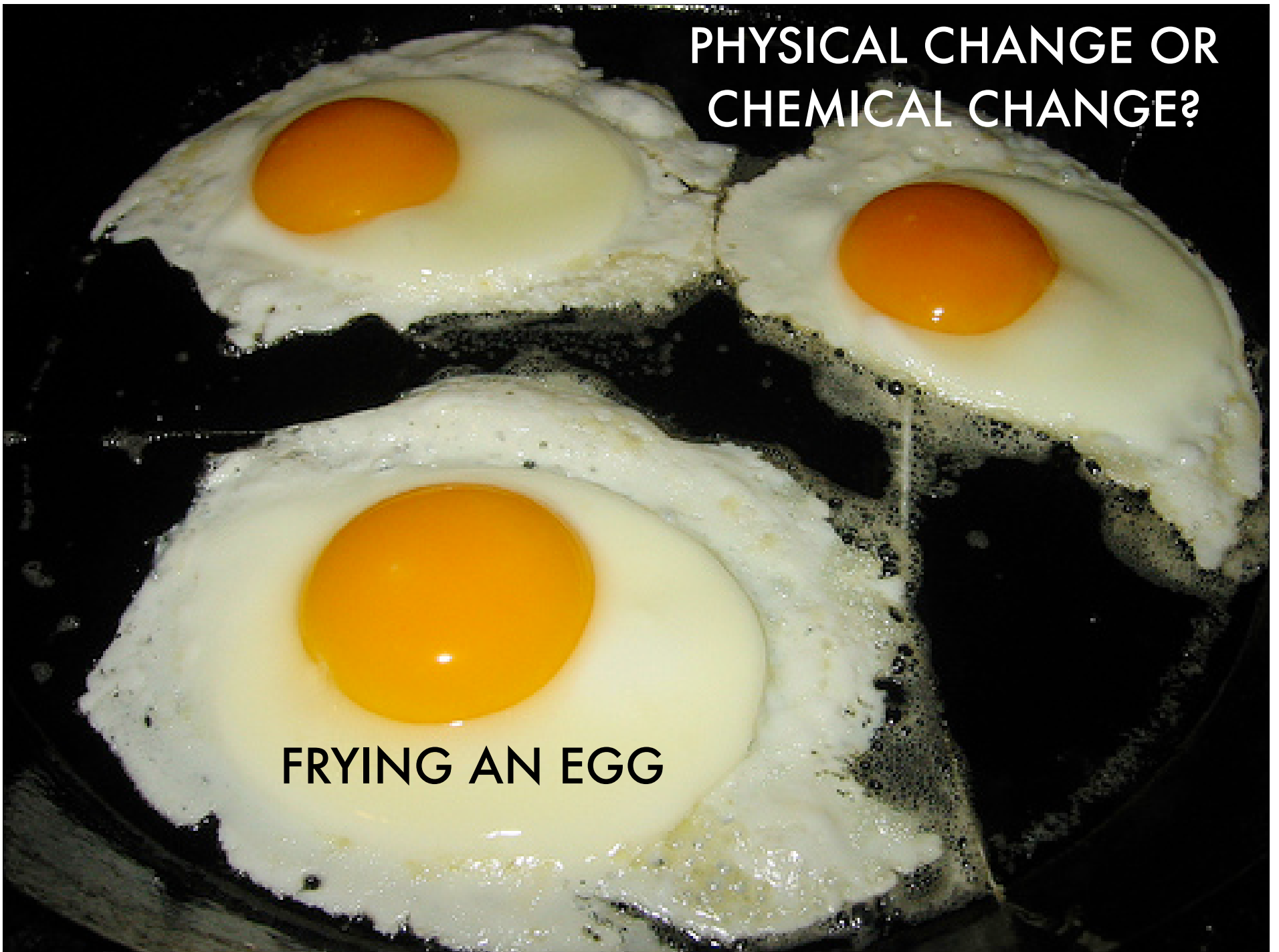
A photograph of a glass of orange juice. In the foreground, there are several slices of orange. In the background, a juicer is visible, with a piece of orange being processed. The glass is filled with bright orange juice.

SQUEEZING ORANGES TO MAKE ORANGE JUICE

PHYSICAL
CHANGE OR
CHEMICAL
CHANGE?

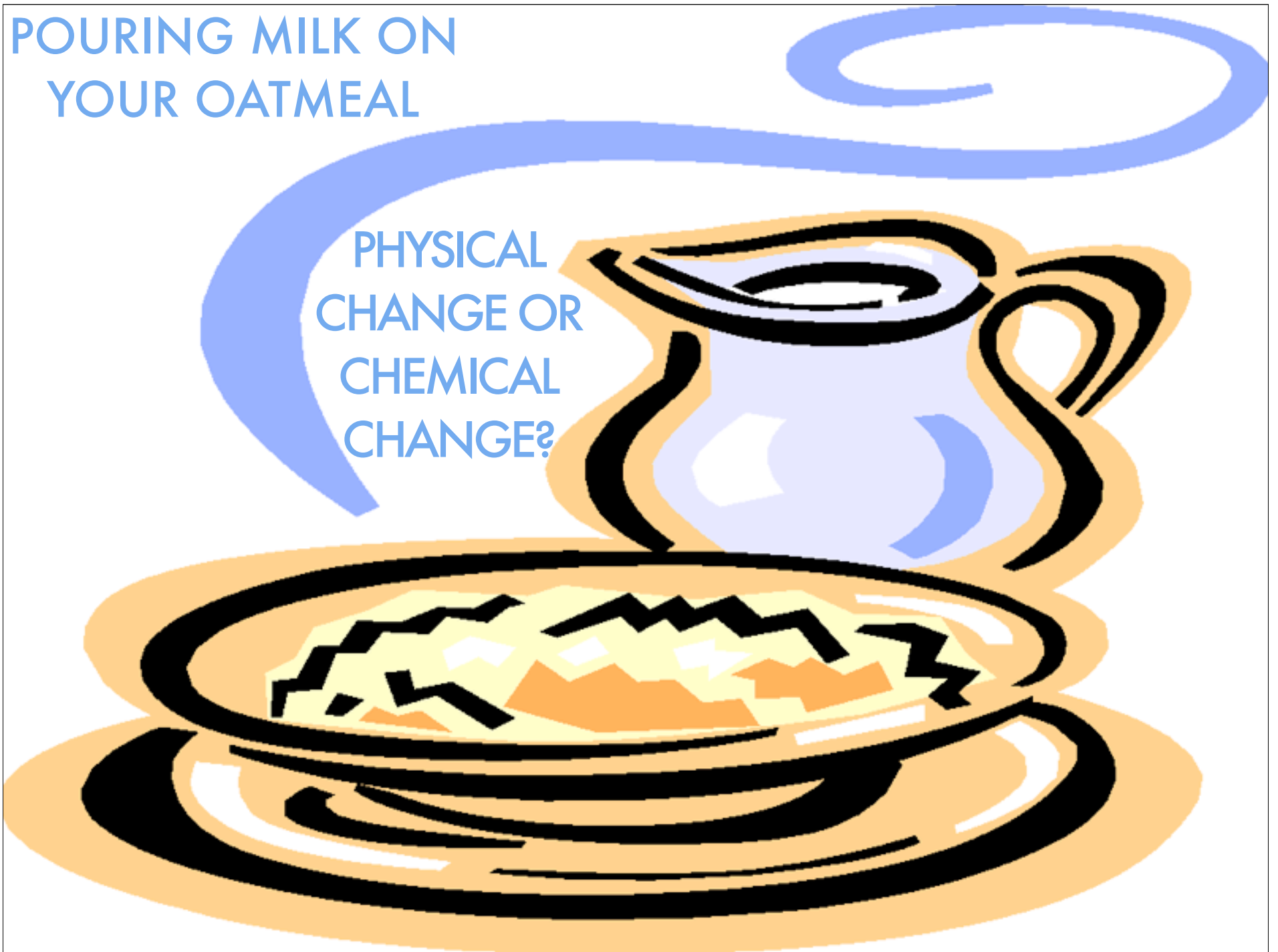
**PHYSICAL CHANGE OR
CHEMICAL CHANGE?**

FRYING AN EGG



POURING MILK ON YOUR OATMEAL

PHYSICAL
CHANGE OR
CHEMICAL
CHANGE?






BURNING LEAVES

**PHYSICAL
CHANGE OR
CHEMICAL
CHANGE?**

A clear glass filled with water sits on a wooden surface. A silver spoon is tilted above the glass, pouring a stream of white salt crystals into the water. The salt is captured mid-air, creating a visible trail of white particles falling into the liquid.

**MAKING
SALT
WATER
TO
GARGLE
WITH**

A clear glass filled with water sits on a wooden surface. A silver spoon is tilted above the glass, pouring a stream of white salt crystals into the water. The salt is captured mid-air, creating a visible trail of white particles falling into the liquid.

**PHYSICAL
CHANGE
OR
CHEMICAL
CHANGE?**

PHYSICAL CHANGE OR
CHEMICAL CHANGE?

CREAM BEING WHIPPED



A close-up photograph of a slice of toast inside a toaster. The toast is heavily charred and blackened on the top surface. Several wisps of white smoke are rising from the top of the toast. The toaster is silver and has a handle on top. The background is white.

BURNT TOAST

**PHYSICAL CHANGE OR
CHEMICAL CHANGE?**

PHYSICAL CHANGE OR
CHEMICAL CHANGE?

FROZEN CHOCOLATE COVERED BANANAS



PHYSICAL CHANGE OR
CHEMICAL CHANGE?

MELTING ICE CREAM



Check Your Answers!

PHYSICAL CHANGE





PHYSICAL CHANGE

HAMMERING WOOD TOGETHER

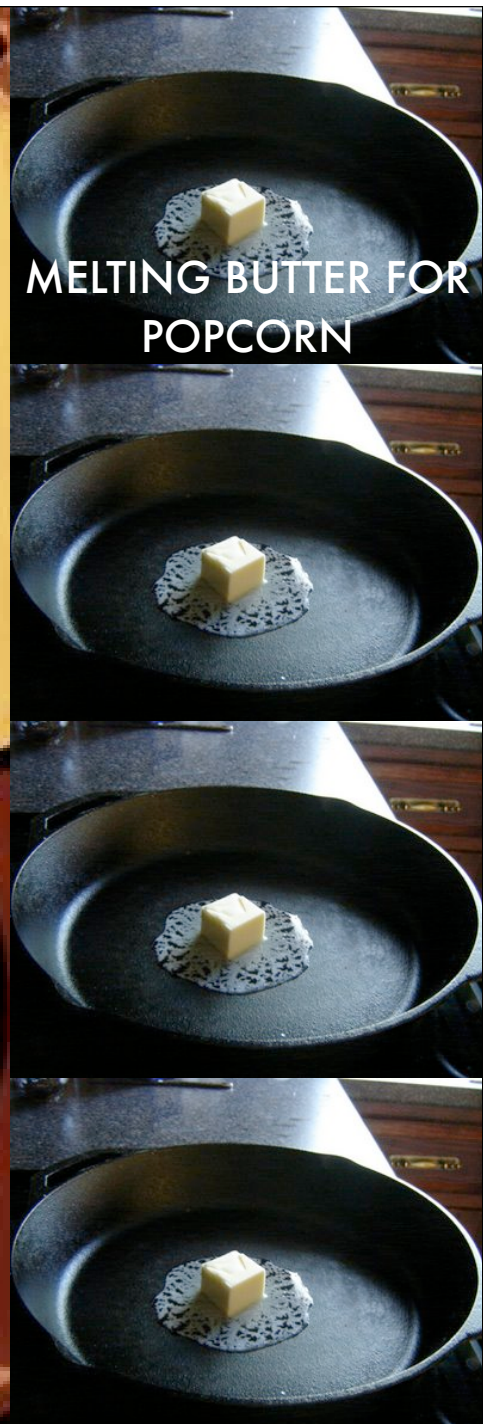


CHEMICAL CHANGE

RUSTY OLD BIKE



**PHYSICAL
CHANGE**



**MELTING BUTTER FOR
POPCORN**

SEPARATING SAND FROM GRAVEL

PHYSICAL
CHANGE





CHEMICAL CHANGE

ROTTING FOOD



PHYSICAL CHANGE

MIXING KOOL-AID POWDER IN WATER

PHYSICAL CHANGE



MOWING THE GRASS



CHEMICAL CHANGE?

CORRODING METAL

A close-up photograph of a person's head from the back, with their hair completely covered in a thick, white, foamy substance, likely hair bleach. The person's hand is visible on the right side, holding the back of their head. The background is a blurred indoor setting, possibly a salon or a laboratory.

CHEMICAL CHANGE

BLEACHING YOUR HAIR

CHEMICAL CHANGE



FIREWORKS EXPLODING

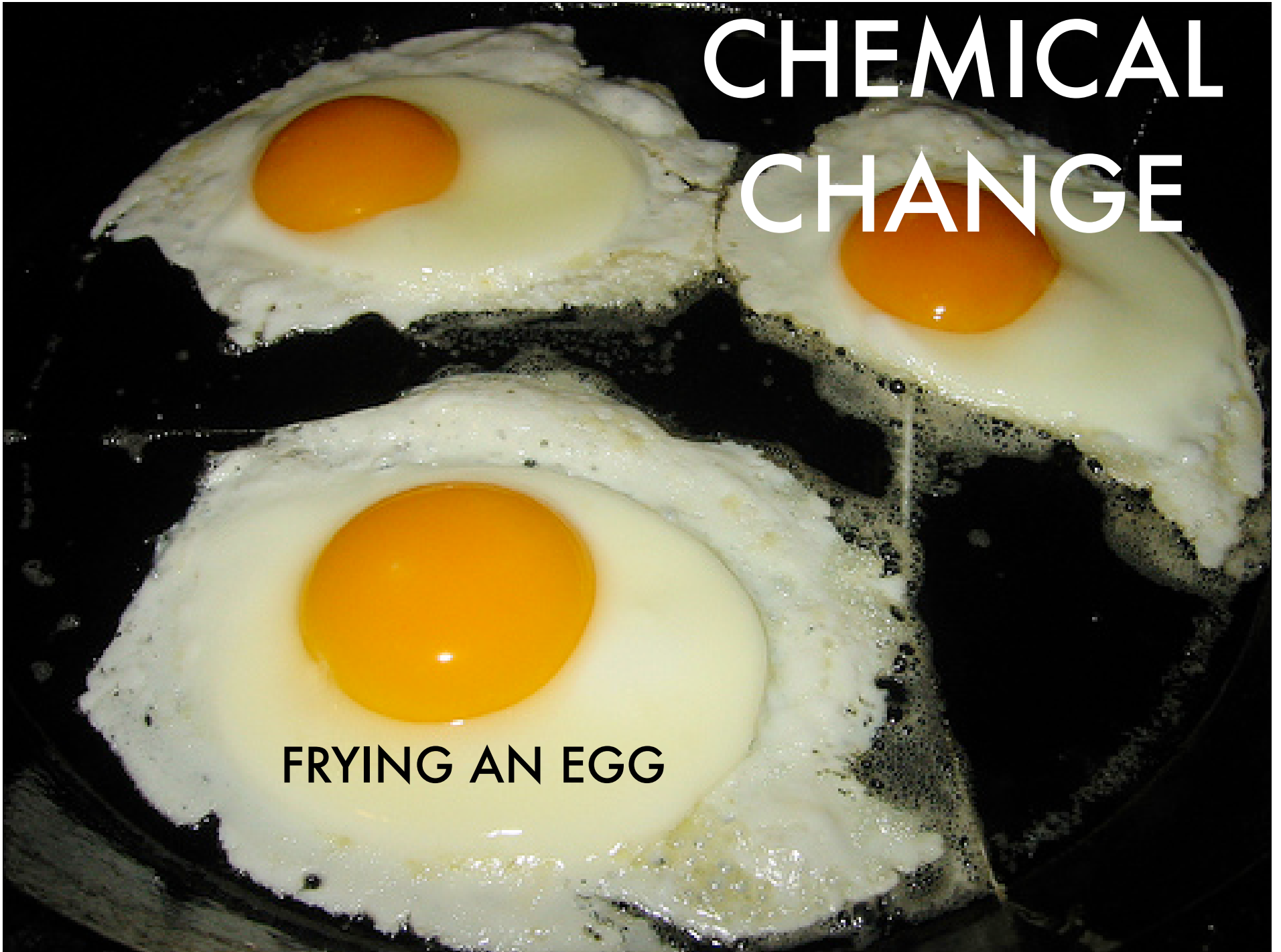
A photograph of a glass of orange juice. In the foreground, there are several slices of orange. In the background, a juicer is visible, and a glass of orange juice is partially filled. The text "SQUEEZING ORANGES TO MAKE ORANGE JUICE" is overlaid on the image.

SQUEEZING ORANGES TO MAKE ORANGE JUICE

PHYSICAL
CHANGE

CHEMICAL CHANGE

FRYING AN EGG



POURING MILK ON
YOUR OATMEAL

PHYSICAL
CHANGE





BURNING LEAVES

CHEMICAL CHANGE



MAKING
SALT
WATER
TO
GARGLE
WITH

PHYSICAL CHANGE

PHYSICAL CHANGE

CREAM BEING WHIPPED



A close-up photograph of a slice of toast that has been burnt to a dark, charred state. The toast is positioned in the upper slot of a silver toaster. Several wisps of white smoke are rising from the top of the toast. The toaster's heating element and the top of the toaster are visible. The background is plain white.

BURNT TOAST

CHEMICAL
CHANGE

A photograph of four frozen chocolate-covered bananas on sticks, arranged on a light-colored plate. The bananas are coated in a thick layer of dark chocolate and sprinkles. The plate is set on a patterned surface. The text "FROZEN CHOCOLATE COVERED BANANAS" is overlaid in white, bold, sans-serif font across the middle of the image.

FROZEN CHOCOLATE COVERED BANANAS

PHYSICAL CHANGE

PHYSICAL CHANGE

MELTING ICE CREAM

A close-up photograph of a melting ice cream cone. The cone is a light brown color with a waffle-like texture and is partially melted, with a large puddle of white ice cream spreading out on the ground. The ground is covered in dark brown mulch and some small grey rocks. The text "PHYSICAL CHANGE" is written in large white letters in the top left corner, and "MELTING ICE CREAM" is written in smaller white letters across the middle of the cone.

SUMMARY

1. Glass Breaking (PHYSICAL CHANGE)
2. Hammering Wood Together (PHYSICAL CHANGE)
3. A Rusting Bicycle (CHEMICAL CHANGE)
4. Melting Butter for Popcorn (PHYSICAL CHANGE)
5. Separating Sand From Gravel (PHYSICAL CHANGE)
6. Rotten Food (CHEMICAL CHANGE)
7. Mixing Kool-Aid powder into water (PHYSICAL CHANGE)
8. Mowing the Lawn (PHYSICAL CHANGE)
9. Corroding Metal (CHEMICAL CHANGE)
10. Bleaching your hair (CHEMICAL CHANGE)
11. Fireworks Exploding (CHEMICAL CHANGE)
12. Squeezing Oranges to Make Orange Juice (PHYSICAL CHANGE)
13. Frying an Egg (CHEMICAL CHANGE)
14. Pouring Milk on Your Oatmeal (PHYSICAL CHANGE)
15. Burning Leaves (CHEMICAL CHANGE)
16. Making Salt Water to Gargle With (PHYSICAL CHANGE)
17. Cream Being Whipped (PHYSICAL CHANGE)
18. Burnt Toast (CHEMICAL CHANGE)
19. Freezing Chocolate Covered Bananas (PHYSICAL CHANGE)
20. Melting Ice Cream (PHYSICAL CHANGE)