

BURNING CANDLE LAB

NAME _____

SC.A.1.3.1.8.1 – determines the physical properties of matter that can be observed without altering the substance (for example: mass, volume, boiling point, density)

SC.A.1.3.5.8.1 – knows how to use clues (for example: change in color or form) to determine whether a change is chemical or physical

BACKGROUND:

Physical properties of matter include (but are not limited to) color, shape, hardness, mass, volume, weight, density, odor, size, texture. Also, matter can exist as a solid, liquid, or gas. A physical change occurs when the physical properties of a substance are altered. However, the substance remains the same kind of matter.

Chemical properties describe how a substance changes into a new substance.

Flammability, the ability to burn, is a chemical property. When a substance undergoes a chemical change, or a chemical reaction, it turns into a new and different substance. A chemical change can be identified by (but not limited to) smoke, light production, presence of heat and color change.

PRECAUTION:

1. **THOSE WITH LONG HAIR MUST TIE THEIR HAIR BACK.**
2. **CHECK FOR LOOSE SLEEVES AND JEWELRY.**

MATERIALS:

Candle (paraffin wax $C_{20}H_{42}$)

Candleholder

Goggles

Balance (Triple Beam or Electronic)

250mL Beaker

Match

Metric ruler

Stopwatch

PROCEDURE:

1. Observe the unlit candle. Record physical properties on the DATA CHART.
2. Measure the length of the candle and record on your DATA CHART. (Note: If you measure to the end of the wick, you will need to measure to the end of the wick in your final length measurement.)
3. **DO NOT PLACE THE CANDLE DIRECTLY ON THE BALANCE.** Do the following:
 - Mass the glass candleholder. Record in the DATA CHART.
 - Remove the candleholder from the balance.
 - Place the candle in the holder; place both on the balance and mass. Record in the DATA CHART.
 - Subtract the mass of the candleholder from the mass of the candleholder and candle. Record this in your DATA CHART – mass of the candle.

PUT YOUR GOGGLES ON

4. Decide which person is going to watch the time and which person will list the observations.
5. Under your teacher's supervision, carefully light the candle. Place the burnt match in the beaker. Allow the candle to burn for 5 minutes. During this 5 minutes note the time and list any physical and/or chemical properties that you observe on your DATA CHART. (For example, 1.2 minutes after lit, the flame turns blue.)
6. At the end of the 5 minutes, blow out the flame.

YOU MAY NOW REMOVE YOUR GOGGLES

7. DO NOT PLACE THE CANDLE DIRECTLY ON THE BALANCE. Do the following:
 - Place the candle and holder on the balance and mass both items. Record in the DATA CHART.
 - Subtract the mass of the candleholder from the mass of the candleholder and candle (after burning). Record this in your DATA CHART – mass of the candle.
8. Measure the length of the candle and record on your DATA CHART. (Note: If you measured to the end of the wick, you need to measure to the end of the wick this time.)
9. Teacher will give you instructions for cleaning up.
10. After you have returned materials and cleaned up your area, answer the OBSERVATIONS and ANALYSIS AND CONCLUSIONS questions.

DATA CHART:

UNLIT CANDLE

PHYSICAL PROPERTIES

Length of candle _____ cm

Color of candle _____

Texture of candle _____

(Mass of candleholder _____)

(Mass of candleholder and candle _____)

Mass of candle _____

CHEMICAL PROPERTIES



LIT CANDLE

| TIME | PHYSICAL PROPERTIES | CHEMICAL PROPERTIES |
|-------------|--------------------------------|--------------------------------|
| | | |

AFTER BURNING

(Mass of candleholder and candle _____)

Mass of candle _____

Length of candle _____

Texture of candle _____

Color of candle _____

Other observations: _____

OBSERVATIONS:

1. What physical properties of the unlit candle did you observe? _____

2. What senses (hearing, smelling, touching) did you use when you made these observations? _____

3. What physical changes did you observe after you lit the candle?

4. What did you have to do to observe a chemical property of the candle?

5. What evidence of chemical change did you observe?

ANALYSIS AND CONCLUSIONS :

1. What do you think is the basic difference between a physical and chemical property?

2. Can a physical property be observed without changing the substance?

NAME _____ PERIOD _____ DATE _____

PHYSICAL AND CHEMICAL CHANGES KWL Chart

SC.A.1.3.1.8.1 – determines the physical properties of matter that can be observed without altering the substance (for example: mass, volume, boiling point, density)

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| K What do you KNOW ? | W What do you WANT to know? | L What did you LEARN ? |
|---------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------|
| 1. What are the four phases of matter? | | |
| | | |
| 2. List 5 physical properties of matter. | | |
| | | |
| 3. List 2 chemical properties of matter. | | |
| | | |
| 4. What is the difference between a physical and a chemical change? | | |
| | | |

PHYSICAL AND CHEMICAL CHANGES

KWL Chart

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| K What do you KNOW ? | W What do you WANT to know? | L What did you LEARN ? |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------|
| 1. What are the four phases of matter? | | |
| Solid, liquid, gas and plasma | | |
| 2. List 5 physical properties of matter. | | |
| Mass, weight, volume, density, color, shape, size, odor, texture | | |
| 3. List 2 chemical properties of matter. | | |
| Flammability (the ability to burn), smoke, light production, presence of heat, color change | | |
| 4. What is the difference between a physical and a chemical change? | | |
| <p>A <u>physical change</u> occurs when the physical properties of a substance are altered, but the substance remains the same.</p> <p>A <u>chemical change</u> occurs when a substance changes into a new and different substance.</p> | | |

LABORATORY RUBRIC (Burning Candle)

NAME _____ DATE _____

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SC.H.3.3.1.8.2 – uses appropriate procedures for safety in the classroom, home and community

| Category | 4 | 3 | 2 | 1 |
|-------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| PHYSICAL PROPERTIES | Identifies 4 physical properties. | Identifies 3 physical properties. | Identifies 2 physical properties. | Identifies 1 physical property. |
| CHEMICAL PROPERTIES | Identifies 4 chemical properties. | Identifies 3 chemical properties. | Identifies 2 chemical properties. | Identifies 1 chemical property. |
| USE OF LAB EQUIPMENT | Lab equipment used effectively with little or no direction from teacher. | Lab equipment used effectively with some extra direction from teacher. | Lab equipment used effectively, but with guidance from teacher. | Struggles with directions for using lab equipment. |
| LAB SAFETY | All safety rules in the lab are followed. | | | One or more safety rules are not followed. |
| LAB EQUIPMENT IDENTIFICATION | Proper pieces of equipment used for all sections of all parts of the lab. | One piece of equipment not used properly. | Two pieces of equipment not used properly. | Two or more pieces of equipment not used properly. |
| GOAL 3: #8 | The student completes all tasks and works/communicates effectively with other class members. | The student completes most important tasks and works/communicates effectively with other class members. | The student completes some of the important tasks and works/communicates effectively with other class members. | The student shows minimal understanding of the tasks and is unable to work/communicate effectively with other class members. |