Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_

**2.2 Physical Properties Guided Notes**

Objective: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Essential Question: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Examples of Physical Properties**

A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**is any characteristic of a material that can be observed or measured without changing the composition of the substances in the material.

A material can be identified by its\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Viscosity**

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a liquid to keep from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is called its **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

* + Thick liquids, such as corn syrup and honey, have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ viscosity.
  + Thin liquids, such as vinegar and water, have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ viscosity.

**Conductivity**

A material’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to allow \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to flow is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

* + Materials that have a high conductivity, such as metals, are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Good conductors of heat are usually also good conductors of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Malleability**

The ability of a solid to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ without shattering is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

* + Most metals, such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_, are malleable.
  + An ice cube or piece of glass breaks into small pieces when struck with a hammer. Solids that shatter when struck are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, not malleable.

**Hardness**

One material can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ another material if it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than the other material.

* + A kitchen knife can \_\_\_\_\_\_\_\_\_\_\_\_\_ a copper sheet because stainless steel is \_\_\_\_\_\_\_\_\_\_\_\_ than copper.
  + The material used to sharpen the knife blade must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than stainless steel. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the hardest known material.

**Melting and Boiling Points**

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at which a material changes state is a physical property.

* + The temp at which a substance changes from solid to \_\_\_\_\_\_\_\_\_\_\_\_\_ (melts) is its **\_\_\_\_\_\_\_\_\_\_\_\_ point.**
  + The temp at which a substance changes from liquid to \_\_\_\_\_\_\_\_\_\_ (boils) is its **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ point.**

**Look at Figure 12 on page 47.** Which of these substances are liquids at room temperature (20°C or 68°F)?

**Density**

The ratio of the mass of a substance to its volume is its \_\_\_\_\_\_\_\_\_\_\_\_. Density = mass / \_\_\_\_\_\_\_\_\_\_\_\_

* + Density can be used to test the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a substance.

**Using Physical Properties**

**Using Properties to Identify Materials**

A material can be identified by its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Decide which properties to \_\_\_\_\_\_\_\_\_\_\_\_\_. 2. Do tests on a sample of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ material.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the results with the \_\_\_\_\_\_\_\_\_\_\_\_ reported for \_\_\_\_\_\_\_\_\_\_\_\_\_\_ materials.

**Using Properties to Separate Mixtures**

**Filtration** is a process that separates materials based on the \_\_\_\_\_\_\_\_\_\_\_\_ of their particles.

**Distillation** is a process that separates the substances in a solution based on their\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Recognizing Physical Changes**

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ occurs when some of the properties of a material change, but the substances in the material remain the same.

During a physical change, the \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ of a material can change but not the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Commit to an Answer 1. \_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_\_\_\_\_ 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. \_\_\_\_\_\_\_\_\_\_\_\_\_5. \_\_\_\_\_\_\_\_\_\_

**2.3 Chemical Properties Guided Notes**

Objective: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Essential questions: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Chemical Properties**

* a chemical property is the ability to cause a \_\_\_\_\_\_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_\_\_\_\_\_\_ of matter; it is how one substance interacts with another
* chemical properties can only be observed when a substance is changing into a \_\_\_\_\_\_\_\_\_\_\_ substance

**A. Observing Chemical Properties**

- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – the ability to burn in the presence of oxygen

- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_– how readily a substance combines chemically with another substance

- ex: oxygen is highly reactive, nitrogen is not very reactive

**B. Recognizing Chemical Changes**

* a chemical change occurs when a substance reacts to form one or more \_\_\_\_\_\_\_\_ substances (ex: \_\_\_\_\_\_\_\_\_\_ rusting, paper \_\_\_\_\_\_\_\_\_\_\_\_, baking soda and vinegar giving off a \_\_\_\_\_\_\_\_)
* changing \_\_\_\_\_\_\_\_\_\_\_\_, producing a \_\_\_\_\_\_\_\_\_\_, and forming a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are all evidence that a chemical change has taken place
  + a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a solid that forms and separates from a liquid mixture

**C. Is a Change Chemical or Physical?**

* Are different substance present after the change or is it still the same material?

**Circle the appropriate term.**

* Ex: burning paper (Chemical or Physical )

Cutting down a tree (Chemical or Physical)

Coloring hair (Chemical or Physical)

Painting a house (Chemical or Physical)

Sugar dissolving in water (Chemical or Physical)

**Checks for Understanding**

Commit to an Answer 1. \_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_\_\_\_\_ 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Peer Partner Work: Discuss with a peer to determine if the following are a PHYSICAL (P) or a CHEMICAL (C) change.**

\_\_\_\_\_1. NaCl (Table Salt) dissolves in water. \_\_\_\_\_\_9. Milk sours.

\_\_\_\_\_2. Ag (Silver) tarnishes. \_\_\_\_\_\_10. Sugar dissolves in water.

\_\_\_\_\_3. An apple is cut. \_\_\_\_\_\_11. Wood rots.

\_\_\_\_\_4. Heat changes H2O to steam. \_\_\_\_\_\_12. Pancakes cook.

\_\_\_\_\_5. Baking soda reacts to vinegar. \_\_\_\_\_\_13. Grass grows.

\_\_\_\_\_6. Fe (Iron) rusts. \_\_\_\_\_\_14. A tire is inflated.

\_\_\_\_\_7. Alcohol evaporates. \_\_\_\_\_\_15. Food is digested.

\_\_\_\_\_8. Ice melts. \_\_\_\_\_\_16. Paper towel absorbs water.

\_\_\_\_\_\_ 17. Food color is dropped into water to give it color.