**Chemical and Physical Changes Lab**  Name: \_\_\_\_\_\_\_\_\_\_\_\_

Partner(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Activity 1: Heating**

The temperature at which something melts (melting point) is a physical property of matter. Some substances burn when they are heated. Burning is a chemical change because bonds are breaking and new substances are formed.

**Materials:** Bunsen burner, striker, wire mesh, crucial tongs, safety goggles, small piece of magnesium and aluminum metal.

Procedure:

* + - 1. Light a Bunsen burner. Adjust to proper flame.
      2. Using crucible tongs, hold a piece of aluminum pie plate in the hottest part of the flame (just over the inner blue cone) until you see a change. Record observations chart below. Place remaining hot metal on wire mesh.
      3. Repeat with a piece of magnesium metal.

\*\*\*NOTE: if anything starts to burn, do not stare directly at flame.

**Observations**

|  |  |  |
| --- | --- | --- |
|  | Before Heating | After Heating |
| Aluminum |  |  |
| Magnesium |  |  |

**Claim/Evidence:** Identify whether each metal went through a chemical or physical change.

Aluminum went through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change. The EVIDENCE was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Magnesium went through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change. The Evidence was \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Reasoning:** Why does the evidence above suggest a physical or chemical change?

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**Activity 2: Reactivity to Acid**

Materials: test tube rack, 1 small test tube, 1 medium test tube, test tube holder, 3.0 M Hydrochloric Acid (HCl), zinc metal, candle, match, wooden splint.

* + - 1. Pour about a 1 cm of HCl into small test tube.
      2. Add zinc into small test tube
      3. Invert the medium test tube over the small one to catch the bubbles.
      4. When enough gas has collected, lift the medium tube away while keeping it upside down. Bring a burning splint to the opening of the inverted tube. Record observations.

Observations:

|  |  |
| --- | --- |
|  | Observations after adding acid |
| HCl  Hydrochloric Acid |  |
| Zinc |  |
| Zinc plus acid |  |
| When gas is tested with flame |  |

**Claim/Evidence:** Was the combination of zinc and acid a chemical or physical change?

The combination of zinc and acid was a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Claim/Evidence:** Was the flame test of the gas a chemical or physical change?

The flame test was a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change because \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Clean up:** Pour the contents of the tube into a strainer over the drain. Rinse and return the metal to the cart. Scrub out test tubes with a brush and Sparkleen.

**Law of Conservation of Mass**

Mass is neither \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ during a chemical reaction, the atoms just \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Mass of Reactants = Mass of Products

What happens to the mass of zinc as the reaction continues? Where does the mass go?

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

What were the reactants in this reaction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What were the products in this reaction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Activity 3: Reactivity to Base**

**Question:** Do substances react to strong bases?

**Materials:** 2 small test tube, rack, Ca(NO3)2 (calcium nitrate), Cu(NO3)2, copper (II) nitrate, NaOH.

**Procedure:**

Add 20 drops of Ca(NO3)2 (calcium nitrate) to one tube. Make observations in chart below.

Add 20 drops of Cu(NO3)2, copper (II) nitrate to the other tube. Make observations in chart below.

Add a squeeze of NaOH (sodium hydroxide base) to each tube. Observe.

Observations:

|  |  |  |
| --- | --- | --- |
|  | The solution looks like.... | When mixed with NaOH... |
| Ca(NO3)2 |  |  |
| Cu(NO3)2, |  |  |

**Claim/Evidence:** Were these two processes chemical or physical changes?

Ca(NO3)2 went througha \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change when base was added. The evidence was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cu(NO3)2 went througha \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change when base was added. The evidence was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Reasoning:** Why does the evidence above suggest a physical or chemical change?

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**Clean up:** Pour tube with Copper into filter funnel at front of lab. Wash out tubes with Sparkleen and a scrub brush. Hang on drying rack.

Self Assess:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Emerging | Developing | Proficient | Extending |
| Planning and Conducting:   * Recording detailed observations * Followed safety guidelines |  |  |  |  |
| Process and Analyze:  Use scientific understandings to identify relationships and draw conclusions | I can state a claim that summarizes my results | I can use specific evidence based on the resutsl of the experiment to support my claim | I can explain the scientific reasoning that supports my claim and evidence | I can relate the scientific reasoning to a different situation (this is similar to ... or this is like how...) |

Extra.....

Materials: Test tube rack, 2 medium test tubes, sodium carbonate solution (CaCl2), calcium chloride solution (Na2CO3).

Pour about 2 cm of sodium carbonate solution in one test tube

Pour about 2 cm of calcium chloride solution in the other test tube.

Make observations of each solution in chart below.

Mix the two together.

Record observations in chart below.

Clean up: Pour contents of test tubes into the beaker with the strainer (on the front lab bench). Clean test tubes at sink and place on rack to dry

Put away all lab equipment

|  |  |  |  |
| --- | --- | --- | --- |
| Solution | Description | Chemical or Physical Change? | Evidence |
| sodium carbonate |  |  |  |
| calcium chloride |  |  |  |
| Mixture |  |  |  |

* + - 1. There are many pieces of evidence that indicate a chemical change occurred. Name 4 pieces of evidence that indicate a chemical change. (You witnessed 3 of them today).

For Activity 4, suggest a reason why

**Questions:**

* + - 1. Why was it necessary to wear goggles when you did these experiments?
      2. There are many pieces of evidence that indicate a chemical change occurred. Name 4 pieces of evidence that indicate a chemical change.
      3. For Activity , what physical property changed?
      4. solutions are used rather than solids?