CONTENT STANDARD: Physical Science

CONTENT TOPIC: Matter II – Change of States

CONCEPT: Solids, liquids, and gases have identifying properties.

TEKS Covered in this lab: 2.1 through 2.5 and 2.7a-b

CONTENT OBJECTIVE: To understand the properties of the three states of matter

INSTRUCTIONAL OBJECTIVES: The learner will:

- identify properties of materials as they undergo physical changes, such as size, form, shape, heated, expanded, cooled, or contracted.
- identify the three states of matter.
- Identify how states change due to energy

OUTLINE OF CONTENT:

I. Classification of Matter
   A. Solid
   B. Liquid
   C. Gases
II. Atoms
III. Molecules

ACTIVE PARTICIPATION: Let's become atoms in solids, liquids, and gases. Show what happens when heat energy is added to the matter (use a prop to simulate heat/energy). The atoms move more (gain energy) by the addition of (heat) energy. Have the students change to the next "state" by having solids change to liquids, liquids change to gas, gas changes to Plasma .

1. SOLIDS – Take a small group of children, place them close to each other and rub your hands back and forth. After adding energy (heat) the students begin to move like liquid atoms.

2. LIQUIDS – Take a small group of children spread out a bit and have them wave their arms. After adding energy (heat) the students begin to move like gas atoms.

3. GASES - Let a group of children walk around room GENTLY bumping into each other and then spreading out in all directions. After adding energy (heat) the

students begin to move really fast and become Plasma atoms. The Sun is made of Plasma.

Draw circles to show how close atoms are in the different states of matter. In the solids they are close together. In liquids they are further apart and in gases they are even further apart. (Teacher should model this on the board.)

SET:

Matter can be put into 3 groups. Tell your neighbor the 3 states of matter. Matter can be a solid, liquid, or gas. Energy can change matter into different states. The normal progression of change for matter is Solid <-> Liquid <-> Gas.

INSTRUCTION:

Water is a liquid that is very important to us. Which form of matter is water? (response). Water can become any form of matter. One factor that can change the form of matter is energy (heat). Energy can be added or taken away.

ACTIVE PARTICIPATION:

Measure the temperature in the room. Write it down. Now let's add some ice to our cup.

They dip a measurement thermometer into a cup of ice cubes in water. Read the thermometer. Record the temperature as time passes. What does it say? (degrees Centigrade or degrees Fahrenheit) Is it going up or down?

While you are working at your tables, I will come around to each team and we will measure hot water. I must caution you to be very careful. We will be using boiling water. It could burn you if you spill it on yourself.

What will happen when we put the thermometer into the boiling water? (Temperature will rise) Then carefully dip the thermometer into boiling water poured into a styrofoam cup. Read thermometer again. Record the temperature as time passes.

Which of these is a solid? (ice cubes) A liquid? (water) A gas? (The steam that rises off the boiling water.) Make a drawing of the thermometer, showing the temperature of the ice and the steam.

CLOSURE:

1) How can we change states of matter?

2) What is the normal progression of change in matter? Is this progression always true?
3) Can a different type of energy (other than heat) affect matter? How?
4) Draw what you think happens to atoms in a liquid if we add cold energy?