Krug Chemistry – Deep Run Daily Planning Guide

Date of Lesson: Q1 Day 10 – Classifying Matter

Topic /Big Questions: (Question Stems & Question Creation Chart)

- **What's the difference between a physical property and a chemical property?**
- **How are mass and volume related?**
- **How is matter classified?**

State SOL	Unpacking the Standards (Video explanation shown at 3:18)
CH 2 h CH 5 a, d	**CH.2** The student will investigate and understand that the placement of elements on the periodic table is a function of their atomic structure. The periodic table is a tool used for the investigations of: **h) chemical and physical properties**; and **CH.5** The student will investigate and understand that the phases of matter are explained by kinetic theory and forces of attraction between particles. Key concepts include: **a)** pressure, temperature, and **volume**; **d)** phase changes;

Visible Learning (For the three items with asterisks*, think from a student perspective. Use simple language)

***What am I learning today?** Matter is classified by its chemical and physical properties.

***Why is it important?** It's **important** for scientists to know the properties of **matter** because all things are made up of **matter**. ... The main physical characteristics of **matter** are mass, volume, weight, density, odor, and color.

***How will I know I've learned it?** Students will understand that the **ratio** of mass to volume determines density. Students will understand that a physical change does not rearrange atomic structure; while a chemical change creates new bond arrangements.

Differentiation strategies:

Steel Wool, Sugar Water, Alka-Seltzer Labs

PhET Density Simulation

Physical and Chemical Properties and Changes Worksheet

AMTA Mass, Volume, Density Worksheet

Matter Classification Flow Chart

Accommodations and/or modifications are being met for students with IEP's/504's.

Access to all materials on Schoology, frequent checks for understanding; CER activity in small groups;

Daily Plan/Sequence of Instruction:

Begin with the Steel Wool Lab, so that the focus is classifying matter. Student groups will each obtain a steel wool pad and a paper plate. The students will be told to sketch a BEFORE image of the steel wool in their lab notebook. They will then be told to record the total mass of the wool and plate. Next students will be told to stretch out the steel wool and make it fluffier. They will be asked to sketch AFTER image showing the change in the wool particles and to re-measure the mass. Ask students to draw the BEFORE and AFTER images and masses on their white boards. Ask the following questions: "Did the mass change BEFORE and AFTER? If so, by how much? Why" (Mass should not change.) "Does the AFTER image reflect the fact that mass stayed the same?" (In other words, does it have the same number of particles?) If students drew too many or too few particles, encourage them to fix it.

Have the students record the following in their notebooks:

WHAT I KNOW SO FAR: # of particles stays the SAME
identity is the SAME

Now ask students to use the tongs to hold the steel wool over a Bunsen burner. Ask them to record their observations in their notebooks. (Orange embers, wool turns bluish black, very crumbly). Once the wool has completely burned, explain that students should return the wool to the plate and re-measure the total mass. (The mass will be greater than before.) Ask the students to draw BEFORE, DURING, and AFTER images in their notebooks and on the white boards. Ask them to write the BEFORE and AFTER masses as well.

Ask the students to look at all the whiteboards to notice similarities and differences. "Did everyone's AFTER mass get larger? Why? Where did the extra mass come from? How can you represent the additional mass in your drawing?" Discuss how the extra mass is new STUFF, different matter, that has been added to the wool. This should be sketched by adding new particles to the drawing. Students can use a new color or different shape to represent the new matter. The amount of new matter should reflect the amount of additional mass.

Have the students record the following in their notebooks:

WHAT I KNOW SO FAR: # of particles CHANGES
identity CHANGES

Do the next two labs as Demos for the sake of time:

Place a 100 ml beaker, stir rod, and sugar packet on a paper plate on top of a digital scale. Fill the beaker with 50 ml water. Ask students to sketch the BEFORE set up and record the total mass in their notebooks. Ask for a volunteer to mix the sugar with the water and return the paper packet and stir rod to the balance. Ask students to sketch AFTER set up and mass in their notebooks. Ask "Did the number of total particles change in this experiment?" Answer is NO. Therefore, since **the # of particles stays the same**, the **identity of the particles stays the same**, so this is a **PHYSICAL CHANGE**. Ask students to write this in their notebooks.

Now remove that set up. Place a new 100 ml beaker on the paper plate. Add 50 ml of water. Add a stir rod and an Alka-Seltzer tablet. Ask students to sketch this in their notebook and record the total mass. Ask for a volunteer to add the Alka-Seltzer tablet to the water. Return the paper packet and stir rod to the balance. Ask students to sketch AFTER set up and mass in their notebooks. Ask "Did the number of total particles change in this experiment?" Answer is YES. Therefore, since **the # of particles CHANGED**, the **identity CHANGED**, so this is a **CHEMICAL CHANGE**. Ask students to write this in their notebooks.

Next ask students to open the PhET Density Simulation on their computers. The simulation has a menu of 5 different materials. Assign a different material to each student group. [If you have more than 5 groups in your class, give the 5th group a graduated cylinder, digital scale, and deionized water. Give the 6th group a cylinder, digital scale, and vegetable

oil.] Ask the groups to choose 5 different masses and corresponding volumes in order to create a mass vs volume graph in their notebooks and on their white boards. Once all the graphs are drawn, have students point out similarities and differences. Ask the students what the slope of the line represents. **DENSITY (g/ml).** Ask the students, who did not use water, if their material will sink or float. How do they know? Will the trend line for water be above or below their material's trend line? Ask them to add the trend line for water to their graph to indicate the difference in slope.

Now allow the students to play with the simulation by clicking on **MY BLOCK**. What happens when they increase the mass? What happens when they increase the volume? Next ask students to click on **MYSTERY** BLOCK. They should place each block on the scale, and then drop it in the water. Use the mass and displaced volume to calculate the density. Then click **SHOW TABL**E for a list of materials to match the identity. The first group to correctly identify all 5 densities and identities, wins! (Students must show work. I like to give a piece of candy and an extra credit ticket. Students must collect 5 tickets in order to earn 5 pts extra credit on a test.)

Now with the remaining time, allow students to work with partners to fill in the **AMTA Mass, Volume, Density Worksheet**. Show students the **MATTER CLASSIFICATION FLOW CHART**. Discuss the different types of matter and show students how to draw particle diagrams for ELEMENTS, COMPOUNDS, HOMOGENEOUS MIXTURES, and HETEROGENEOUS MIXTURES. Assign the **Physical and Chemical Properties and Changes Worksheet** for homework.

Assessments (List all formative/summative assessments used to check for understanding during this lesson. Summative assessments may occur during a different class period.):

Labs and Simulations (formative)

Physical and Chemical Properties and Changes Worksheet (summative)

AMTA Mass, Volume, Density Worksheet (summative)

After assessing today's lesson are you and your students comfortable moving forward with your next objective?

Yes - Students actively participated and recorded sketches and information in their notebooks

No, remediation required to proceed – If students did not participate or take good notes, teacher will email parent/guardian to inform them of lack of progress. Teacher will recommend that student copies notes from a classmate in order to catch up.

Teacher reflection: