Lesson 3
Lesson Title: Density Columns

Grade Level: 5th

State Core Standards:

Standard 1

Students will understand that chemical and physical changes occur in matter.

Objective 1

Describe that matter is neither created nor destroyed even though it may undergo change.

1.Compare the total weight of an object to the weight of its individual parts after being disassembled.

Objective 2

Evaluate evidence that indicates a physical change has occurred.

1.Identify the physical properties of matter (e.g., hard, soft, solid, liquid, gas).

Specific Lesson Objective: I want my students to be able to identify the physical differences in liquids

Lesson Purpose: What is density and how does this physical property affect the stages of matter.

Vocabulary Focus:
Density
Volume
Buoyancy

Materials:
6 Tall cylindrical Beakers
6 Scales
30 4oz cups
300 mL Water, Rubbing Alcohol, Corn Syrup, Glycerin (Dish Soap) and Vegetable Oil
Food coloring
3 Clear boxes
50 foam balls
Lesson Time:

B. Instructional Procedures.

Engage and Launch:
I will start the lesson by asking the students to review what we have already learned.

1. **What are the 3 phases of matter?**
2. What is solubility?
3. Does breaking an object effect how much mass an object has?

I will review with the kids to see how much information has been retained as well as fill in any gaps that will be necessary for the experiment we will be doing today. I will then inform them that today we will be learning about another property of matter: Density

Next I will ask if any kids know what density is and can explain it. I will take few suggestions and see what they know. I will then start an experiment that gives solid evidence of density. We will be testing the densities of different liquids.

Teacher Role	Asks questions; Assesses prior knowledge; Provides information needed for Explore phase
Student Role	Gains interest; Calls up prior knowledge; Develops a need to know

Explore: 30 min.
I will start off the experiment by passing out the procedure instructions. I will have them read the instructions individually and then have the students go through the experiment step by step.

1. Each group of students needs to collect each of their liquids. There will be trays with the liquids set about the room. Each group needs to measure 50 mL of each and have them be different colors so that they can see the different levels later on.
2. Once each group has the 5 different liquids I will have them predict the order of density of each and write it on their worksheet.
3. Next they will have to find the density of each liquid. First they will measure the weight in grams of each liquid and subtract the weight of the cup. Next they will have to find the density, which is Mass/volume. So they need to divide the weight of their liquids by 50 because there is 50 mL.
4. After they have found the density's they will then get to pour the liquids into the cylinders and see how they layer.

Teacher Role	Makes open suggestions; Questions and probes; Provides feedback; Assesses understanding and processes
Student Role	Explores resources and materials; Hypothesizes and predicts; Records observations and ideas;

Explain and summarize: 10 minutes

1. I will then ask the students why they think the liquids layer in that particular way and get a few suggestions.
2. I will then grab the clear boxes and foam balls and have a demonstration of how density works in each type of matter:

Solid: I would ask the students about some different types of metals and get some suggestions. I will then show them that in a solid the particles are tightly packed into the solid. I will show this by stuffing a bunch of foam balls into the box. The box will fill up and the balls will be smashed together. Now in solids like Steel and aluminum the balls will still be packed together but steel will have tons of balls smashed into the box, but aluminum will have significantly less.

Gas: I will show the same examples above but with only 1 2 or 3 balls in the box. Oxygen would have 3 balls bouncing around the empty box and helium would have 1 ball bouncing around showing that helium is less dense than oxygen but they are still both gases.

Liquids: Same as above using the most dense and least dense liquids in the experiment.

Teacher Role	Asks for clarification and evidence from students; Enhances or clarifies student explanations; uses students' experiences as a basis for explaining new concepts; provides new vocabulary; evaluates student explanations.
Student Role	Clarifies understandings discovered; Shares understandings for feedback; Forms generalizations; Seeks new explanations

Elaborate and extend: 5 mins

1. Finally if there is extra time or if a group of students finish early,I will as the students to gather a few objects around the room that they would like to test: Erasers, beads, cork, popcorn kernels etc. and have them guess how dense the items are and where they would fall in the density column. They will then drop the items into the density column and observe where the items layer. I will ask questions about their observations and why they made their predictions.

Teacher Role	Asks questions; Poses new problems and issues;
Student Role	Applies new knowledge by performing related tasks; Asks questions;

Evaluate:

I will have formative assessments from my open-ended questions and from the student's worksheets and observations. I will continuously quiz the students on what they have learned in previous lessons.

There will also be a cumulative assessment when the kids take their unit test.

Teacher Role	Observe and assess students; Asks open-ended questions;
Student Role	Demonstrate an understanding of a skill or concepts; Evaluates his/her own progress and knowledge; Answers open-ended questions by using observations, evidence, and previously accepted explanations

Adaptations for Special Needs:

Charlie, Rayanna, Abram, and Abby will need to be monitored to keep them focused and on task. We moved seats around this week so they way the kids work in teams might be different from usual. Hunter has a tendency to daydream so he also needs to be monitored. All of these kids have been place next to other students who are willing to help them out and keep them on task.

Name:_____ #:_____

Density Columns Worksheet

1. Which liquid do you think is the most dense (will be at the bottom)?

2. Which do you think is the least dense?

3. Record het weight for each liquid and calculate the density
   Density = Weight/ 50 milliliters

Liquid	**Weight (grams)**	**Density (grams/mL)**
Water		
Rubbing Alcohol		
Dish Soap		
Corn Syrup		
Vegetable Oil		

Draw a graduated cylinder to the left and color and label the liquids.

_____

_____

_____

_____

_____

4. Which liquid was the least dense?

5. Which liquid was the most dense?

6. Was your hypothesis correct from beginning to end? (Write a paragraph using complete sentences to explain)