Lesson Plan Template

Heading

Name:
Curriculum Area: Chemstry Teacher Activity
Lesson Name: Dimensional Analysis
Grade: 10-11

Audience (whole class, small group…)
Anticipated Time: 1 hour, 30 minutes
Date: Fall Semester

Standard(s)

III. MATHEMATICAL SKILLS

Students are expected to know the content of the *Massachusetts Mathematics Curriculum Framework,* through grade 8. Below are some specific skills from the *Mathematics Framework* that students in this course should have the opportunity to apply:

- ✓ Construct and use tables and graphs to interpret data sets.
- ✓ Solve simple algebraic expressions.
- ✓ Perform basic statistical procedures to analyze the center and spread of data.
- ✓ Measure with accuracy and precision (e.g., length, volume, mass, temperature, time)
- ✓ Convert within a unit (e.g., centimeters to meters).
- ✓ Use common prefixes such as *milli-, centi-,* and *kilo-*.
- ✓ Use scientific notation, where appropriate.
- ✓ Use ratio and proportion to solve problems.

Objective(s)

Learning objectives communicate the expectations of the teacher

"Students will demonstrate their ability to use ratios to solve for density."

Objectives state the learning that will be assessed

"Students will demonstrate their ability to measure mass and volume and calculate density"

Objectives must be measurable

Students responses will be compared to true values

Assessment

Criteria for success are defined in advanced of the lesson and are used to guide planning
How you know that learning is taking place?

"Students will document their responses on an activity sheet provided by the teacher and it will be corrected for accuracy and completeness. ***See document attached to activity.***

How do you know that your teaching resulted in learning?
"Students will be provided example problems prior to activity and teacher will demonstrate some examples."

How will you ***check for understanding*** during the lesson?
"Students will work in groups and have their answers checked prior to activity:"

All assessment does not have to summative.

Prior Knowledge

What are students bringing to the lesson?

What do I know that students already know?
"Students know how to measure mass using a triple beam balance and students know how to measure volume using a graduated cylinder".

How will I find out what else students already know?
"Students will be asked to determine how liquid substances of different densities would arrange themselves in a graduated cylinder."

How does this build on prior experience or knowledge?
"This builds on prior knowledge by scaffolding their laboratory skills of measuring mass and volume and calculating density and using logic and rational thinking skills to demonstrate the property of density from a calculation.

How does this lesson contribute to what the student should learn from the entire unit?
"*This lesson provides the student with an opportunity to expand and combine their prior knowledge of using a ratio of mass/volume to calculate density."*

Materials

Needed materials for teacher and students

- Activity Sheet - Laboratory Assessment Skills – Calculating density from mass and volume.

Procedure

What will I actually do?

Motivational Activity

Proper Use of the Balance Laboratory.
Density of Pennies Laboratory.

Learning Activities
A step by step of what you will do. Include details
Teacher activity (TA) Students will be given examples of calculating density.

Student activity (SA) Students will be working in groups to determine the density values.

(TA) Teacher will demonstrate how liquids of different densities find their appropriate level in the graduated cylinder. Teacher will ask students to explain how they know which liquid is least dense and most dense.
(SA) Students will discuss their responses and observations.

(TA) Teacher will pass out activity sheet.

(SA) Students will perform the calculations on the activity sheet.

Outgrowths

Then what?

Where do we go from here?
"Student responses will be checked for accuracy. Common misconceptions will be discussed. Most common is that students confuse density with the volume; the liquid with the greatest volume will be placed on the bottom of the graduated cylinder instead of the liquid with the greatest density."

What are (or would be) your anticipated next steps?
"Discuss how to improve the activity with the students and determine a better way to improve their understanding of ratios and proportions."

Keep in mind that your assessments will guide your future instructional planning.

Adaptations

***There are a lot of differences out there*!**

In this section you are not only considering **contingencies**, but planning for **differing learning styles, inclusion issues, students who finish early, students who are struggling…**

Lesson can be adapted for students with lower math skills.

Lesson can be completed in a group setting.

Narrative on Lesson Reflection

To be completed after you have taught the lesson. Consider any of the following "Authentic Teaching" criteria in evaluating your effectiveness.

- Advanced Organizers
- Getting Attention
- Enthusiasm
- Clarity
- Directions

- Timing
- Variation
- Interaction
- Wait time
- Active Learning
- Role Playing

- Closure
- Independent Learning
- Groups
- Cooperation
- Inquiry

Context

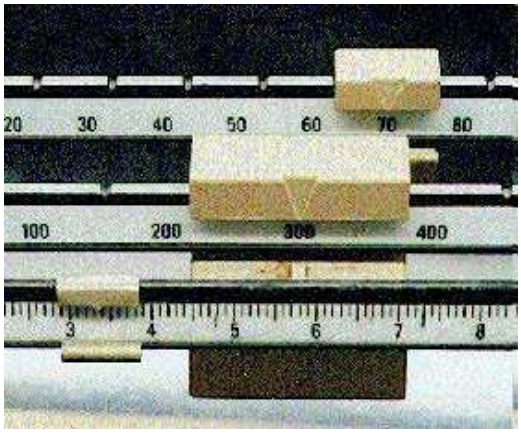
In this section, describe the Unit of which this lesson is a part and where this lesson fits into the unit.

This lesson takes place at the end of the unit and is used as a quarterly project.

Name: _____Period: ____ Date: _____

HONORS CHEMISTRY 1ST QUARTER LABORATORY SKILLS ASSESSMENT

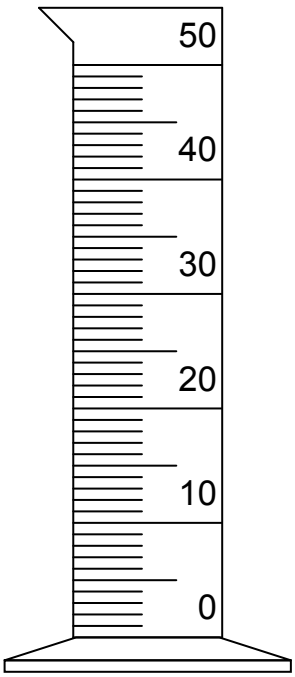
1. Below is a _____which is used to measure _____.
   Record the following measurement using the correct units.



_____

2. Below is a _____which is used to measure _____.

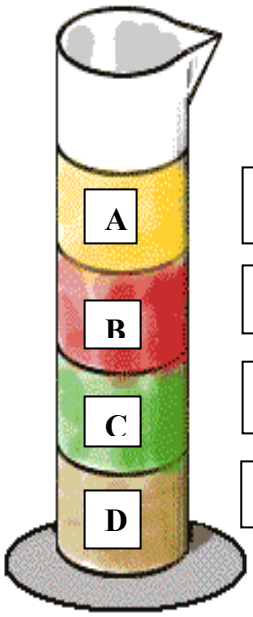
Record the following measurement using the correct units.



_____

3. The following graduated cylinder contains four liquids labeled A, B, C, and D. Label the liquids based on the data

Liquid	Density (g/ml)
corn syrup	1.38
ether	1.20
canola oil	0.93
salt water	1.10



A -

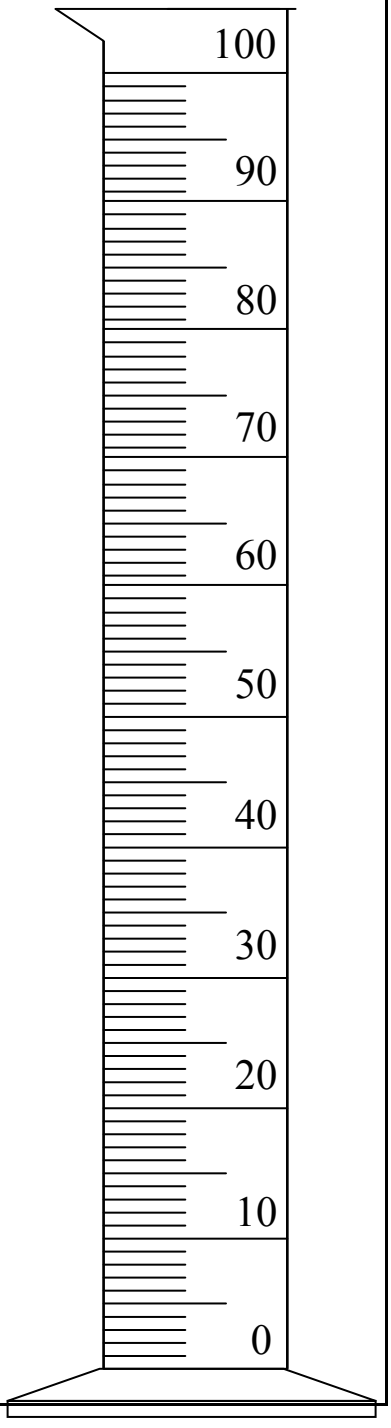
B -

C-

D -

4. A student is given different amounts of four unknown colored liquids. Complete the table and use the necessary information and colored pencils to illustrate (show) how the liquids would be layered if they were poured into the graduated cylinder.

Sample	Density (g/ml)	Mass (g)	Volume (ml)
orange liquid		**61.41**	**10.1**
blue liquid	**9.18**	**218.08**	
green liquid	**3.87**		**21.8**
red liquid		**22.43**	**15.2**



Write the correct formula for each of the unknowns.
Solve for unknowns and complete table.

red liquid:

d =

blue liquid:

v =

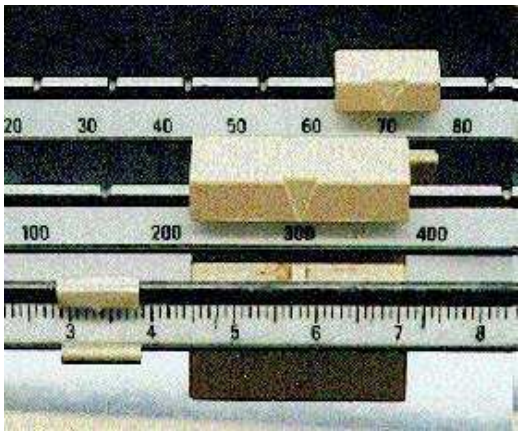
orange liquid:

d =

green liquid:

m =

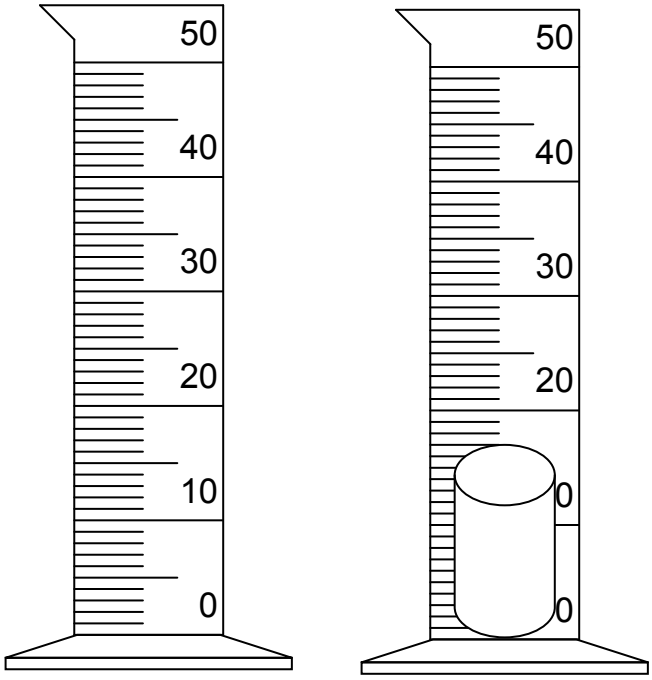
5. The student was then given an irregularly shaped object and asked to predict where it would land if it was dropped into the graduated cylinder with the four unknown liquids in question #4. The following measurements were taken.



mass of the object: _____

Because the object had an irregular shape, the

_____



method was used to calculate the volume.

volume of the object: _____

density of the object: _____

***Bonus – Return to the graduated cylinder in question #4 and use a darkened arrow to indicate where the object will land after being dropped into the graduated cylinder with the four unknown liquid**