

TITLE OF LESSON

Physical Science Unit 1 Lesson 12 – Lab 3: Density

*Nature of Matter: How do tribes define the substances around them and their interactions?*

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TIME ESTIMATE FOR THIS LESSON

One class period

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ALIGNMENT WITH STANDARDS

California – Sciences: Chem, Gases and Their Properties 4; Investigation and Experimentation 1d, f

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MATERIALS

*Kirinyaga* Ch. 3 pp. 62-84 – Reading (not provided by ESubjects)

**Separating Plastics** – Teacher Page

**Lab 3 – Density** – Student Page (one for each student)

**Lab 3 – Density Key** – Teacher Page

**How to Write Up a Lab Report** – Student Page (one for each student)

calculator (optional)

For demo:

4 250 ml beakers

long forceps

stirring rod

propanol (isopropyl or rubbing alcohol)

water

corn oil

Plastics with various numbers, 1, 2, 3, 4, 5, 6

Each lab group will need:

several different 10.0g samples of metal shot, a balance, weighing paper, graduated cylinder, water

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LESSON OBJECTIVES

- To assess density
  - To create a hypothesis
  - To do an experiment
  - To analyze results to form a conclusion
  - To write a group lab report
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FOCUS AND MOTIVATE STUDENTS

- 1) Homework Check – Stamp/initial complete homework assignments. Pass back graded assignments and have students place them in the appropriate sections of their binders.
- 2) **Agenda** – Have students copy the agenda you posted.
- 3) Question Answers – Ask the students to get out their answers to the following questions on *Chromium* from *The Periodic Table* by Primo Levi. Randomly call on students to give their answers, then relate this story to the importance of keeping good notes. For instance, in this case, scientists were following a protocol and doing a step that was unnecessary. Thus, keeping good notes provides clarity, comprehension, and potentially a savings of time and money.
  - a. What customs do you have or why do we do things in a particular way?  
*Responses may include: For example, people usually have red wine with red meat and white wine with fish. Why do we have macaroni and cheese? Why are buttons on different sides for men and women?*
  - b. Why did they add an onion to linseed oil?

*Responses may include: The onion was used to determine the temperature of the batch of linseed oil. When the onion started to fry the boiling was finished. It did not have any chemical importance.*

- c. Why was ammonium chloride added to varnish?

*Responses may include: It was added to solve a problem called livering, a process where either the chromate was too basic or the resin was too acidic and it caused the varnish to undergo livering, or turn from liquid to solid*

- 4) Discuss – Ask students when they would expect someone to separate items for recycling. Take answers and write them on the board. Ask how these items are separated. Write their answers on the board. Ask how one would separate plastics since one can't use a magnet. Take answers and put them on the board. Remind students that if you are writing, they should be taking notes too. They can title their notes for today, Recycling. Then begin the teacher-performed demo.
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#### ACTIVITIES – INDIVIDUAL AND GROUP

1. Demo – Separating plastics by density. See **Separating Plastics** (Teacher Page) and follow the instructions for teacher demonstration.
2. Lab Protocol – Remind students that working in the lab is serious. Review safety precautions. Remind students that although they will not be working with any dangerous chemicals they should follow proper protocol. The students in each lab group must work together as a team.
3. Hypothesis – Ask students to break into lab groups, assign group roles (see *Group Roles* below), and formulate a question and an hypothesis about how to identify elements by density. Give them five minutes to come up with their agreed upon question and hypothesis. At the end of five minutes, call time.
4. **Reading Out Loud** – Hand out copies of **Lab 3 – Density**. Ask students to write in their agreed upon question and hypothesis in the appropriate place on their handout. In their lab groups, have students read the procedure out loud. Ask students if there are any questions. Explain to students that they must finish all steps of Lab 3 before the end of the period, as they will need the ideas from the process to write up their lab report tonight. They should all agree upon the information they write down on the **Lab 3** handout and understand why they get the answers they do because they will have to transfer that information into an individual essay this evening. Make sure all students write down all the information on their own handout!
5. **Lab 3** – Have the Materials Manager collect the materials necessary for the lab today. Ask students to perform the experiment by following the procedure in **Lab 3 – Density**. (You can play music to help students focus and remember not to talk loudly, which would disrupt other groups.) Students should work in their lab groups to collect and record their data.
6. Clean Up – Make sure to allow 10 minutes for students to clean up before the period is over.
7. How to Write Up a Lab Report – Have the students take out the handout, **How to Write Up a Lab Report** (or pass copies out, if you have not already done so.) Review with students the steps listed in the handout. In essence, their Lab 3 handout is the outline for the Lab Report. All they have to do is use their notes from the lab to go home and write it up in paragraph form. If everyone took good notes, agreed upon the answers, and made sure they understood all of the steps, students should have no difficulty writing the report in essay form tonight. Ask if there are any questions. Field them. You may want to give students a few minutes to talk to their group members to make sure they understood the lab and can write intelligently about what they learned in their lab report.
8. **Binders** – Remind students that their completed lab will be stored in the LAB section of the binder after they write Lab Report 3. That means they should be prepared to turn in the lab and the lab report tomorrow morning when they walk in the door.
9. Homework Review – Review the homework with students.

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#### HOMEWORK

- 1) Write first draft of Lab Report 3 due at the beginning of class tomorrow.
  - 2) Read *Kirinyaga* Ch. 3 pp. 62 – 84.
  - 3) Write a [Dialectical Journal 6](#) with at least three entries.
  - 4) Study all notes and vocabulary to date.
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#### GROUP ROLES

Manager – You are responsible for making sure your group has all necessary materials.

Recorder – All students will be acting as recorders today.

Facilitator – You are responsible for making sure your group stays focused and completes the lab.

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#### DOCUMENTATION FOR PORTFOLIO

Lab Report 2