



Introduction to Lab Science – Grades 3-5

Nebraska Science Standards

5.1.1.d Make relevant observations and measurements

5.1.1.e Collect and organize data

5.1.1.f Develop a reasonable explanation based on collected data

5.1.2 Students will describe how scientists go about their work.

5.1.2.c Recognize many different people study science

Objective: The goal of these activities is to familiarize the students with basic laboratory equipment, safety, and scientific terminology.

Materials (provided by CSM):

- Three (3) activity leaders from CSM
- Activity packet
- Goggles and gloves
- Crayons or colored pencils

Microscopes Activity

- Microscopes (3 or multiple sets of 3 depending on class size)
- A set of slides for each microscope: peacock feather, bumblebee leg, human blood

Measurement Activity: Beakers and Dry Volume

- Beakers: (3) 50mL, 100mL, and 200mL beakers
- Small paper cups
- Cooking trays (3)
- Scales
- Jellybeans

Measurement Activity: Pipetting and Liquid Volume

- Test tubes and test tube stands (3)
- Pipettes (3 per beaker)
- Beakers: 100mL (3)
- Food coloring: red, green, and blue
- Paper towels

Materials (provided by the classroom):

- Water

Discussion: (Questions to ask the students)

- Why is it important to study science?
 - Technology
 - Make advances in technology like computers, phones, Ipads, video game systems, etc.
 - Astronomy
 - Understand about the moon, planets, and stars
 - Medicine
 - To find cures for diseases and to make us feel better when we are sick
- What kind of jobs can scientists have?
 - Doctor or nurse
 - Astrologist
 - Archaeologist
 - Meteorologist
- What does a scientist wear?
 - Lab coats
 - Goggles
 - Gloves
 - Masks
- What kind of tools does a scientist use? And what are they used for?
 - Microscopes: seeing really small things that we cannot see with just our eyes like cells and germs
 - Telescopes: seeing things that are far away like planets and stars
 - Thermometers: measuring the temperature
 - Scales: measuring the weight of something

Activity Description: Students will be given a worksheet to complete by rotating between three stations: microscopes, measurements, and temperature. The microscope station allows students to observe samples on a cellular level using a compound light microscope. The measurement station will allow students to practice measuring dry and liquid volumes through the use of beakers, scales, and pipettes.

Volunteers will set up three stations so that the class will be split into three groups to rotate around.

STATION 1 – MICROSCOPES

You will need:

- Activity packet (PAGE 1)
- Goggles and gloves
- Crayons or colored pencils
- Microscopes (3 or multiple sets of 3 depending on class size)
- A set of slides for each microscope: peacock feather, bumblebee leg, human blood

Setup:

- Set up the three microscopes with each of the three slides. Make sure the slides are turned upside down so the students can't read the label. Demonstrate the correct way to use a microscope and monitor their use of the microscopes and the slides.

- Things to remember: Before allowing students to use the microscopes, remind them that they only need their eyes to look- they should not be touching the microscope at any point in the activity. Do not let them move the microscopes across the table.
- Have the students hypothesize what they are looking at under each microscope. They will know the options of peacock feathers, bumblebee legs, and human blood.
- A common question from students is, how do the “things” get inside the microscope? If this question is asked, explain to them that there are slides where the “things” were glued onto which help us to view something under the microscope. Remind them that microscopes are used to view really small objects. Scientists take small pieces from really big things and put them onto the slides. For example, to view the peacock feather, a scientist took a small piece of the feather from a big peacock. The little bumblebee leg came from a bigger bumblebee, and the small drop of human blood came from a human.

Procedure:

1. Have each student in this group take turns looking under each microscope.
2. Ask the students what they think they are looking at under each microscope. Ask them what their favorite image is.
3. Have them draw what they see, be generous and kind to their drawings, and have them match the images found on their worksheet.

STATION 2 – MEASUREMENTS: BEAKERS AND WEIGHT

You will need:

- Activity packet (PAGE 2)
- Goggles and gloves
- Crayons or colored pencils
- Beakers: (3) 50mL, 100mL, and 200mL beakers
- Plastic cups
- Cooking trays (3)
- Scales
- Jellybeans

Beaker – Dry Volume Set up:

- This activity involves measuring jellybeans in a beaker to visualize their volumes and then weighing the same volume on a scale to determine its mass. Students will then make a chart of the **number** of jellybeans for each of the three-volume samples. *Note, not the mass.
- You will need to explain how to use the scales and demonstrate how to use the cup to “tare” or “blank” or “zero” out the scale. Explain how this is important to get an accurate reading.
- For each beaker station, fill a large cup with jellybeans.

- At each beaker station, lay the beakers out from largest to smallest. Make sure the cup of jellybeans and beakers are on the cooking tray.
- Have a scale at each station and make sure they are turned on.
- Break up the students into three groups and assign them a cooking tray of beakers and jellybeans.
- Things to remember: This activity tends to be more difficult for the students. Before starting the procedure, ask them if they know what “this” is while holding up a beaker.
- They will most likely say it is a measuring cup. Assure them that they are on the right track. Bakers call them measuring cups, but since we are studying science, we will call them beakers.
- Point out that there are different sizes of beakers. The bigger beakers will have a bigger number associated with them. Bigger beakers can carry more things and smaller beakers carry less.
- Explain that the amount the beaker holds is the volume, and the amount of that volume will have a weight in the form of mass.
- Explain what a hypothesis is (prediction based upon previous results or knowledge).

Procedure:

1. Begin by having the student tare the 50mL beaker on the scale. Now they are able to lift the beaker and fill it with 50mL of jellybeans. Once this has been done, weigh the 50mL of jellybeans in grams and record them on their worksheet.
2. Once weighed, determine how many jellybeans are in 50mL by counting the individual jellybeans and record on their worksheet.
3. Next, have the student tare the 100mL beaker on the scale and fill the beaker with 100mL of jellybeans. Once this has been done, weigh the 100mL of jellybeans in grams and record them on their worksheet.
4. Once weighed, determine how many jellybeans are in 100mL by counting and recording on their worksheet.
5. Put the 50mL and 100mL beakers aside and tare the 200 mL beaker. Have the students hypothesize how much 150mL of jellybeans will weigh if they pour 50mL of jellybeans and 100mL of jellybeans into the beaker and record them on their worksheet. Have the students also hypothesize how many jellybeans are in 150mL.
6. Once they answer, pour the 50mL and 100mL of jellybeans into the 200mL beaker, weigh and record the actual mass on their worksheet. Then count the number of jellybeans found in the 150mL volume and record it on their worksheet.
7. Once finished, pour all the jellybeans back into the cup.
8. Once they have gathered all their data, students will need to create a chart showing their results for the **number** of jellybeans in the different volumes of 50mL, 100mL, and 150mL.

STATION 3 – MEASUREMENTS: PIPETTES

You will need:

- Activity packet (PAGE 3)
- Goggles and gloves
- Test tubes and test tube stands (3 sets)
- Manual pipettes and 10mL pipette tip (9)
- Beakers: 100mL (3)
- Food coloring: red, green, and blue
- Paper towels

Set up:

- Fill the three beakers with water and add 2-3 drops of food coloring to each beaker.
- Place three pipettes into each beaker and keep that pipette tip in its appropriate beaker (ie. do not use the pipette found in the blue water beaker in the red water beaker).
- Arrange the test tubes in sets of three in the test tube stands.
- Explain how to use pipettes including demonstrating inserting the pipette tip into the pipette.
- Demonstrate drawing fluids into the pipette and how to expel the fluids. Make sure they keep the pipette tip completely in the fluid when drawing up the fluid and also emphasize slow and steady when expelling.
- Explain the measurement lines on the test tubes. Each line represents 1mL and students should fill the test tube to the bottom of the line.

Procedure:

1. The students will use a pipette to measure different amounts of liquids from beakers into test tubes.
2. Use the pipette to measure 3mL of red water to put into one test tube.
3. Use the pipette to measure 5mL of blue water to put into a second test tube.
4. Finally, use the pipette to measure 7mL of green water to put into the last test tube.
5. Have the students fill out this portion of their worksheet.
6. When finished, pour the test tubes into the appropriate beakers for the next group to use.

Congratulate the students on becoming little scientists!!