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 and safety and scientific terminology.

Activity Workshop

Materials (provided by CSM) for students:
** All students will receive a pair of gloves and goggles and a worksheet.

- Microscopes Activity
  - (3, or multiple sets of 3 depending on class size) Microscopes
  - A set of slides for each microscope: peacock feather, bumblebee leg, human blood
- Weight Activity
  - (6) Scales
  - Crayons
  - Cups
- Beaker Activity
  - Sets of beakers: 200 mL, 100 mL, and 50 mL
  - Plastic cups
  - Cooking trays
  - Rice
- Pipette Activity
  - (3, or multiple sets of 3 depending on class size) Beakers: 100mL
  - (3 per beaker) Pipettes
  - Several test tubes
  - (2) Test tube stands
  - Food coloring: red, green, and blue

Discussion:

- Why is it important to study science?
  - Technology

        - Make advances in technology like computers, phones, ipods, etc
    - Astronomy
        - Understand about the moon, planets, and stars
    - Medicine
        - To find cures for diseases, to make us feel better when we are sick
- What kind of jobs can scientists have?
    - Doctor or nurse
    - Astrologist
    - Archaeologist
    - Meteorologist
- What do scientist wear? -- Let them draw on their worksheet to match what you talk about
    - Lab coats
    - Goggles
    - Gloves
    - Masks
- What kind of tools do 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 really far away like planets and stars
    - Thermometers: measuring the temperature
    - Scales: measuring the weight of something
    - etc

Activity Description:

Students will be given a worksheet (see link above) to complete and have the opportunity to rotate between 3-4 stations. The microscope station allows students to observe samples on a cellular level. There are two measuring stations which allow students to practice using beakers and test tubes. The weighing station offers students a chance to use balances or electronic scales.

Microscopes:

Set up: The goal of the microscope activity is to have students hypothesize what they are looking at under each microscope. They will know that they will be looking at peacock feathers, bumblebee legs, and human blood. Set up each microscope with a slide. Turn the slide face down so the students cannot read the label. The will oftentimes cheat! :)

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 slides the microscopes across the table.

Procedure:

1. Have them take turns looking under each microscope.
2. Have the students draw a picture of what they see under the correct box in the worksheet.

3. Ask them what they think is under each microscope.
4. Ask them what their favorite one is.

** 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 which help us to view something under the microscope. Remind them that microscopes are used to view really small things. Scientists take small pieces from really big things and put them into 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.

Beaker: - Dry Volume

Set up: Fill a plastic cup for each set of beakers. Lay the beakers out from largest to smallest. Make sure the rice and beakers are in the cooking tray. If possible, each student should have his/own set of beakers and rice cup. Otherwise, some students will need to share.

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 it. Bigger beakers can carry more things and smaller beakers carry less.

Procedure:

1. Have the students hold up the 50mL beaker. Let them fill the beaker up to 50mL with rice. Now, have the students hold up the 100mL beaker. Add 100mL of rice.
2. Put the 50mL and 100mL beaker aside and hold up the 200 mL beaker.
3. Have the students hypothesize how much rice will be in the 200mL beaker if they pour 50mL of rice and 100mL of rice into the beaker.
4. Once they answer, pour the 50mL and 100mL of rice into the 200mL beaker. Let them evaluate
5. Have the students complete their worksheet

Pipet: - Liquid Volume

Set up: Fill the beakers with water and add food coloring to each beaker. Place three pipettes into each beaker. Arrange the test tubes in sets of three in the test tube stands.

Procedure:

1. Explain the measurement lines on the test tubes.
    - Each line represents 1mL.
    - Students should fill the test tube to the bottom of the line.
2. Explain how to use pipettes.
    - Squeeze the top/bulb before inserting the pipette into the water.
    - Once in the water, release the top/bulb.
    - To release the water gently squeeze the water into the test tube, being careful to add the right amount.
3. The students will use the pipette to measure the following:
    - Use the pipet to put 5mL of red water into a test tube
    - Use the pipet to put 3mL of blue water into a test tube
    - Use the pipet to put 7mL of green water into a test tube
4. When finished pour the test tubes into the appropriate beakers for the next group.
5. Have students fill out the worksheet

Weight: - Mass

Set up: Set out the crayons and turn on the scales. Place a plastic cup with each scale.

Procedure:

1. Each student will pick three colors and write their chosen colors on their worksheet.
2. Find all the crayons corresponding to one of the chosen colors.
    - If you have blue, find all the blue crayons
3. Write the number of crayons you found on the worksheet.
4. Weight the crayons and write their weight on worksheet.
5. Fill out the graph

Congratulate the students on becoming little scientists!!