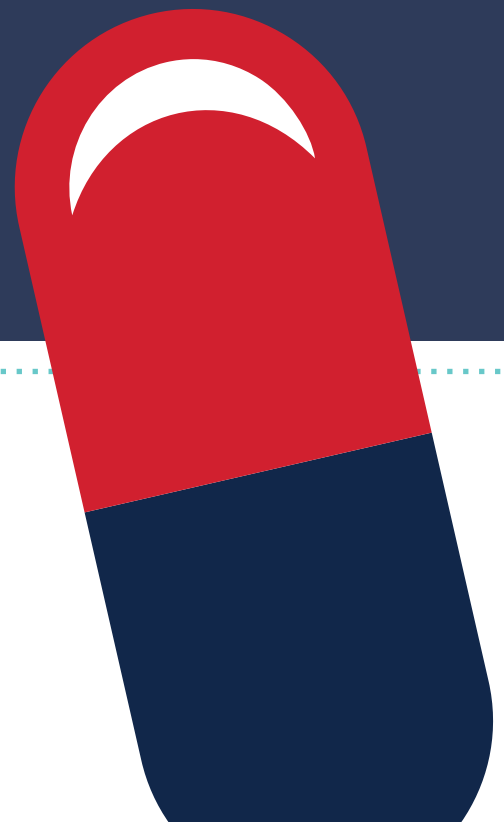


ELEMENTARY
SCHOOL

INTERDISCIPLINARY ACTIVITY

Malachi's Medication



LESSON OVERVIEW



Students will discover why it is important to use an appropriate device when measuring the dosage of a medication. Initially, they will explore a prescription label to identify and explain the dosage instructions (quantity, frequency, and special instructions). They then will conduct an experiment to determine why a young boy named Malachi should use a particular measuring device with his medication. To demonstrate understanding, they will write a conclusion that summarizes which measuring tool most accurately dispenses Malachi's dosage.

Content Areas

Health, English Language Arts, Math

Activity Duration

60 minutes

Grade Level

Grades 3-5

Essential Questions

- How do I determine the proper dosage and usage of medication?
- Why is it important to use an appropriate tool to measure my prescribed dosage?

Materials

Each student will need the following:

- [What's in a Label? Student Handout](#)
- [Malachi's Medication Investigation Student Handout](#)

Each group will need the following:

- 2oz clear plastic cup labeled #1, 2oz clear plastic cup labeled #2, and 2oz clear plastic cups labeled #3
- 8oz clear plastic cup full of water labeled **Malachi's Medicine**
- One plastic spoon, one medicine cup with metric, and one unmarked dropper

The class will need the following:

- Three strips of tape
- A table

Objectives

- Analyze the information on a prescription label
- Explain why it is important to use an appropriate measuring device with a medication

HEALTH STANDARDS

National Health Standards

Students will comprehend concepts related to health promotion and disease prevention to enhance health.

1.5.5 Describe when it is important to seek health care.

Students will demonstrate the ability to access valid information, products, and services to enhance health.

3.5.1 Identify characteristics of valid health information, products, and services.

Students will demonstrate the ability to use decision-making skills to enhance health.

5.5.4 Predict the potential outcomes of each option when making a health-related decision.

Common Core English Language Arts

CCSS.ELA-Literacy.RI.4.7

Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Common Core Mathematics

CCSS.MATH.CONTENT.3.MD.A.2

Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

BACKGROUND INFO

The U.S. Food and Drug Administration (FDA) determines whether medications are prescription and require consultation with a doctor or are nonprescription and can be readily available at stores. This helps us know which medications are safe and effective to take with or without a doctor's prescription.

BACKGROUND INFO

Prescription medication is prescribed for a specific person. Physical properties such as weight, age, fat mass, and muscle mass are considered when factoring how to prescribe medication. The FDA establishes criteria to ensure that prescription labeling accurately summarizes the safe and effective use of a prescription medication. Physicians use the labeling to prescribe medications unique to each individual. The dosage will vary from person to person as we are all genetically and chemically different and may tolerate certain types of medicine more than others.

According to the National Council for Prescription Drug Programs (2014), inaccurate dosing of oral liquid medications has been a concern for years. Common dosing errors include confusing volumetric units (e.g. teaspoons, tablespoons, droppers) or abbreviations (e.g. tsp, TSP, t, mL). When dispensing oral liquid medication, the Council recommends that physicians provide a dosing device with units that correspond with the prescription labeling or tell the patient where to obtain one.

Over-the-counter (OTC) medications do not need a doctor's prescription and can be sold directly to a consumer. Doctors, may, however, prescribe an OTC medication if specific dosage instructions need to be given. They prevent diseases, manage recurring conditions, and relieve aches, pains, and itches. Some OTC medications, such as cough and cold medicines, are easily purchased without a prescription and contain Dextromethorphan (DXM). When consumed in quantities greater than recommended, DXM can produce euphoria and dissociative events. Prescription cough medicine contains codeine, a type of opioid, that targets the same cell receptors as illegal opioids, like heroin. Through this activity, students will identify safe practices to take the recommended dosage of medication to prevent misuse.

<https://www.fda.gov/downloads/drugs/drugsafety/safeuseinitiative/ucm397847.pdf>

ENGAGE



Pose the question, “What do you know about the test doctors give to diagnose strep throat?” Provide an opportunity for student volunteers to share their ideas.

- It is anticipated that some students will be familiar with rapid strep tests. Strep throat is most common during ages 5-10. A rapid strep test is when the doctor swabs your throat and tonsils to collect bacteria. The bacteria are analyzed to see what type of bacteria is present. A doctor also conducts a physical exam by looking at your throat with a light and checking for signs of a fever.
- Optional: Show Kid’s Health video Getting a Strep Test (1:13) at https://www.youtube.com/watch?v=xbeke8q0_II.

Share the scenario:

- Malachi’s throat has been really sore. When his grandfather takes him to the doctor, she conducts a rapid strep test. The test indicates that Malachi has a really bad cough, and not strep throat. The doctor prescribes a cough medicine that can be purchased over the counter. The doctor tells him that he needs to use the device provided to carefully measure out 5 mL of medication for each dose.
- Ask students what they think a doctor considered about Malachi when she prescribed how much medication he should take

Medication is unique to each person. The doctor had to consider Malachi’s weight, age, fat mass, and muscle mass to determine how much medicine he should take to get better.

Distribute a [What’s in a Label? Student Handout](#) to each student. This handout outlines Malachi’s prescription. Prompt students to identify the parts of the label.

Say:

- Raise your hand if you can tell us who is allowed to take this medication.
Answer: Malachi Sanders
- Put an X on the name of the pharmacy where the prescription was filled.
Answer: Pea Tree Pharmacy
- Underline the name of the prescribing physician.
Answer: Dr. Peter Smith
- Put a star next to the prescription number.
Answer: 54321

Review the directions and have students work independently to complete the worksheet. After five minutes, invite students to compare their answers with a partner.

EXPLORE



Prepare the investigation materials for each group. Adhere three tape strips to the class observation table. Put students in groups of three, and distribute one copy of [Malachi's Medication Investigation Student Handout](#) to each student. Review the scenario at the top of the worksheet as a class, and allow students to ask clarifying questions. Have students work in groups to make predictions about which device they think Malachi should use to most accurately measure his dosage.

Distribute the investigation materials to each group. Have students work in groups to conduct the first two steps of the procedure. Once all of the groups have measured six doses with the spoon, ask them to line up their cups on the first strip of tape. Direct students to compare the amounts of medication in the cups and record their observations. Repeat this process with the remaining two measuring devices.

After the students have tested all three devices, present the control cup with 30 mL (milliliters) of Malachi's medication. Explain that the control contains exactly six doses of Malachi's medication. Place the control cup next to each line of cups, allotting time for students to make comparisons and record observations.

Suggested Scaffold for Procedure:

Teachers can demonstrate the steps first, and then be available to support students.

- Point to today's date on a calendar and say, "It is time for Malachi to take his morning dose. Please use the spoon to measure out his first dose/5 mL of medication, and put it in cup number one. Now, it is time for his night dose. Please use the spoon to measure out his second dose of medication, and put it in cup number one." Repeat the exercise for the next two days' worth of dosages until each group has six doses in its cup.

EVALUATE



Guide individual students to write a conclusion convincing Malachi which device most accurately dispenses his medication. Remind students to use data to support their ideas. Then, ask students to summarize why it is important that only Malachi use the medication that was prescribed to him.

Extension:

Invite each student to select a vitamin supplement (e.g. Vitamin A, Vitamin C) to research. Direct students to investigate the possible benefits of the vitamin supplement, the possible dangers of vitamin misuse/overdose, and why it is necessary to consult an adult prior to consuming the vitamin supplement.

- **Teacher note:** Vitamins are found in foods we eat but are sometimes recommended as a mineral supplement. They boost our immune system and support growth and development in young children. Vitamins are made in gummy, chewable, and pill forms and are flavored to be tasty to children so they want to take them. Vitamins can be toxic when excessive amounts are taken. It is important for students to recognize that over-the-counter supplements should be used according to the directions on the box.

Resources

Amoxicillin Insert

https://www.accessdata.fda.gov/drugsatfda_docs/label/2009/065162s021lbl.pdf

Image of Amoxicillin Oral Suspension with Measuring Cup

<https://healthy.kaiserpermanente.org/static/drugency/images/A4150730.JPG>

Cold Medicine Abuse

<https://www.drugabuse.gov/publications/drugfacts/cough-cold-medicine-abuse>

WHAT'S IN A LABEL?

NAME: _____

DATE: _____

Directions: Circle the patient's name on the prescription label. Use the label to answer the questions below.

<i>Pea Tree Pharmacy</i> 333 Medicine Street Silver Spring, MD 20904 301-555-0000	
Caution: Federal law prohibits the transfer of this drug to any person other than patient.	
RX# 54321	Date Filled: 7/10/17
Patient: Malachi Sanders 26 Any Street, MD 20904	
Take one 5 mL twice daily for ten days. Amoxicillin 250 mg/5mL suspension (150 mL) 0 Refills Remaining	MFG: Sebert Co. Discard After: Dr. Peter Smith

What is the name of the medication?

How often should Malachi take the medication?

How much medication should Malachi take for each dose?

Are there any warnings or special directions?

MALACHI'S MEDICATION INVESTIGATION

NAME: _____

DATE: _____

Read the Scenario:

Malachi's doctor prescribed him a medication to treat his bad cough. He is supposed to take 5mL twice a day for ten days. His doctor told him to use the measuring device provided with his medication. He doesn't understand why the doctor made a big deal about which measuring device. Your job is to convince Malachi why it is so important to use the proper device to measure his medication.

Make a Prediction:

Circle the device you think Malachi should use to most accurately measure his dosage. Explain why you think Malachi should use this device.

Device #1

Spoon



Device #2

Dropper



Device #3

Cup



Explain your thinking.

MALACHI'S MEDICATION INVESTIGATION

Test your Thinking:

1. Use the **spoon** to measure three days or six doses (30mL) of Malachi's medication. Put the six doses in **cup number one**.
2. When you finish, put your group's cup labeled number one on the observation table.
3. Compare the amount of medication in your cup number one to the others on the observation table. Record your observations in the chart below.
4. Use the **dropper** to measure three days or six doses of Malachi's medication. Put the six doses in **cup number two**.
5. When you finish, put your group's cup number two on the observation table.
6. Compare the amount of medication in your cup number two to the others on the observation table. Record your observations in the chart below.
7. Use the **cup** to measure three days or six doses (30mL) of Malachi's medication. Put the six doses in **cup number three**.
8. When you finish, put your group's cup number three on the observation table.
9. Compare the amount of medication in your cup number three to the others on the observation table. Record your observations in the chart below.
10. Compare the amount of medication in the control cup to the amount in the cups measured with the spoon. Record your observations.
11. Compare the amount of medication in the control cup to the amount in the cups measured with the dropper. Record your observations.
12. Compare the amount of medication in the control cup to the amount in the cups measured with the cup. Record your observations.

Record your Observations:

	How does the amount of medication in your cup compare to the others?	How does the amount of medication in your cup compare to the amount in the control?	Does this device accurately measure the medication? Why or why not?
Device #1 Spoon			
Device #2 Dropper			
Device #3 Cup			

MALACHI'S MEDICATION INVESTIGATION

Conclusion:

Write a conclusion that explains which device Malachi should use to most accurately measure his medication. Use data from your observations to support your ideas. Why is it important that only Malachi use this medication?
