

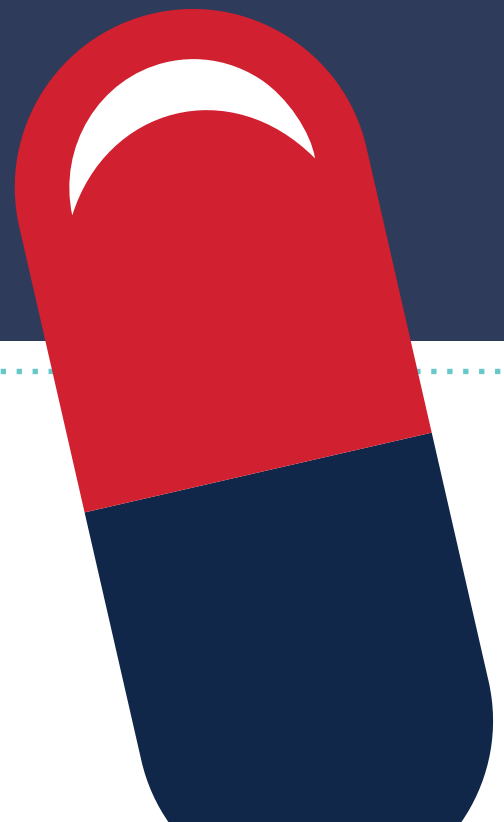
ELEMENTARY  
SCHOOL

# INTERDISCIPLINARY ACTIVITY

Malachi's Medication



Discovery  
EDUCATION



# SESSION 5 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.

## Malachi's Medication

### Content Areas

Health, English Language Arts, Math

### Activity Duration

60 minutes

### Grade Level

Grades 3-5

### Objectives

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

### Materials

Each student will need the following:

- [What's in a Label? Student Handout](#)
- [Malachi's Medication Investigation Student Handout](#)
- [Exit Ticket Student Handout](#)
- Optional: Internet Access
- Optional: [Research Guide: Vitamin Safety Student Handout](#)

Each group will need the following:

- 2oz clear plastic cup labeled #1, 2oz clear plastic cup labeled #2, and 2oz clear plastic cup 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

# 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.

Optional: Show Kid’s Health video Getting a Strep Test (1:13) at <https://kidshealth.org/en/kids/video-strep.html>

### Key Talking Points:

- To determine whether or not you have strep throat, a doctor will swab your throat and tonsils to collect bacteria.
- The bacteria are analyzed to see what type they are.
- A doctor also looks at your throat with a light to check for signs of a fever.
- The doctor will look at the bacteria and if they are the ones that cause strep throat, he will prescribe an antibiotic.

### 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 an antibiotic medication that must be purchased at the pharmacy. The doctor tells his grandfather that he needs to use the device provided to carefully measure out 5mL of medication for each dose.

Ask students what they think a doctor considered about Malachi when she prescribed how much medication he should take.

Anticipated Student Responses:

- Age
- Height
- Weight

### Key Talking Points:

- Medication is unique to each person.
- Doctors consider age, height, weight, and muscle mass to determine how much medicine a person needs in each dose.

**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, like they have done in previous sessions. 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

## ENGAGE CONT.



- Underline the name of the prescribing physician.

**Answer:** Dr. Daphne 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 give students time 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 30mL (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.

### Key Talking Points:

- It is important to use the correct and provided measuring device when measuring medication.
- Using the wrong measuring device can cause you to receive the wrong amount of medicine.
- Receiving the wrong amount of medicine can mean you do not get better or can mean you get even sicker.

### Suggested Scaffold for Procedure:

Teachers can demonstrate each step first, and then be available to support students as they complete the step in their groups.

- 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/5mL 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 claim statement convincing Malachi which device his grandfather should use to most accurately dispense his medication. Remind students to use data to support their claim.

**Exit Ticket:**

Distribute an [Exit Ticket](#) to each student. Ask them to summarize why is it 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. Distribute [Research Guide: Vitamin Safety Student Handout](#) to guide students' research.

- **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.

# SUMMARY/WRAP-UP



## Key Talking Points:

- Antibiotics are used to treat strep throat.
- Antibiotics are prescription medication and should only be taken by the person it is prescribed to.
- Being able to read a prescription label is a good skill to have.
- We should always take medication according to the directions provided.
- Knowing the correct dosage of a medication helps us to make good decisions about our health.

# RESOURCES

Amoxicillin Insert

[https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2009/065162s021lbl.pdf](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>



# 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	
Amoxicillin 250mg/5mL suspension (150mL) Take one 5mL twice daily for ten days. 0 Refills Remaining	MFG: Sebert Co. Discard After: 7/28/17 Dr. Daphne 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 strep throat. He is supposed to take 5mL twice a day for ten days. His doctor told his grandfather to use the measuring device provided with his medication, but Malachi doesn't understand why the doctor made a big deal about which measuring device he should use. 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's grandfather should use to most accurately measure Malachi's dosage. Explain why you think he 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 <b>Spoon</b>			
Device #2 <b>Dropper</b>			
Device #3 <b>Cup</b>			





# RESEARCH GUIDE: VITAMIN SAFETY

**NAME:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

Select one of the following vitamin supplements to research:

VITAMIN A    VITAMIN B12    VITAMIN C    VITAMIN D    VITAMIN E

Use the internet to find information about your chosen supplement. Use the table below to guide your research.

<b>What are possible benefits of taking this vitamin supplement?</b>	
<b>What can happen if you take too much of this vitamin supplement?</b>	

**Reflection:**

Why it is necessary to consult an adult prior to taking this vitamin supplement?