

Lab Framework

Text: Cord Applied Math

Unit number and title: 9 – Using Ratios and Proportions

Short Description: How discover how much of an orange is edible by using a weight ratio and circumference ratio

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Lab Title

THE INCREDIBLE ORANGE!

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

Students will look for patterns in nature, use scale, use circumference, and calculate the ratio of an orange that is edible.

- **Statement of pre-requisite skills needed**

- Students will need to understand how to read a scale and calculate circumference
- Students' knowledge of problem solving techniques
- Students' knowledge of estimating answers
- Students' knowledge of measuring in English and Metric Units
- Students' knowledge of working with shapes in 2-D
- Students' knowledge of calculating percent

- **Vocabulary**

Circumference
Ratio
Proportion

- **Materials List**

30 oranges of various types (navel, Satsuma, blood)
3 – 4 Scales
String and ruler or flexible tape

- **State Standards addressed**

Math:

- 1.1.4 Apply the concepts of ratio, percent, and direct proportion.
- 4.1 Gather information.
- 4.2 Organize, represent and share information.
- 5.3.1 Understand that mathematics is used extensively in daily life outside the classroom.

Reading:

- 3.2 Read to perform a task

Writing:

- 3.3 Knows and applies writing conventions appropriate for the grade level.

- **Leadership Skills**

- 2.1 The student will communicate, participate, and advocate effectively in pairs, small groups, teams, and large groups in order to reach common goals.

- **SCAN Skills/Workplace Skills**

Arithmetic

A. Performs basic computations

B. Uses basic numerical concepts such as whole numbers and percentages in practical situations

D. And uses tables, graphs, diagrams, and charts to obtain or convey quantities information

- **Set-up information**

Set up for this lab is fairly simple, the only set up would be ensuring the materials are present and user ready

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)

Working in partner groups, each pair will need to work together to gain the information needed and answer the questions. Clean up of the lab will need to be addressed before the lab is started. This lab can be completed in a 50 minute class.

- **Teacher Assessment of student learning** (scoring guide, rubric)

Scoring of this unit will be a grade scale of 1-4

Understands and Applies Concepts Very Well ~ 4	Mostly Understands and Applies Concepts and asks for help when needed~ 3	Has Difficulty Understanding and Applying Concepts and chooses not to ask for help~ 2	Wont try to Understand and Applying Concepts and chooses not to ask for help, but is putting in some effort to do the lab ~ 1	Little to no effort put into understanding or applying concepts, chooses not to ask for help, or does other activities not related to Lab ~ 0
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- **Summary of learning** (to be finished after student completes lab)

In this project, students will look for patterns in nature, use a scale with gram measurements, define and measure circumference of oranges. They will calculate a percentage and averages of the edible parts of the fruit and use that information to design spreadsheets, charts, and computer generated graphs. Students will also be developing scientific processing and communication skills.

- **Optional activities**

An optional activity would be to have the students create a graph from the data obtained in the class and find trends associated with the data.

- **Career Applications**

Nutrition

Cooks

Grocery

<https://wa-appliedmath.org/>

LAB TITLE: THE INCREDIBLE ORANGE!

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
Can you calculate a ratio of edible part of an orange to the inedible part?
- **Grouping instructions and roles**
2 per group, each person in the group is responsible for recording their own information.
- **Procedures** – steps to follow/instructions
 1. Obtain an orange from your teacher. Make sure you know what type of orange you have and the price paid for the orange.
 2. Students will then measure the circumference in centimeters and record the data.
 3. Students will weigh the orange and record the data.
 4. Students will peel the orange.
 5. Students will weigh the edible part of the orange and record the data.
 6. Students should calculate the weight of the peel from the data already collected.
 7. Now, they must derive a ratio of orange that is edible.
 8. Calculate the percentage of edible part of the orange. How are ratio and percent related?
 9. Calculate the average percentage in the class
- **Outcome instructions**
This is the formula: Divide the weight of edible part by the weight of the whole orange. Multiply that number by 100. Have students round off the percentage.
- **Assessment instructions** (peer-teacher)
Assessment for this lab will be based upon finding a reasonable ratio and percent for the amount of orange that is edible.

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Lab Data Collection

Student: _____ Date: _____

Unit: 9 – Using Ratios and Proportions

Lab Title: THE INCREDIBLE ORANGE!

Criteria: Write the problem/objective in statement form

Working with this unit it will help the student:

1. Read and interpret ratios
2. Compare Ratios
3. Recognize and write proportions from found information
4. Solve problems in a practical, work-related format.

Data Collection: Record the collected/given data

Type of Orange: _____

Circumference of Orange: _____

	Grams (g)
Weight of Orange	
Weight of edible part of orange	
Weight of inedible part of orange	

Calculations: Complete the given calculations to solve for an answer(s)

1. What is the ratio of edible part of the orange?
2. What is the percentage of edible part of the orange?
3. How are ratio and percent related?
4. Calculate the average edible part for each type of orange using class data

Summary Statement:

Which orange is the best value and why?

Other Assessment(s)

An optional assessment would be to have the students create a graph from the data obtained in the class and find trends associated with the data.

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