WAMC Lab Template

Math Concept(s): Ratios

Source / Text:

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Date: Summer Conference 2022

Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

This lab is part of a lesson on ratios. It takes place in the classroom after an entry task and discussion to activate background knowledge and get them thinking about ratios. Students will use candy provided to write ratios that compare the amounts of different types of candies they have. Students will come up with some of their own comparisons to use and write ratios for and will practice identifying and creating equivalent ratios.

Lab Plan

Lab Title: Edible Ratios

Prerequisite skills: Understanding of the word ratio. How to write a ratio. Adding and subtracting numbers and ratios.

Lab objective: The student will be able to solve problems involving ratios

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*

Mathematics K–12 Learning Standards:

- CCSS.MATH.CONTENT.6.RP.A.1 CCSS.MATH.CONTENT.7.RP.A.2

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Model with mathematics.

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- CCSS.ELA-LITERACY.SL.9-10.1

K-12 Science Standards

-

Technology

-

Engineering

-

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
Creativity and Innovation ☐ Think Creatively ☐ Work Creatively with Others ☐ Implement Innovations Critical Thinking and Problem Solving ☐ Reason Effectively ☐ Use Systems Thinking ☐ Make Judgments and Decisions ☒ Solve Problems Communication and Collaboration ☐ Communicate Clearly ☒ Collaborate with Others	Information Literacy ☐ Access and Evaluate Information ☐ Use and manage Information Media Literacy ☐ Analyze Media ☐ Create Media Products Information, Communications and Technology (ICT Literacy) ☐ Apply Technology Effectively	Flexibility and Adaptability ☐ Adapt to Change ☐ Be Flexible Initiative and Self-Direction ☒ Manage Goals and Time ☐ Work Independently ☐ Be Self-Directed Learners Social and Cross-Cultural ☒ Interact Effectively with Others ☐ Work Effectively in Diverse Teams	☐ Manage Projects ☒ Produce Results Leadership and Responsibility ☒ Guide and Lead Others ☐ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Edible Ratios Lab Sheet
- Chromebooks
- Package of Candy for Each Student
- Pencils

Set-Up Required:

- Organize students into groups of two
- Display instructions
- Provide students with candy

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Students have their own computer and materials to take care of. They are responsible to each other to complete the task together. They may have to motivate one another to stick to the task.

Cooperative Learning:

- Students are working in a group of two and must work effectively together to complete the lab and produce results.

Expectations:

- Students are expected to separate their candies into groupings, write ratios of their types of candies, think critically and work together to create their own ways of comparing the candies, and produce a graph of some of their findings.

Timeline:

- This lab can be completed within a single class period.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Discuss using ratios to compare numbers in a data set. Talk about looking through data to find trends.

Career Applications

- Data Analysis

Optional or Extension Activities

- Students go home and create ratios of items in their house. Have them think of some common rates they may encounter each day. (For example, miles per hour in a car, or cost per pound in shopping)

LAB TITLE: Edible Ratios

STUDENT INSTRUCTIONS:

• You are going to determine the ratio of different types of candies in a bag of candy

• You will be divided into groups of two. You are expected to record the results of others in your group and use your results to complete the worksheet individually.

• 1. You will be divided into groups of two 2. Each group will get a bag of candy. You will need to count the number of different kinds of candy you receive (grouping by colors and type.) 4. Record your results for the types of candy. 5. Create a graph using your computer that represents the how many of each color candy you received.

• Complete the team activity. Using the data, complete the worksheet

• 1.Your worksheet and graph will be collected and checked 2.Your participation will be monitored during the lab

Edible Ratios

(Do not eat any candy until after completing the assignment)

1. What is your ratio of M&Ms to Skittles?
2. What is your ratio of red candies to green candies?
3. What is your ratio of blue candies to yellow candies?
4. What is your ratio of purple candies to orange candies?
5. Come up with 4 other ratios to compare your candies and label them.
6. Are any of your ratio's equivalent? Which ones?
7. Give equivalent ratios for each of your ratios from questions 1-4.
8. Use your computer to create a graph that represents how many of each color of candy you have.

Rubric

Identifies Ratio of M&Ms to Skittles: 1 point

Score: /1

Identifies Ratio of Red to Green Candies: 1 point

Score: /1

Identifies Ratio of Blue to Yellow Candies: 1 point

Score: /1

Identifies Ratio of Purple to Orange Candies: 1 Point

Score: /1

Correctly Writes Four Other Possible Ratios: 4 Points

Score: /4

Correctly Identifies if There Are Any Equivalent Ratios: 1 Point

Score: /1

Writes Correct Equivalent Ratios for Questions 1-4: 2 Points

Score: /2

Uses Computer to Create a Correct Graph: 4 Points

Score: /4

Teacher Observes Student Participating Actively in Lab: 5 Points

Score: /5

Total: 20 Points

Score: /20

WAMC Lesson Plan

Name(s): Kevin Schultz
Email Address: schultzk@tenino.k12.wa.us
Lesson Title: Edible Ratios
Date: WMAC Summer Conference 2022
Text: None STEM Correlation: Math Lesson Length: 60 minutes

Big Idea (Cluster): Create ratios when given a set of items to group and compare characteristics of the items in a population.	
• Mathematics K–12 Learning Standards: CCSS.MATH.CONTENT.6.RP.A.1 CCSS.MATH.CONTENT.7.RP.A.2	
Mathematical Practice(s): MP1 MP2 MP4	
Content Objectives: Students will be able to write accurate ratios comparing numbers of objects in a population.	Language Objectives (ELL): Students will be able to define new vocabulary words with 90% accuracy.
Vocabulary: Ratio, Rate, Term, Proportion, Equivalent Ratios	Connections to Prior Learning: Finding part of a whole Comparing values Writing Ratios
Questions to Develop Mathematical Thinking: • How can I compare the amount I have of one thing to another? • When given a set of items, how do I group, sort, and measure each item by itself, and as part of the group? • How can I compare multiple sources of data? • Can I see any trends when looking at a set of data? • How can I compare two ratios to each other?	Common Misconceptions: • When asked to write a ratio of x to y, writing it instead as y to x. • Forgetting to label with units, especially when using rates. • That a rate compares items measured in two different units.

Assessment (Formative and Summative):

- Formative Assessment: I will observe students doing a lab on writing ratios
- Summative Assessment: I will give an end of unit test

Materials:

- Student Notebooks
- Edible Ratios Lab Sheet
- Chromebooks
- Package of Candy for Each Student
- Pencils

Instruction Plan:

Introduction: Students will enter and get out their math notebooks. They will write down the content objective in their notebook and then answer the following questions in their notebook:
How can we compare the number of students in class wearing a hat to the number not wearing a hat?

What are two other ways we can compare the population of students in our class into two categories?

What does the term Miles Per Hour mean?

What does this activity make you think? What do you notice? What do you wonder?

Explore: First we will discuss the entry task. Talk about writing the numbers as a ratio, and discuss what different methods the students came up with for comparing the population of students. Talk about miles per hour and explain that this is a rate. Explain that a rate compares two values measured in different units. Do two more examples of writing ratios as a class.

After the two examples, students will be split into pairs to do the lab. Students will have the remainder of the class time to do the lab and write their own ratios.

When I observe students: Students should be working collaboratively with a partner to finish the lab. I will check to make sure both partners in a group are participating. I will look for students not participating or on task and check in to see how to get them on task. I will make sure to check for understanding with all groups.

Questions to Develop Mathematical Thinking as you observe:

- How can I compare the amount I have of one thing to another?
- When given a set of items, how do I group, sort, and measure each item by itself, and as part of the group?
- How can I compare multiple sources of data?
- Can I see any trends when looking at a set of data?
- How can I compare two ratios to each other?

Answers:

- Write them as a ratio comparing one to the other.
- Separate into groups by given classification. Classifications can be a wide range of characteristics of an item such as type, color, size, shape, etc. In this lab it is color of candy and type of candy.
- Compare numbers with another group. Or compare multiple ratios to one another.
- Look at the data and see what similarities are there.
- Check to see if ratios are equivalent.

Summarize: When given a population, students should be able to group sections of the population together and compare them to one another. One way to compare two subgroups is to write them as a ratio. Students will do a lab to practice writing ratios and I will observe the groups and assist them in completion.

Career Application(s):

- Data Analysis, comparing data sets and looking for trends and relationships.

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

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☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation
☐ Think Creatively
☐ Work Creatively with Others
☐ Implement Innovations

Critical Thinking and Problem Solving
☐ Reason Effectively
☐ Use Systems Thinking
☐ Make Judgments and Decisions
☒ Solve Problems

Communication and Collaboration
☐ Communicate Clearly
☒ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
☐ Access and Evaluate Information
☐ Use and manage Information

Media Literacy
☐ Analyze Media
☐ Create Media Products

Information, Communications and Technology (ICT Literacy)
☐ Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
☐ Adapt to Change
☐ Be Flexible

Initiative and Self-Direction
☒ Manage Goals and Time
☐ Work Independently
☐ Be Self-Directed Learners

Social and Cross-Cultural
☒ Interact Effectively with Others
☐ Work Effectively in Diverse Teams

Productivity and Accountability
☐ Manage Projects
☒ Produce Results

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