MISSISSIPPI DEPARTMENT OF EDUCATION

Ensuring a bright future for every child

MISSISSIPPI

EXEMPLAR

Units & Lessons

MATHEMATICS

Grade 7

Grant funded by:

W.K. KELLOGG FOUNDATION

Lesson 1: Table as a Tool

Focus Standard(s): 7.RP.2a, 7.RP.2b

Additional Standard(s): 7.RP.1

Standards for Mathematical Practice: SMP.1, SMP.3, SMP.7

Estimated Time: 50 minutes

Resources and Materials:

- Butcher Paper
- Markers
- Handout 1.1: Graffiti Wall
- Handout 1.2: Table as a Tool
- Unit Rates Video: https://www.youtube.com/watch?v=SpZQFKU5P70

Lesson Target(s):

- Students will activate prior knowledge of ratios and proportions.
- Students will use tables to solve proportions and begin to develop academic vocabulary pertaining to ratios and proportions.

Guiding Question(s):

- What tools can be used to help find unit rate?
- How is unit rate used to determine proportionality?

Vocabulary

Academic Vocabulary:	**Instructional Strategies for Academic Vocabulary:**
• Unit Rate • Constant Rate • Proportional	☐ Introduce words with student-friendly definitions and pictures ☐ Model how to use the words in discussion ☐ Create pictures/symbols to represent words

• Table of Values • Rate	□ Write/discuss using the words

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below the grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes: Students will be introduced to how unit rate relates to proportionality. Students will find the unit rate from a table and complete tables with missing values using the unit rate. Students will compare different methods and decide which method they prefer.

Anticipatory Set/Introduction to the Lesson: Graffiti Wall

Distribute **Handout 1.1: Graffiti Wall**. This activity will require students to recall prior knowledge about ratios and proportions. Instruct students to brainstorm and record their ideas (e.g., terms, examples, pictures) onto the Graffiti Wall and share ideas with their team. Ask the following questions to prompt student discussion:

- What do you know about ratios and proportions?
- Are there any situations you can think of related to these words?
- Is there anything you know of that is proportional?
- What additional words do you associate with these words?

✓ Actively monitor students and provide scaffolding support by having students respond to the following prompts:

- Why do you associate that word to ratios?
- What helped you connect that example to proportions?
- Explain this word to me.
- How does the example use ratios?

Note: The teacher is responsible for encouraging participation from all team members. Some teams may find it difficult to begin. If so, the teacher can ask the following questions to activate prior knowledge:

- What is unit rate?
- How can you represent ratios?
- What do you remember about ratios?

Teams share their Graffiti Wall with the whole class, making connections and exploring different perspectives.

Allow time for students to discuss ideas they may have shared and/or unique notions presented (SMP.3). Students discuss while the teacher ensures discussions remain math-centered.

- ✓ Check for understanding as students explain their reasoning. Determine which students have made appropriate connections to prior concepts or skills and which students needed extra support.

Collect and display Graffiti Walls grouped together as one giant wall. This will be displayed for the remainder of the unit and students will have the opportunity to add to it as the unit progresses.

For students who are EL, have disabilities, or perform well below grade-level:

- Use the Graffiti Wall for both visual and written representations. Encourage students to continue to add ideas to the wall throughout the unit.

Extensions for students with high interest or working above grade level:

- Encourage teams with detailed Graffiti Walls to create real-world applications and careers where unit rate would be important to understand.

Activity 1: Unit Rates Video

Display the Unit Rates Video.

Note: This video may be substituted with another on proportionality if you cannot access YouTube.

Have students complete a Think-Pair-Share activity. Facilitate discussion of the information that would help them respond to the question at the end of the video asking students to determine the cost effectiveness of selecting one gas station over another. Once partners share with one another, ask for volunteers to share responses with the whole group. Explain that students can organize the information to solve this problem with a table. Today's lesson will focus on finding unit rate from a table.

Activity 2: Table as a Tool

Distribute **Handout 1.2: Table as a Tool**. Display the first table on the board. Instruct students to independently complete the table. Once completed, students compare answers and discuss methods used to solve (SMP.3).

Note: The table values are not in any order and will require some perseverance (SMP.1). It is normal for students to use a Guess and Check method. If a student is using this method, suggest exploring by looking for a pattern (SMP.7).

Select students to come to the board and complete the table. Lead a whole group discussion on different methods and reasoning.

- ✓ Actively monitor students and provide scaffolding support by asking the following questions:
    - How did you find the missing value?
    - Did you use the same method for every value?
    - Can you show it another way?
    - How does this relate to unit rate?
    - What is the unit rate?
    - Could we create a situation to represent this table?
    - Is the x-axis represented on this table?
    - Is the y-axis represented on the table?

Answer any additional questions students have about completing the table. Repeat this process for the remaining tables on the handout.

Note: As exposure increases, students will have more questions. Incorporate how each table could represent a real-world scenario.

Each time the class returns to whole group discussion, ask the following questions to help them solidify understanding:

- How are you finding unit rate using the table?
- Is anyone in your team using a different method?
- How could you add more values to your table?
- What makes the unit a constant rate?
- What would the y-value be if the x-value was zero?
- Is this table proportional?

For students who are EL, have disabilities, or perform well below grade-level:

- Encourage students who are having difficulties finding a pattern to put the x-values in order from least to greatest to help organize the table.
- Provide students with a multiplication fact sheet or a calculator to assist in the creation of their own table.

Extensions for students with high interest or working above grade level:

- Create more challenging tables using decimals or fractions.

✓ Monitor discussions to check for understanding. Determine which students have begun to make connections between the multiplicative factor and the unit rate.

Reflection and Closing:

Refer to the Graffiti Wall and review the lesson with students. Ask the following questions to prompt students:

- What words did we use the most today?
- Can we add anything to our wall?
- What one word will you remember from today?
- Is there anything that we didn't cover today that we need to look at later?
- What is another way we can define unit rate?

- ✓ Exit Ticket: Using **Handout 1.2: Table as a Tool**, have students create their own table with a unit rate of 4.

Homework

Students will not receive homework.

Handout 1.1: Graffiti Wall

Handout 1.2: Table as a Tool

Name: _____ Date: _____

Directions: Fill in the missing values for each table as directed by the teacher.

Table 1:

x	**10**	**4**		**9**	**7**		**18**	**5**	
y		**32**	**8**			**16**		**40**	**0**

Strategy Used:

Table 2:

x		**2**	**5**		**-1**	**1**	**-5**	**0**	**8**
y	**-27**			**-9**	**3**		**15**		**-24**

Strategy Used:

Table 3:

x	**-9**	**15**		**42**	**18**	**0**	**-6**	**30**	**-1**
y	**-6**		**8**		**12**		**-4**	**20**	

Strategy Used:

Create Your Own!

x									
y									

Answer Key:

Table 1: y = 8x

x	10	4	1	9	7	2	18	5	0
y	80	32	8	72	56	16	144	40	0

Strategy Used: Strategies will vary. Expect guess and check, rearrangement, and/or using a rule to follow the pattern.

Table 2: y = -3x

x	9	2	5	3	-1	1	-5	0	8
y	-27	-6	-15	-9	3	-3	15	0	-24

Strategy Used: Strategies will vary. Expect guess and check, rearrangement, and/or using a rule to follow the pattern.

Students may struggle with the negatives if they do not have a strong sense for multiplying integers.

Table 3: y = 2/3x

x	-9	15	12	42	18	0	-6	30	-1
y	-6	10	8	28	12	0	-4	20	$-\frac{2}{3}$

Strategy Used: Strategies will vary. Expect guess and check, rearrangement, and/or using a rule to follow the pattern. Anticipate students who have difficulties with fractions to struggle with this problem.

For training or questions regarding this unit,
please contact:

exemplarunit@mdek12.org