

Enhancing Mathematical Learning Through “Truth or Dare”: A Creative Approach to Vocabulary Review and Problem Solving

Kayleigh Bishop
Wichita Public Schools

Mikayla Taylor
Wichita State University

Abstract: In this article, we share a “truth or dare” structure for vocabulary and concept review that draws upon constructivist practices and makes use of students’ intrinsic motivation. We have found this activity to be engaging and productive in supporting students’ recall, conceptual understanding, and application of mathematics. The lesson plan provided illustrates the use of the game to support learning in proportional relationships but could easily be adapted to many mathematical topics.

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In the ever-evolving landscape of education, educators are continuously seeking innovative methods to engage students and deepen their understanding of mathematical concepts. Traditional approaches often struggle to captivate the attention of learners, particularly when tackling abstract topics such as mathematical vocabulary and problem-solving in proportional relationships. However, by incorporating elements of a fun and interactive task into the learning process, educators can create a dynamic and engaging classroom environment that promotes active participation and deeper comprehension. This article explores the integration of the popular game “Truth or Dare” as an innovative pedagogical tool for reviewing mathematical vocabulary and reinforcing concepts related to proportional relationships.

The integration of games into educational settings aligns with constructivist theories of learning and motivation. According to constructivist theories, learning is an active process that occurs through engagement and meaningful tasks and social interactions. Games provide opportunities for students to actively construct knowledge, solve problems collaboratively, and apply mathematical concepts in contextually relevant situations. Additionally, the concept of intrinsic motivation suggests that students are more likely to engage in learning activities when they are enjoyable and personally meaningful. By leveraging the intrinsic appeal of games, educators can enhance students’ motivation and enthusiasm for learning mathematics. In this activity “Truth or Dare” prompts students to decide for themselves which card to choose from and then construct their own definitions of the math terms. When the students are

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picking each card they are forced to actively recall and be able to provide working definitions or steps to solving proportional relationships.

Practical strategies for incorporating “Truth or Dare” into the mathematics classroom are outlined, emphasizing the importance of thoughtful planning and adaptations to suit the specific needs and interests of students. “Truth” challenges focus on reviewing mathematical vocabulary related to proportional relationships, including terms such as variable, proportion, inverse operation, and ratio. These challenges encourage students to articulate their understanding of key concepts and engage in meaningful discourse with their peers. “Dare” challenges present students with real-world problems that require the application of proportional reasoning and problem-solving skills. By tackling these challenges collaboratively, students develop critical thinking abilities and deepen their conceptual understanding of proportional relationships.

Sample “Truth” and “Dare” challenges are provided to illustrate the types of activities

that can be implemented within the framework of “Truth or Dare” in the math classroom. “Truth” challenges prompt students to define mathematical vocabulary terms. “Dare” challenges require students to solve problems involving proportional reasoning, such as calculating unit rates or determining the missing value of x in a ratio. These challenges are designed to engage students in active learning experiences that reinforce their understanding of mathematical concepts and promote mathematical fluency.

The integration of “Truth or Dare” into the mathematics classroom offers a positive approach to enhance students’ understanding of mathematical vocabulary and proportional relationships. By combining elements of friendly competition and collaboration, educators can create learning experiences that captivate students’ interest and foster deeper engagement with mathematical concepts. By embracing innovative approaches to mathematics instruction, educators can empower students to become more confident and proficient problem solvers.

TRUTH OR DARE

Grade Level: 7th grade mathematics

Total Time: 45 minutes

Overview: Students will practice their learning of solving proportions with an activity called Truth or Dare to test their knowledge.

Standard(s): 7.RP.3 - Use proportional relationships to solve multistep ratio problems

Learning Objective(s):

- Students will be able to create proportions from word problems.
- Students will be able to recall the steps in solving a proportional relationship.
- Students will be able to utilize the definitions of vocabulary words for this unit.

Time	Instructional Activities	Anticipated Student Responses & Teacher Supports
5 min.	Bell work: <i>Set up</i> – The smartboard will have the bell work question presented and students will need to get out their bell work paper. *If students do not have the bell work paper, then there are copies on the back table. <i>Task</i> - Once the bell rings students will be working on the problem and the teacher will be monitoring. Then the teacher will pick a student to go up to the board to solve and show their work. During this time, the student will explain their reasoning while writing out their work. The teacher will have students put their thumbs up or thumbs down if they agree with the student who went up. Some students will be called by the teacher to explain why they agree or disagree. Once the class discussion is over then students will put their bell work paper away and get ready for the next activity.	Student Struggle: ● Students may not know how to set up the proportional relationship or mix the two units. ● Students may forget the steps in solving a proportion. ● Students may not remember how to use inverse operations to isolate the variable. Teacher Assistance/Questions: ● I will underline the key components of the proportion in the word problem. Then have students tell me which things have the same unit. I will also ask what we are trying to find.

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	Problem: Between 1990 and 2000, the population of New York City increased at a rate of 32 people every four hours. By how many people would the population have increased in 63 hours? Answer: 504 people after 63 hours.	• I will ask students if they remember any steps and then go from there. I can hint at the steps and students could pick up on them. • I will use the vocabulary of isolating the variable and inverse to get students to put those meanings in their own words.
35 min.	Activity: <i>Set up</i> - The teacher will pair up students and pass out a set of truth and dare cards to each group. The students will also need a pencil, lined paper, and a calculator. <i>Task</i> - The truth cards have vocabulary that are used in the unit and the dare cards have practice problems. Once the students are in the groups and start the activity, they will take turns either pulling from the truth pile or the dare pile. The partner will ask “Truth or Dare” and the other student must pick. Then they will answer whatever is on the card. This will alternate between each student. For vocabulary the student will need to write the word down and then the definition. The definition can either be an example or described with words. Then for the practice problems the student will write out their work and solve it. The students will repeat this process until it is time to do the exit ticket. Then students will turn in the paper they used in this activity. Instruction: • You will work with your partner to play truth or dare with proportions.	• Vocabulary (Truth cards) ○ Inverse ○ Variable ○ Part to Part ratio ○ Part to Whole ratio • Problem Solving (Dare cards) ○ Setting up an equation from word problem ○ How to cross multiply Teacher Assistance/Questions: • Vocabulary (Truth cards)

• You will take turns asking your partner “Truth or Dare” and will pick one to answer. • You will record your answer on your paper because you will turn it in at the end of the hour. • If you are struggling and need help then you will need to raise your hand • I will do an example of both a truth card and dare card up on the board. Teacher Monitoring: • Walk around the classroom while students are working on the activity and answer any questions students may have. • Observe what students are struggling the most with and make notes because the next day they will continue to practice the target. Differentiation Options: • For English learners you could also provide the word in their home language on the cards to help understand what vocab word is being used. • For students who need more of a challenge, they can also give an example while providing the definition of the vocab word. For students who might need extra guidance, you can provide a set of examples from prior instruction on proportional relationships. This way the student can have a resource to look back on when struggling.	○ Is there another word we’ve used for “opposite”? ○ When you are completing a lab in science and you change something. What are you changing? What is a number that can change? ○ Comparing green to yellow skittles ○ Comparing yellow skittles to the whole bag. • Problem Solving (Dare cards) ○ What do we know about the problem? What information still needs to be found? ○ Circle the diagonals. What math operation does this create? Example Student Response to Truth Cards Examples: • Variable - A letter that represents an unknown value • Inverse Operation - The opposite operation that is being used • Numerator - The number that is on top in a fraction • Isolate the variable - Moving the numbers on the same side as the variable.
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5 min.	Exit Ticket: On a sticky note, have students write: 1. What are you confident in when solving proportions? 2. What are you still confused on when solving proportions? Teacher monitoring: • Hand out sticky notes so that students can be able to write the exit ticket down and then collect them before the bell rings. • Use the responses from the exit ticket to see where the students are at with the target. Focus on those struggles the next day when working on the next activity.	
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Dare Cards (with tasks)		
$30x = 25$	$417 = x68$	$x46 = 4823$
$2743 = 54x$	$42x = 1417$	$536 = x72$
A boat travels 287 miles in 8 hours (with a constant speed). How far can it travel in 6 hours (with the same speed)?	A car can travel 168 miles on 7 gallons of gasoline. How far can it travel on 10 gallons?	45 lbs of bananas cost \$180. How much would 18 lbs cost?
49 lbs of potatoes cost \$343. How many lbs of potatoes can you get with \$161?	A car travels 220 miles in 9 hours (with a constant speed). How far can it travel in 14 hours (with the same speed)?	A boat can travel 240 miles on 30 gallons of gasoline. How much gasoline will it need to go 72 miles?

Truth Cards (with Vocabulary)		
Variable	Isolate the variable	Proportion
Cross Multiply	Inverse Operation	Proportional Relationships
Ratio	Part to Part Ratio	Part to Whole Ratio
Divide	Numerator	Denominator