Unit 5: Proportional Reasoning

Time Out is related to *Unit 5: Proportional Reasoning*.

Time Outs strengthen numeracy and reasoning skills by using math strategically.

Use strategic thinking to play the game and answer the questions that follow. You will be assessed according to the rubric provided.

Category	Strategy and Procedures	Mathematical Reasoning
	The student...	*The student...*
4	• uses efficient and effective strategies to solve the problem(s) and complete questions	• presents complex and refined mathematical reasoning
3	• uses effective strategies to solve the problem(s) and complete questions	• presents effective mathematical reasoning
2	• uses effective strategies inconsistently to solve the problem(s) and complete questions	• presents some evidence of mathematical reasoning
1	• does not use effective strategies to solve the problem(s) and complete questions	• presents superficial or confusing evidence of mathematical reasoning

This assessment is worth 8 marks. Take your time.

Spatial Brain Teasers

Spatial intelligence can be thought of as the ability to think visually. One of the most famous spatial brain puzzles is the Rubik's Cube. Success with the Rubrik's cube comes with the activation of the right side of the brain and the ability to make sense of the six different faces of a cube simultaneously.

There are a number of other games that require the use of spatial intelligence. These types of games involve visual organization and decision-making and some examples are described below. For this *Time Out*, try **three** of the six games described below. Explain or show your solution. Then, answer the questions listed following the games.

1. Ten to Twenty Coin Game

   Place 10 coins in two rows of five as shown below. Now, arrange the coins to make five rows each with four coins. There are several solutions.

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2. Rearrange the Coins Game

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You have 3 moves to create the order below. With each move you can only move two coins at a time and the coins moved must be adjacent. The coins should have no gaps in the the final position.

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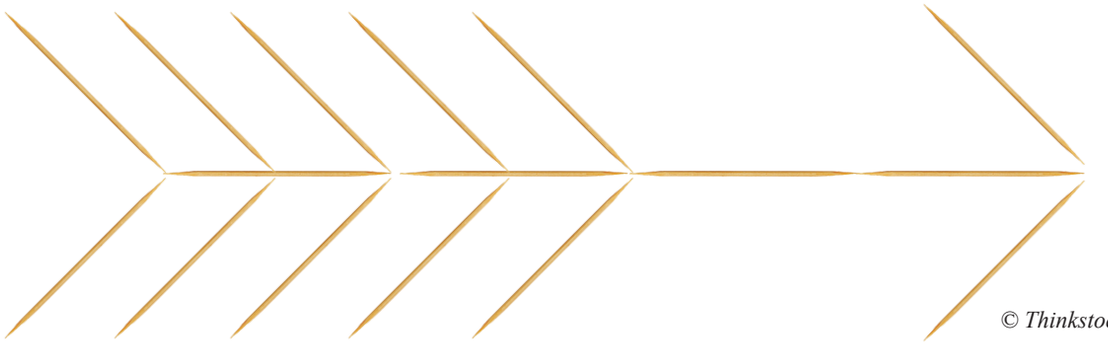
An example of a first move is shown as an example. This, however, is **not** a correct first move.

3. Arrow Arrangements

Arrange 16 toothpicks on your table as shown below. Move eight toothpicks to form eight congruent triangles.



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4. Rubik's Cube

   Using an online Rubik's Cube simulator or a traditional Rubik's Cube, attempt to make one side the same colour, timing how long it takes. Mix it up and attempt a different colour, timing how long it takes. Repeat for a total of 5 to 10 trials and record each time on a piece of paper.

5. Spatial Pen/Pencil Game

   Place six pens/pencils in the following configuration. Manipulate only three of the pens/pencils to create four equilateral triangles.

6. Water Jug Game

Using a three-litre jug and a five-litre jug, measure exactly four litres of water.

Answer the following questions.

a. Rate the difficulty level of each brain teaser activity from easiest to most difficult.

b. In a couple of sentences, explain why you feel that the brain teaser you identified as the most difficult was most difficult.

c. In a couple of sentences, explain why you feel that the brain teaser you identified as the easiest was the easiest.

d. Was there one puzzle you could not solve? Other than searching for "cheats" on the Internet, explain what type of hint or help might have assisted you in solving the brain teaser on your own.

e. There are two types of sensory stimuli used in these brain teasers that assist people in processing and understanding their surroundings and in finding the solutions. What are the two senses?

f. Learning by doing suggests true understanding of the problem at hand. List other types of senses that assist you on a daily basis to understand and learn from your environment.

You have completed *Unit 5 Time Out*. Please proceed to the *Unit 5: Final Review Assignment*, on the next page of this *Workbook*.