Free Sample

Tetris Geometry Analysis

Name & Period:_____ Date:_____

Directions. Draw as much as possible to explain your point.

Part I: Play First.

1. Play **Tetris** and record your final score. Official site: `https://tetris.com/`.

Final Score:

2. How many **"different"** pieces are in the game? Draw them and count them.

3. How do you know the pieces are **"different"**?

4. How many different, in the sense of being non-congruent, pieces are there?

Part II: Rigid Motions

5. How does the user control the pieces in Tetris? Meaning, by what rigid motions can the player move the pieces as they are falling?

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6. What are the degrees of freedom for each rigid motion? In other words, in what direction can you translate? What is the degree measure of each rotation?

7. What rigid motion is missing from the game for the player to use? Why do you think this is?

Part III: Area and Congruence

8. How many unit squares make up **each** Tetris piece?

9. Which Tetris pieces are **geometrically equivalent** (congruent)? Draw the pairs of congruent pieces down below. What **rigid motion(s)** describe how to get from one congruent piece to another? Draw pictures.

Pieces	Transformation	Explanation

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Solutions.

This is a fun project to use colored pencils for. Some questions are open-ended.

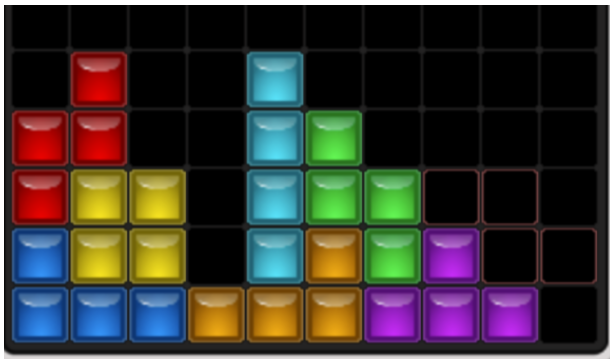
Part I: Play First.

1. Play **Tetris** and record your final score. Official site: `https://tetris.com/`.

Final Score: 47,000 points

2. How many **"different"** pieces are in the game? Draw them and count them.

   Solution. There are seven different pieces in the game of Tetris as demonstrated by their seven different colors: red, yellow, blue, baby blue, green, purple, and orange.



3. How do you know the pieces are **"different"**?

   Solution. The pieces differ in both color and shape.

4. How many different, in the sense of being non-congruent, pieces are there?

   Solution. There are two pairs of congruent pieces. Therefore, there are five distinct pieces up to congruence. In the following questions, those pieces will be revealed.

Part II: Rigid Motions

5. How does the user control the pieces in Tetris? Meaning, by what rigid motions can the player move the pieces as they are falling?

   Solution. The player can only translate or rotate the pieces.

6. What are the degrees of freedom for each rigid motion? In other words, in what direction can you translate? What is the degree measure of each rotation?

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surface area. We do not brew whole coffee beans—we grind them up. This creates more surface area, and thus a better brew.

15. How does Tetris help create better geometric thinking?

    Solution. The packing problem is a classic problem in mathematics and it has a wide variety of applications. Tetris helps make you faster at finding where pieces fit. You see connections you did not see before. Tetris increases spatial reasoning through having to solve local and global geometry problems.

If you have enjoyed working through this problem, then check out the book that started it all:
Learning Isn't Linear

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