# Entrapment

This visually challenging game helps students understand congruence through translation (slides), rotations (turns), or reflections (flips). At the beginning, when the board is completely open and no squares have been filled in the game doesn't appear to be too difficult. After all, we're just filling in patterns of squares, right? Well, as players keep filling in the board, it's more and more challenging to find ways to slide, turn, and flip the available shapes to fit the remaining blank squares. Some of the most mind-bending are the rotations. They're not obvious at all and it sometimes takes quite a bit of mental gymnastics to figure out if something really will fit.

Don't rearrange the four different patterns! You can slide them, flip them, or turn them but you're not allowed to take them apart. Another way to play this game is to give each player a color pencil and when the game board is as filled in with shapes as possible the player with the most individual squares filled in wins.

Another way to play this game is to use color construction paper or tiles. Just because a player has placed a tile on a square doesn't mean a second player couldn't place a different-colored tile there as well. For this game, every move that's made has to cover at least one blank square that has not been covered before.

Remaining squares for that particular move can be covered more than once. This extends game play and it can be quite interesting to see which squares are covered numerous times.



It might also be interesting to pose some other questions to students when using this in a classroom setting. Can they see any way to fill the entire board so that there are no white squares left at all? How many of each of the patterns are used on the board? In other words, how many of #1, #2, #3, and #4 have been used? It might be fun to compare different finished games as well to see if there are any patterns from game to game or let two teams of two players each compete to see who can fill in the boards the fastest.

There are so many fun ways to play this game. Students will understand simple transformations better than ever after practicing with "Entrapment."

With 2 players, I recommend cutting the board down to 2/3 or even 1/2 the original size. This keeps the time played, on average, about the same as a 3 player game on your size game board. Also, shrinking it down right away makes placement critical and forces the students to call/write out the harder movements, like reflection and rotation clockwise or.. counter clockwise 90 degrees.

**Common Core Mathematical Standards**

1. Verify experimentally the properties of rotations, reflections, and translations.
2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

# ENTRAPMENT

**Objective:** Recognize motion as a slide (translation), turn (rotation) or a flip (reflection) [5.SS(T).20].

**Materials:** Entrapment game board, one 6-sided die, pencil crayons.

**Players:** 2 or 3 players.

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**Rules:**

[1] The objective of this game is to be the last player to draw a given shape on the game board.

[2] The youngest player starts. On a turn a player rolls the die to determine the shape which he or she must add to the game board. If the player rolls a 5 s/he can add any of the four shapes s/he wishes. If the player rolls a 6, s/he skips the turn and will not add a shape.

[3] The player will draw and color his/her shape at any available location on the game board.

[4] If a player needs to add a shape for which there is no appropriate space left on the game board, s/he takes a strike. Three strikes and the player is out of the game.

[5] When a player chooses a location for his or her shape, s/he must specify whether the shape needs to be rotated, slid, or reflected to fit that space (that is, in comparison to the blackened shapes at the bottom of the game board).

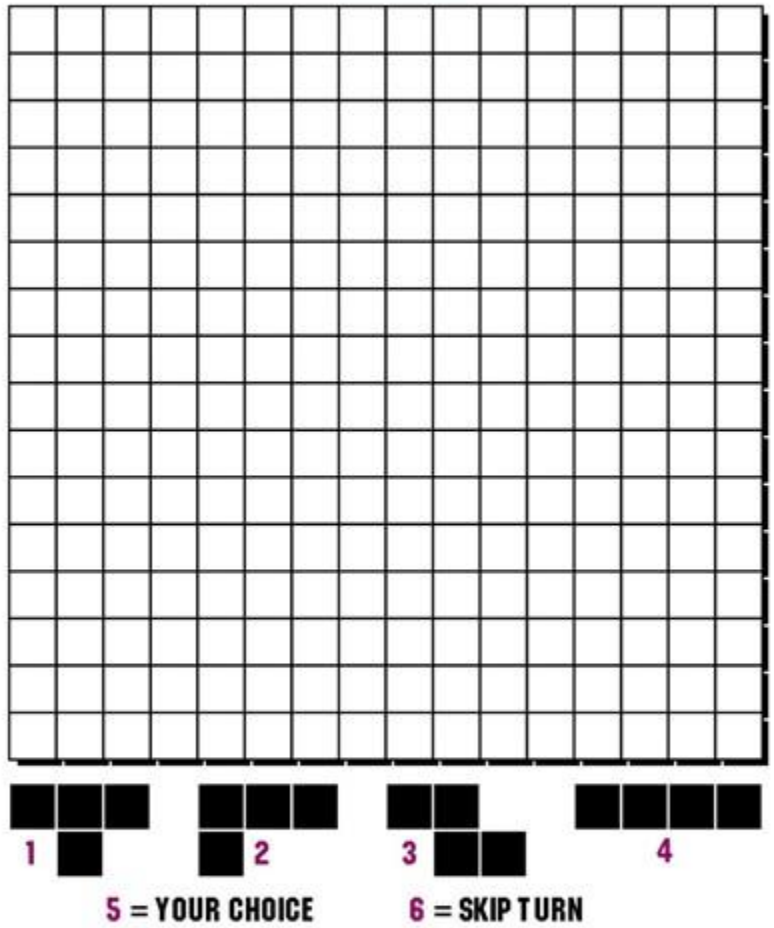
**Adaptations:**

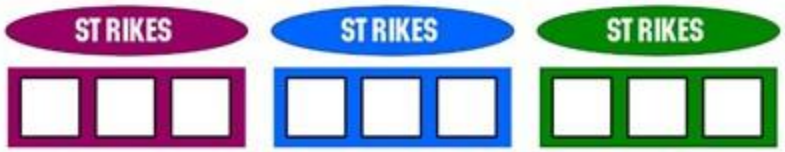
[1] Play as a solitaire game. Roll the die to determine which shape must be added. See how many you can add before you roll a shape that you cannot add.

[2] Allow each player to shade 5 spaces with a black crayon before starting the game. These spaces cannot be used when placing a shape.

[3] Use a scoring system in the game. Each time you add a shape, score 3 points if it is a rotation of a shape already in place, 2 points if it is a reflection, and 1 point if it is a translation. High score wins.

ENTRAPMENT



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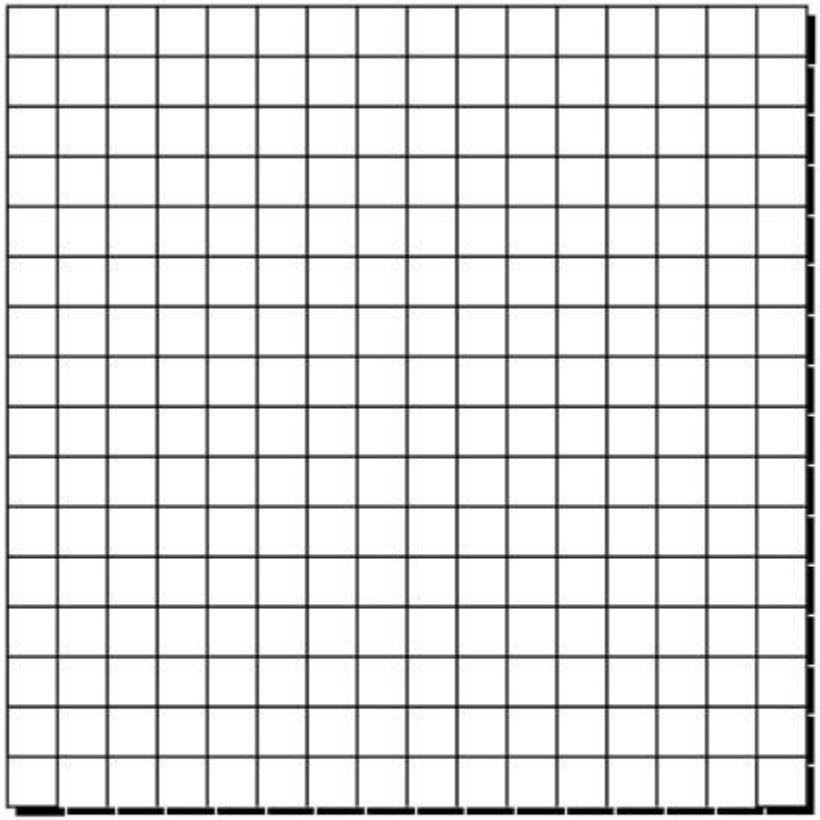


5 = YOUR CHOICE  6 = SKIP TURN

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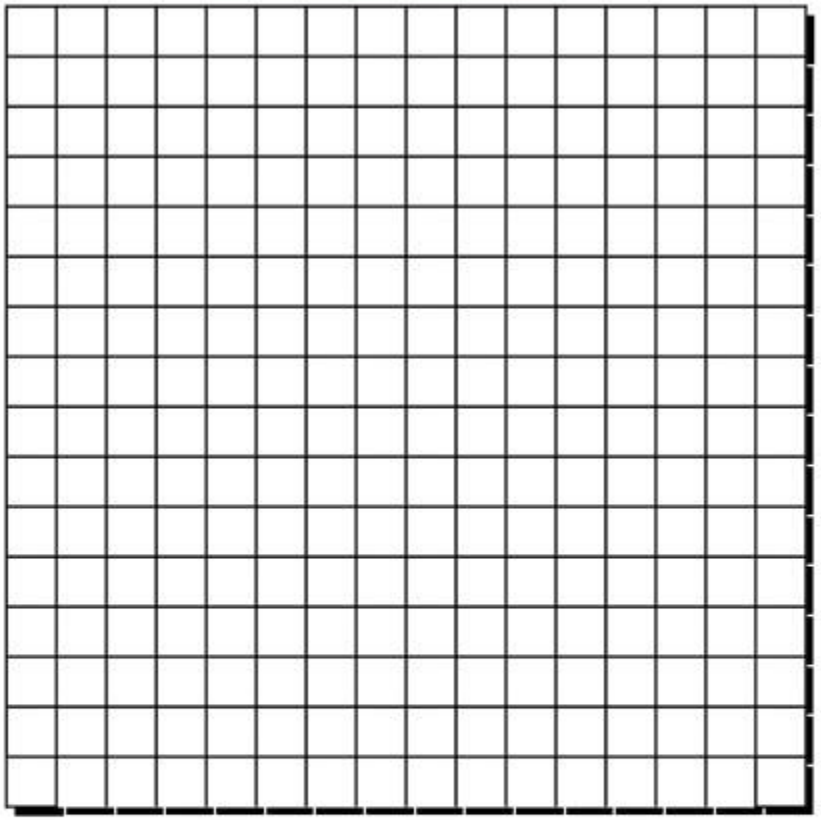


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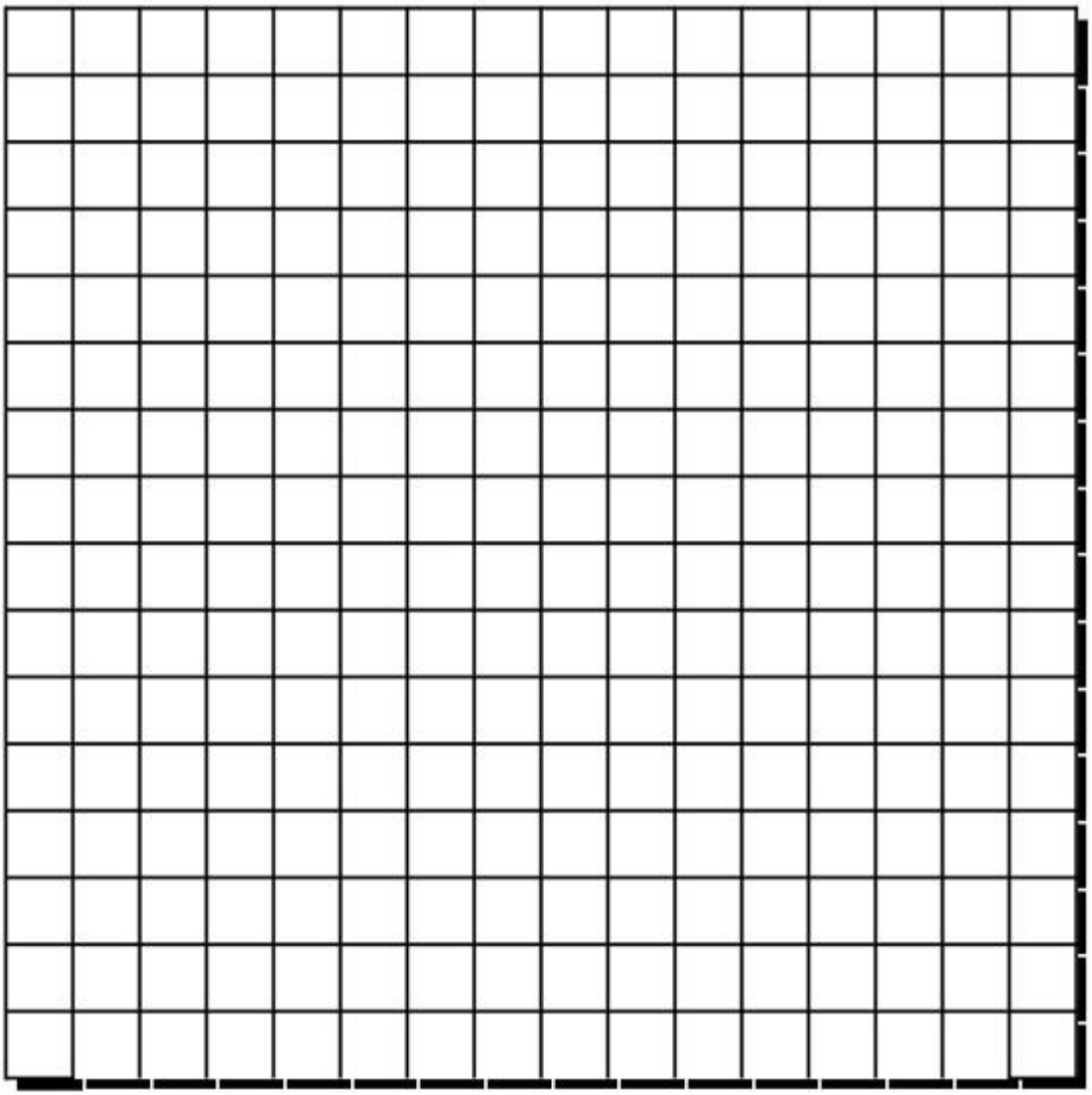

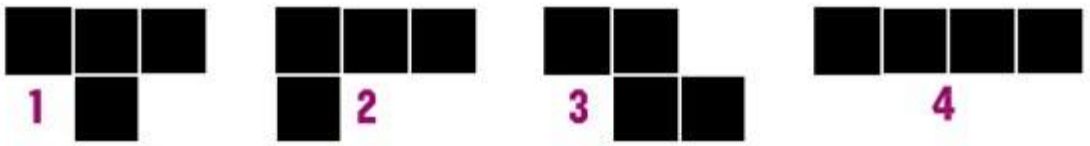


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# Entrapment Score Card

(Mark on each round whether you translated, rotated, or reflected the object)

| Round |  |  |  |  | Skip Turned |
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| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |

| Round |  |  |  |  | Skip Turned |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
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| Round |  |  |  |  | Skip Turned |
|---|---|---|---|---|---|
| 1 | | | | | |
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