

# Algebra/Geometry Institute Summer 2010

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Grade Level: 5<sup>th</sup>



## Fun with Transformations

### 1. Teaching objective(s):

Student will describe the characteristics including the relationship of the pre-image and the image of each type of transformation, rotation (turns), reflection (flips) and translations (slides) of two-dimensional figures. (Mississippi Math Curriculum Frameworks, 5<sup>th</sup> grade, 3c)

### 2. Instructional Activities:

Demonstrate and discuss the three types of transformations using the over-head projector, 1" grid paper, and a trapezoid with students. Have students draw and label each transformation on 1" grid paper after each demonstration.

Allow students to practice the objective by having them play 'The Transformation Game'. Work with students to complete the game.

Direction for The Transformation Game:

- Separate the class into groups of four.
- Choose the corner square that matches your game piece. Place your game piece so that it matches the T on your corner square. The goal is to reach the square that is diagonally opposite from your starting square.
- A player chooses a card from the card pile, follows the instructions, and places it face up in a discard pile. A playing piece may be moved following the instructions on the card if and only if the T can be made to match the T on the final square on which it lands. Two or more players may occupy the same square. Diagonal moves are not permitted.
- Free spaces do not have a T on them. Playing pieces may land on free spaces facing any direction. However, if a player lands on an occupied free space, his or her piece must match the piece that is already there.
- A player loses his or her chance to move only if it is impossible to follow the instructions on the card. The first player to move into his or her diagonally opposite corner square is the winner. (See Attachment 1)

### 3. Materials and Resources:

Materials: an over-head projector, 1" grid paper, a trapezoid, The Transformation Game Directions, (See attachment 1), Transformation Game Board, (See Attachment 2), The Transformation Game Pieces, (See Attachment 3), The Transformation Game Cards, (See Attachment 4a, & 4b), Teacher made quiz, (See Attachment 5), Teacher made quiz answer sheet, (See Attachment 6), a coordinate plane, (See Attachment 7)

- Photocopy the coordinate plane onto clear transparency.
- Make a copy of the Transformation Game Directions for each student in the class (See Attachment 1).
- Photocopy The Transformation Game Board onto card stock for each group (See Attachment 2).
- Photocopy The Transformation Game Pieces master onto clear transparency Cut out the game pieces and give each group four different game pieces. (See Attachment 3).
- Make a copy of The Transformation Game Cards masters onto card stock for each group. Cut out the cards (See Attachments 4a & 4b).
- Make copies of quiz for each student. (See Attachment 5a)

Resources: [www.shodor.org/interactive/discussions/TranslationsTeflecti/](http://www.shodor.org/interactive/discussions/TranslationsTeflecti/):




-Glencoe/McGraw-Hill, Mathematics: Applications and Concepts, Course 3, PP. 22-26

-Buckle Down Mississippi, Mathematics Level 3, 2<sup>nd</sup> Edition, Page 115

### 4. Assessment:

The student will write if a translation, reflection, or rotation was used to go from figure A to figure B using a teacher created quiz.

Transformation Game Board Directions:

- ❖ Work in groups of 4's.
- ❖ Place the cards in the middle of the table.
- ❖ Choose the corner square that matches your corner square.
- ❖ Place your game piece so that it matches the T on your corner square.
- ❖ The goal is to reach the square that is diagonally opposite from your starting square.
- ❖ A player chooses a card from the card pile, follows the instructions, and places it face up in a discard pile.
- ❖ A playing piece may be moved following the instructions on the card if and only if the T can be made to match the T on the final square on which it lands.
- ❖ Intermediate steps need not match, but all steps must be carried out in the exact order in which they appear on the card.
- ❖ Therefore, the T on the playing piece must always match the T on the game board space on which it sits.
- ❖ Two or more players may occupy the same square.
- ❖ Diagonal moves are not permitted! !
- ❖ There are three types of moves: translations (slides), rotation (turns), and reflections (flips)
- ❖  (slide)       (turn)       (flip)
- ❖ Free spaces do not have a T on them.
- ❖ Playing pieces may land on the free spaces facing any direction.
- ❖ However, if a player lands on an occupied free space, his or her piece must match the piece that is already there.
- ❖ If a player can move, he or she must move, no matter what.
- ❖ A player loses his or her chance to move if it is impossible to follow the instructions on the card.
- ❖ The first player to move into his or her diagonally opposite corner is the WINNER!!!!!!!!!!!!



### Game Pieces

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> |
| <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        |
| T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> |
| <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        |
| T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> |
| <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        |
| T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> | T        | <i>T</i> |
| <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        | <b>T</b> | T        |

# The Transformation Game Cards

|                        |                        |                        |
|------------------------|------------------------|------------------------|
| Slide                  | Slide & Turn           | Slide & Turn           |
| Flip, Slide<br>& Turn  | Turn, Slide<br>& Flip  | Slide, Turn,<br>& Flip |
| Flip, Slide<br>& Turn  | Turn, Slide<br>& Flip  | Slide, Turn,<br>& Flip |
| Turn, Flip,<br>& Slide | Slide, Flip<br>& Turn  | Flip, Turn,<br>& Slide |
| Turn, Flip,<br>& Slide | Slide, Flip,<br>& Turn | Flip, Turn<br>& Slide  |

# The Transformation Game Cards

|       |              |              |
|-------|--------------|--------------|
| Flip  | Flip & Turn  | Turn & Flip  |
| Flip  | Flip & Turn  | Turn & Flip  |
| Turn  | Flip & Slide | Slide & Flip |
| Turn  | Flip & Slide | Slide & Flip |
| Slide | Turn & Slide | Turn & Slide |

Name \_\_\_\_\_ Date \_\_\_\_\_  
 5<sup>th</sup> Math Quiz Objective 3c

Directions: Write on the line if a translation (slide), reflection (flip), rotation (turn) was used to go from figure A to figure B.

1.    
 figure A figure B \_\_\_\_\_

2.    
 figure A figure B \_\_\_\_\_

3.    
 Figure A figure B \_\_\_\_\_

4.    
 Figure A figure B \_\_\_\_\_

5.    
 Figure A figure B \_\_\_\_\_

6.    
 Figure A Figure B \_\_\_\_\_



## Math Quiz Answer Key

1. translation/slide

2. reflection/flip

3. rotation/turn

4. reflection/flip

5. translation/slide

6. rotation/turn