Slides, Flips and Turns

Summary

Activities to improve students' understanding of transformations such as translations and reflections.

Materials

Math Journals
Pencils
Crayons
Pentominoes
Graph paper
- *Slides, Flips, and Turns Game Board*

Dice (one per two students)
Colored Bingo chips (a different color for each team member)
- *"L" shapes*
- Assessment for Slides, Flips, & Turns

Slide, Flip, Turn Game

One die
Different colored bingo disks
- *Slides, Flips, and Turns Game Board*
- "L" shapes
- Slides, Flips, and Turns Individual game board

Additional Resources

Books
- *Twizzlers: Shapes and Patterns*
  by Jerry Pallotta ISBN 0613678605
- *What's Your Angle, Pythagoras? A Math Adventure*
  by Julie Ellis ISBN:1570911509

Background for Teachers

Third grade students struggle with developing the spatial sense of transformations such as translations or reflections. Teachers need to give students ample opportunities to help them visualize transformations on shapes.

Definitions:

Slide (translation) -- a transformation that slides a figure a given distance in a given direction. A slide is also called a translation.

Congruent -- having exactly the same size and shape

Flip (reflection) -- a transformation creating a mirror image of a figure on the opposite side of a line. A flip is also called a reflection.

Turn (rotation) -- the transformation that occurs when a figure is turned a certain angle and direction around a point. A turn is also called a rotation.

Intended Learning Outcomes

1. Demonstrate a positive learning attitude toward mathematics.
2. Become mathematical problem solvers.

Instructional Procedures

Invitation to Learn

Ask the students, "How many of you have ever gone down a slippery slide? Who has ever seen anyone do a back flip? Who would like to show the class how you can turn around?"

Instructional Procedures

Tell the students that as detectives, they will learn what slides, flips and turns are. Using a large stuffed animal, slide it across the floor and ask what it was doing? Have the students describe it. The animal was sliding across the floor. With your bodies, how would you show a slide?

Have the students lie on the floor (on their backs or stomachs) and ask them to show you a move by sliding. If your feet are pointing East to start, where are they pointing after a slide? (same way).

Next, have the students demonstrate a flip. Students move from their backs to their stomachs, or their stomachs to their backs. Suggest that they flip on their left side, flip on their right side.

If your head is pointing to me when you start, where is it pointing after a flip? (away from me).

Right or left flip -- the head and feet point in the same direction as before, but what is right is now left and vice-versa.

Head or feet flip -- the head will be pointing the opposite direction.

How could you show a turn? If standing--what does a turn look like? (As in basketball, pivot on one foot so you are not traveling.)

If lying on your back what does a turn look like? What was the pivot point?

Pass out pentominoes to each student. Have students use a shape (such as the "L" shape from the game) to demonstrate a slide, flip, and a turn. Students will trace the shape in their journals and apply slides, flips, and turns to the shapes. Have students communicate by writing an explanation of how they know the shape was changed.

Slide, Flip, Turn Game

Players: two to four

Place colored markers on the direction game board.

Roll the die.

Move the marker clockwise around the board, and follow the directions in the space where the marker is placed. If there are not enough spaces, player may go until they run out of spaces and they loose the rest of their turn. If there are squares or spaces available, player must move.

Goal: Be the first player to fit their shape into the final "finish" space or be the closest in fine minutes.

Extensions

Curriculum Extensions/Adaptations/ Integration

Integrating mapping skills for directional skills

Play the *Follow Directions* game:

Teacher gives directions using directional words (north, south, east, west) and slide, flip, or turn for students to follow.

Choose a student to follow one simple direction. (e.g., walk north five steps) Then choose another student to do the previous direction and add another direction. State only the new direction. Lay down and turn one-fourth turn south. (Students must remember the previous directions.) Continue giving directions for students to listen and follow. Great for listening skills as well.

Assessment Plan

Informal assessment -- observe students as they portray slides, flips, & turns with their bodies

Journal assessment -- students trace and label slides, flips and turns with pentominoes or "L" shape

- *Assessment for Slides, Flips, & Turns*

Bibliography

Research Basis

Cain-Caston, M. (1996). Manipulative Queen [Electronic version]. *Journal of Instructional Psychology* , 23(4), 270-274.

This is a study which determined the differences in third grade student achievement between using manipulatives verses worksheets.

Fox, T. B. (2000). Implications of research on children's understanding of geometry. *Teaching Children Mathematics*, 6(9), 572-576.

A study which reports research on children's understanding of geometry in the United States.

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