Transformation Shuffle

Presented by

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Assessed Curriculum

Reporting Category Geometry and Spatial Reasoning

Readiness Standard Grade 4

4.9B use translations, reflections, and rotations to verify that two shapes are congruent

Assessed Curriculum

Reporting Category Geometry and Spatial Reasoning

Supporting Standard Grade 3

3.9A Identify congruent two-dimensional figures

3.9C Identify lines of symmetry in two-dimensional geometric figures

Supporting Standard Grade 5

5.8B Identify the transformations that generates one figure from the other when given two congruent figures on a Quadrant 1 coordinate grid

Assessed Curriculum

Processed Standards

14.D Use tools such as real objects,manipulatives,and technology to solve problems

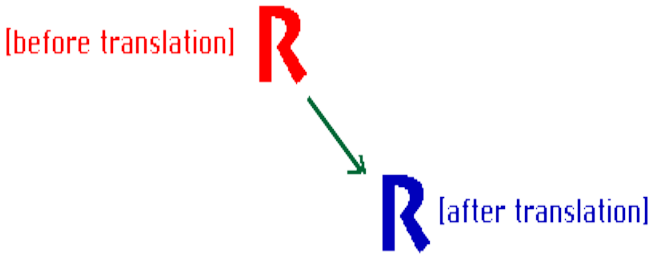
16.A Make generalizations from patterns or set of examples and non-examples

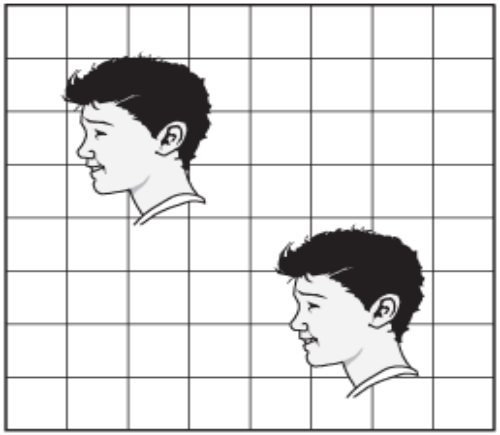
16.B Justify why an answer is reasonable and explain the solution process

Transformations

Translation

In a **translation** transformation all the points in the object are moved in a straight line in the same direction. The **size, the shape and the orientation** of the image are the same as that of the original object. Same orientation means that the object and image are facing the same direction.

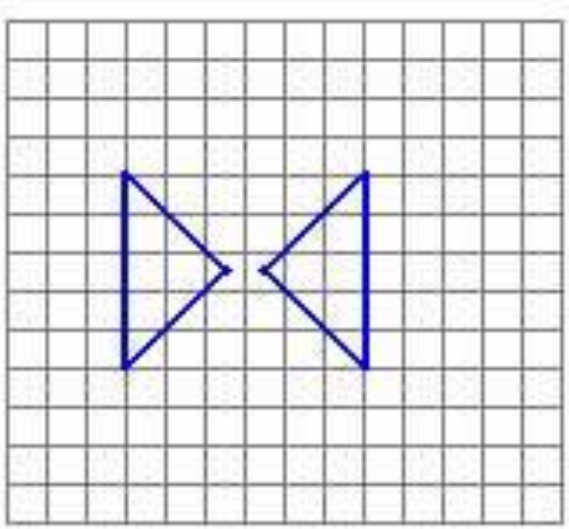


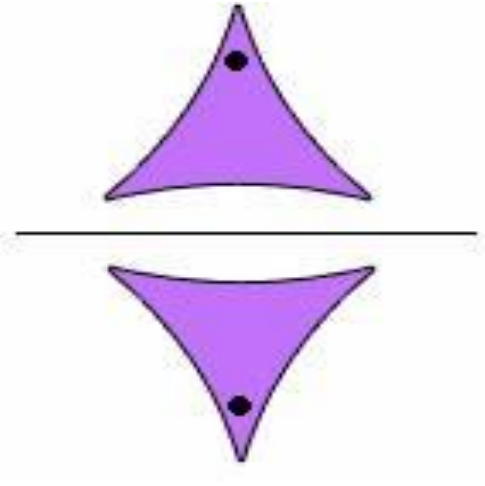


Transformations

Reflection

A transformation in which a geometric figure is reflected across a line, creating a mirror image.

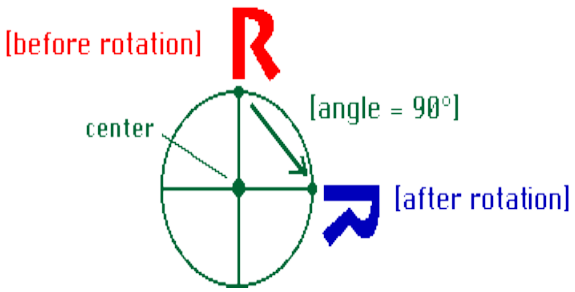


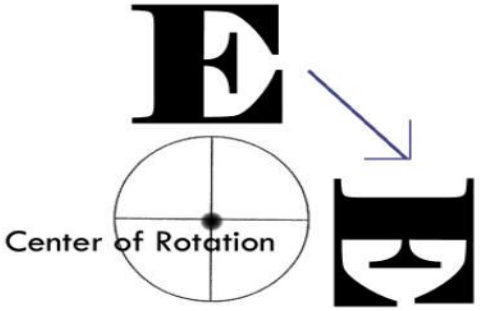


Transformations

Rotation

A **rotation** is a transformation that turns a figure about a **fixed point**.





RICE

Transformation

Identify transformations displayed

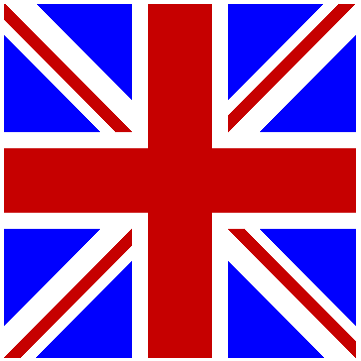
Rotational Symmetry

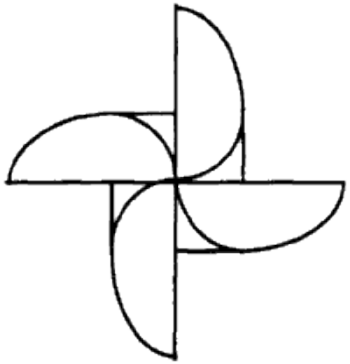
A figure has **rotational symmetry** when it can be rotated around a central point, or point of rotation less than 360 and still be identical to the original figure.

A picture has **rotational symmetry if you can turn it and it looks the same**. (It doesn't count if you turn it in a complete circle - everything looks the same then!)

Rotational Symmetry Examples

Let's test for rotational symmetry





Rotational Symmetry

Activity 1

Different logos and designs

- Whole group with a box
- Small group “Turn It Around”
- Extension-students find company logos with rotational symmetry

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Polyominoes

Polyominoes are shapes formed by connecting equal-sized squares, each joined together with at least one other square along an edge.

The shape of a polyomino can grow quite complex when there are many squares.

A **domino** has two squares.

Then come **trominoes** (3 squares)
tetrominoes (4)
pentominoes (5)
hexominoes (6)
heptominoes (7)

Polyominoes

Advantages of Using Polyominoes

Polyominoes develops an environment that includes:

- intriguing puzzles,
- interesting patterns
- exciting games
- applications for using transformations
- applications of area and perimeter
- exercises in critical thinking and spatial reasoning
- nurture a non-anxious and positive attitude toward math
- promote an atmosphere of cooperation

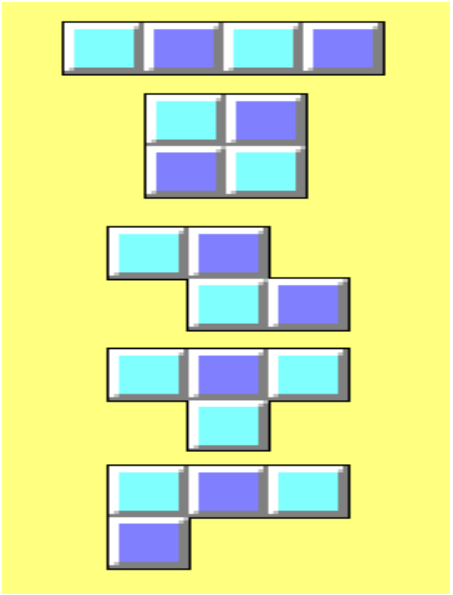
Tetrominoes

Tetrominoes (4 squares using color tiles)pieces the same as the video game Tetris invented by Alexey Pajitnov from the Soviet Union, June 6, 1984

Make all possible tetrominoes using color tiles

Tetrominoes

Make all possible tetrominoes using color tiles



Tetrominoes

Activity 2

Tetromino Cover Up

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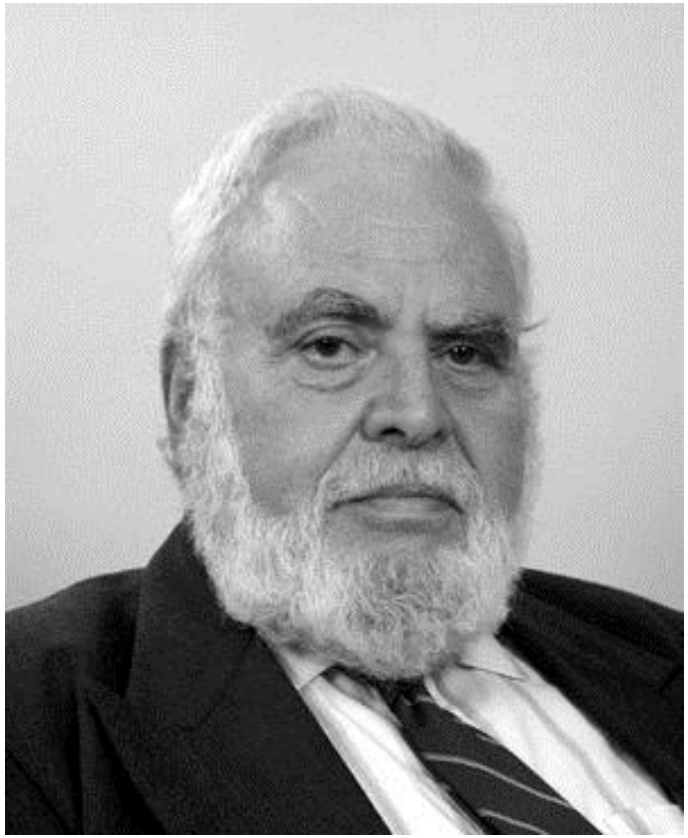
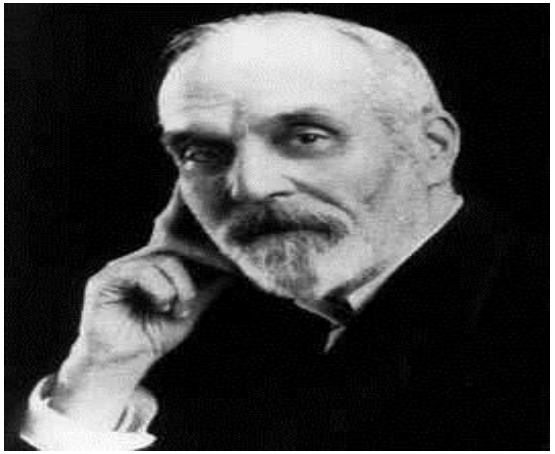
Pentominoes



- Pentominoes are thought to have been "invented" by Solomon W. Golomb in 1953, during a talk he gave to the Harvard Mathematics Club. He is credited with coining the name pentominoes, but they have been around since a much earlier time

Pentominoes

Henry Ernest Dudeney



Henry Ernest Dudeney, a great English inventor of puzzles, created the first pentomino problem, which was published in the Canterbury Puzzles in 1907.

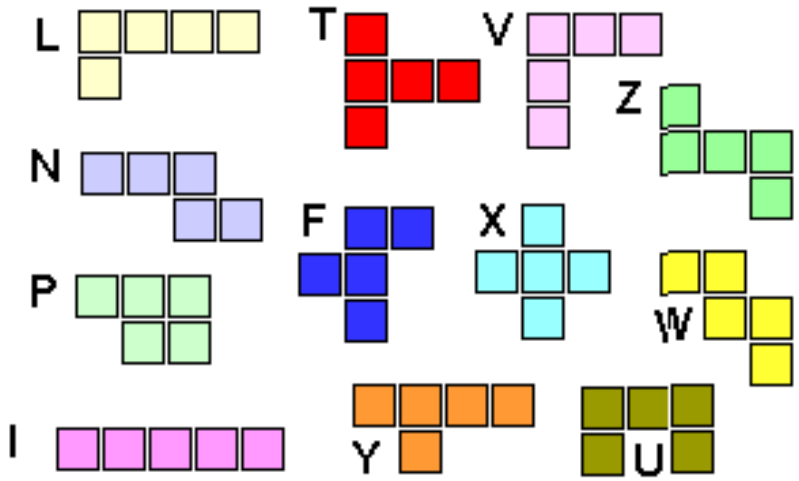
Pentominoes

Activity 3

- Display the correct way to connect 5 squares to make a pentomino
- Use color tiles to make all possible pentominoes
- Using commercial pentominoes
- Find the pentomino that has the least perimeter, a line of symmetry, and rotational symmetry

Pentominoes

Each pentomino consists of 5 square blocks joined together with at least one common side. There are 12 different pentominoes named after the letters of the alphabet



Pentominoes

Activity 4

Pentomino Squeeze

Pentominoes

Literature Selection

Chasing Vermeer by Blue Balliett

Illustrated by Brett Helquist

Activity 5

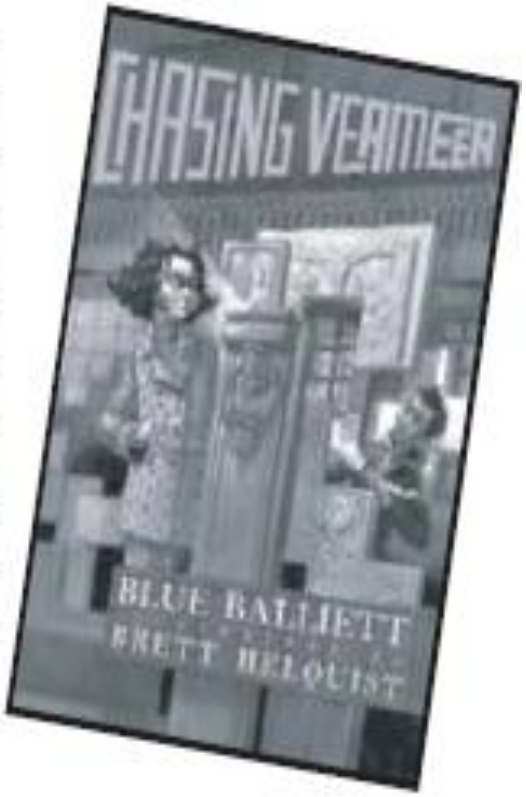
Chasing Vermeer by Blue Balliett

Break the Calder's Pentomino Code

- It is odd but even
- What animal is in each picture? How many of each?
- View pictures from some of the chapters

Calder's Code

	1	2	3
F	A	M	Y
I	B	N	Z
L	C	O	
N	D	P	
P	E	Q	
T	F	R	
U	G	S	
V	H	T	
W	I	U	
X	J	V	
Y	K	W	
Z	L	X	



Pentominoes

Activity 6

Pentomino Activities, Simple to Complex

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Welcome

The Rice University School Mathematics Project has been providing a bridge between the Rice University mathematics research community and the Houston PreK-12 mathematics teaching community since 1987.

Our mission is to help teachers and school administrators better understand the nature of mathematics, the effective teaching and assessing of mathematics, and the importance of

News & Events

RUSMP announces Fall 2010 short courses

RUSMP will offer three short courses during October 2010: Topics in Algebra for Elementary Teachers (Grades 3-5), Topics in Algebra for Middle School Mathematics Teachers, and A Look at Functions for Senior High School Mathematics Teachers. The courses will »

Rice University/Project GRAD Advanced Mathematics Institute highlighted

The Rice University Project GRAD Advanced Mathematics Institute, funded by Shell Oil

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