

TETRIS ACTIVITY

MATHEMATICS: Geometry

SCIENCE: Critical Thinking

ART: Drawing

AIM: Students manipulate geometrical figures.

BACKGROUND: This game is a lesson in geometrical transformations. A geometrical transformation changes an object's position or orientation, but not its shape or size. There are three basic transformations: translations, reflections, and rotations. A translation, or slide, changes the object's position without changing its orientation. A reflection, or flip, is similar to a mirror image. A rotation, or turn, spins the pattern around a point.

BEFORE PLAYING

Discussion: As a class, discuss the types of geometric transformations. Help students define slide, flip, and turn. Help them visualize each transformation and its result by coming up with everyday slides, flips, and turns. (Examples: Slide—playground slide, you move from high to low but you are still sitting upright when you hit the bottom. Flip—gymnast doing a handstand. Turn—basketball player pivoting on one foot.)

AFTER PLAYING

Activity: Explore tessellations, or mosaics created by repeatedly positioning one or more congruent shapes next to each other without gaps or overlaps. A tessellation is a result of performing geometric transformations. Visit the tessellation web sites or look through the tessellation book listed under **Resources** below. Then challenge your students to design and color their own tessellations. Post the drawings around the room.

ASSESSMENT: Check students' answers on the After Playing Worksheet.



TA-6.1

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RESOURCES

Symmetry and Tessellations: Investigating Patterns (Grades 5-8), by Jill Britton (Dale Seymour, 1999, \$25.95, ISBN 0-76900-083-5). Integrate art and math with creative math projects that explore symmetry, patterns, and more. To order, call 1-800-526-9907.

M.C. Escher (1898-1972), a famous Dutch graphic artist, masterfully combined art and math in his works. Visit these sites to view his butterfly, lizard, and fish tessellations.

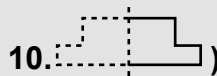
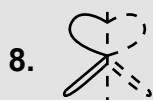
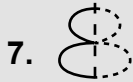
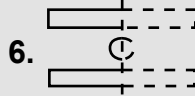
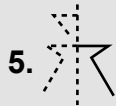
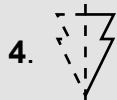
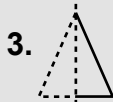
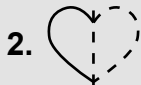
<http://www.worldofescher.com/gallery/SymmetryE70.html>

<http://www.worldofescher.com/gallery/SymmetryE25.html>

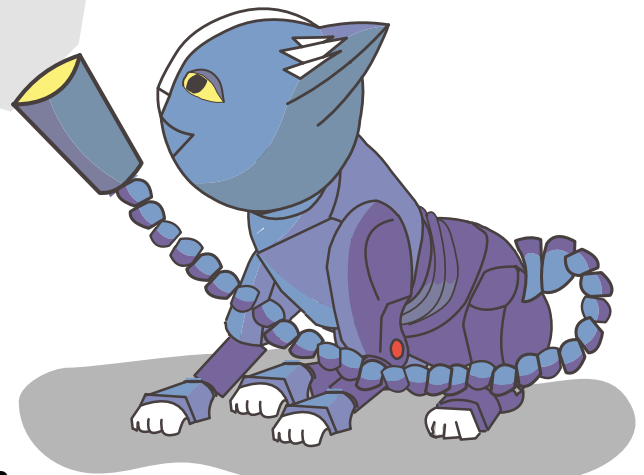
<http://www.worldofescher.com/gallery/SymmetryE72.html>

ANSWERS

Before Playing, Worksheet: (1.



After Playing, Worksheet:
(Escher slid, flipped, and turned shapes to create beautiful art.)



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CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

- Predict and describe the results of sliding, flipping, and turning two-dimensional shapes
- Identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs
- Create and describe mental images or objects, patterns, and paths
- Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life
- Investigate, describe, and reason about the results of subdividing, combining, and transforming shapes
- Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed

Science:

- Systems, order, and organization
- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

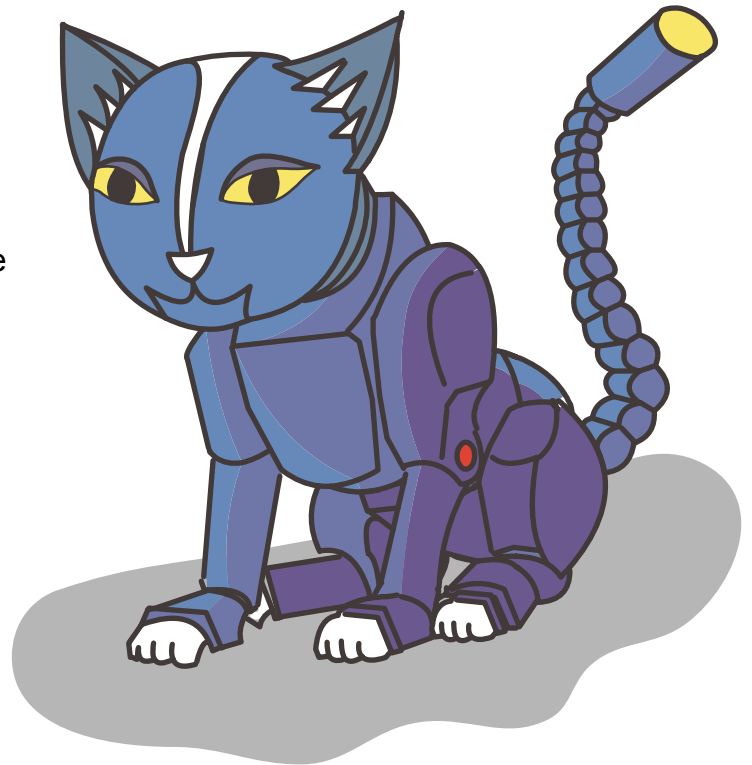
CURRICULUM AREAS

Math: geometry, flipping, sliding, turning, symmetry, congruency.

Science: measuring.

Art: drawing tessellations.

Technology: computer science.





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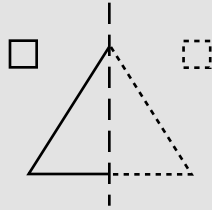
(Before Playing)

Name: _____

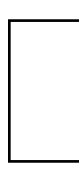
Date: _____

Using the dotted line as the line of symmetry, complete each shape.

Example:



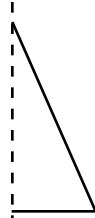
1.)



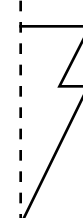
2.)



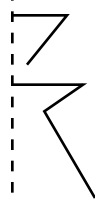
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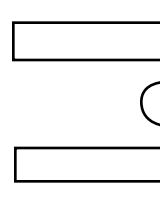
4.)



5.)



6.)



7.)



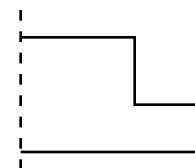
8.)



9.)



10.)





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(After Playing)

Name: _____

Date: _____

Identify each image as a slide, flip, or turn. Circle the word under the correct column. Use a mirror to decipher the message about a famous artist.

	Original	Image	Slide	Flip	Turn
Example:			No	No	Yes
1.)			Natshn	Mac	Escher
2.)			,took	,sib	,colored
3.)			,bedift	,shook	,sib
4.)			so	went	and
5.)			went	bounced	turned
6.)			shpes	cook	drawings
7.)			and	to	he
8.)			create	fly	see
9.)			temple	beautiful	happy
10.)			.painting	.foot	.st.