LOGOS BY DESIGNS

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Geometry Honors

TRANSFORMATION PROJECT

ROTATION

REFLECTION

TRANSLATION

Challenge Project 2006

by

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REFLECTION

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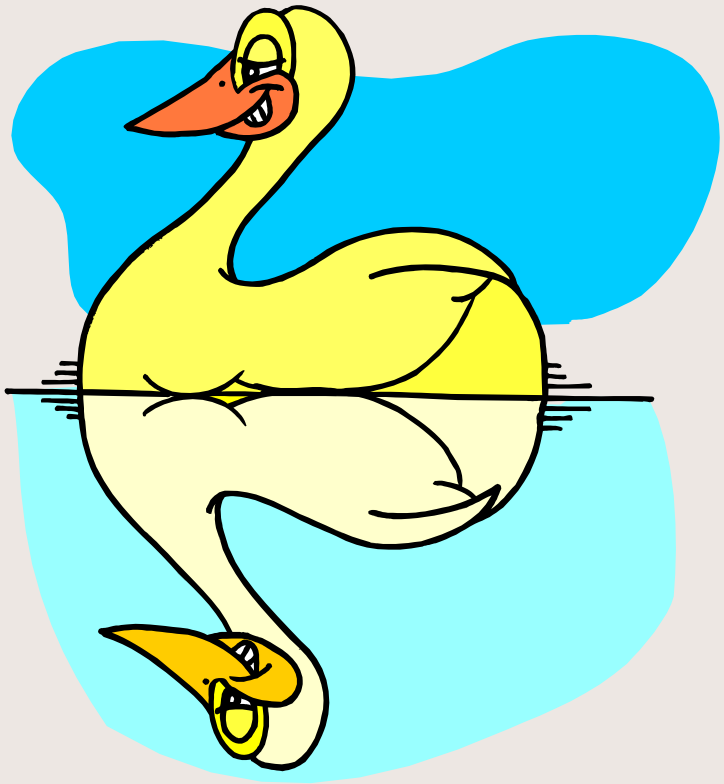
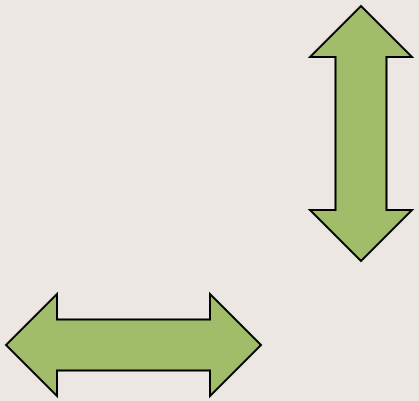


- A transformation in which a figure is flipped or reflected over a *line of reflection* to produce a mirror image.

ROTATION



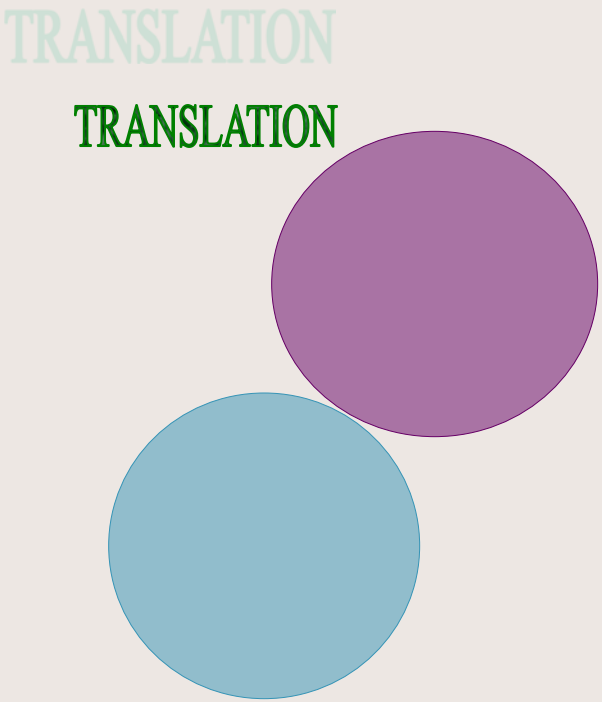
- A transformation that turns a figure about a point.
- When rotating a figure, you need:

  *a center of rotation about which to rotate the figure

  *a clockwise or counterclockwise direction of rotation

  *a number of degrees of rotation

TRANSLATION



- A transformation that moves or slides every point of a figure the same distance in the same direction.

CMST Institute Challenge Project Problem Statement

Students will work for a company that specializes in creating company logos. The students will use their knowledge of transformational geometry to create a unique design for each company. Their design must consist of at least two types of transformations: reflections, translations or rotations. They will be given extra points if they can create their design using tessellations.

CMST Institute Challenge Project Problem Statement

Throughout this project, students will work cooperatively in pairs. They will complete two worksheets and their final project. Assessment of student understanding will be based on the completion of the worksheets and final project.

Modeling Software

Students will use the TI-83 plus graphing calculators to reinforce the rules for reflections that are frequently asked on the Math A exams. These include reflections in the origin, x-axis, y-axis, y = x, and y = -x. They will also use the graphing calculator to perform translations. Students will also use *Geometer's Sketchpad* to investigate transformations. Their final project will require them to use this program to design their own geometric shape and use translations, rotations or reflections to design their own company logo.

Log of minutes

This project was conducted over 4 class periods (45 minutes). Preliminary investigations involved research on the Internet on how to use the graphing calculator and GSP to perform transformations and then practicing these skills to model for the students. Yolanda Wooten and Carolina Machuca-Dall were responsible for developing lessons and activities on the graphing calculator, as well as modeling transformations on GSP. Reggie Sherrill and Marie Jenkins-Cox designed the poster board as well as the powerpoint presentation.

Summary of Project

Problem Scenario:

You will be working for a company that designs logos. Your job is to come up with a creative design that involves using transformations to design your logo. Your design must include at least two transformations in your design. The company favors designs that use tessellations. Thus, if you can tessellate your design you will be awarded extra points.

Objectives:
Students will:

- Be able to define a transformation, preimage, image, mapping, isometry, reflection in a line and point, translation, rotation, dilation, tessellation.
- Be able to use the TI-83 plus graphing calculator to perform reflections and translations
- Be able to manipulate *GSP* to investigate transformations
- Be able to construct a tessellation using *GSP*.

Problems encountered:

One of the most significant problems we encountered was finding times to meet during the school day to work on this project. Because our team members are on different time schedules, with different roles and responsibilities, it was very difficult to set time aside to meet. Professional development meetings, after school tutoring and the overwhelming amount of paperwork involved (grading, etc.) from our overcrowded classrooms made it even more challenging.

Problems encountered:

Another problem that we encountered was that our schools (Engineering and Skilled Trades) do not have computer labs that have GSP, STELLA, Interactive Physics or Agent Sheets installed. Therefore, if we wanted to use the software for students to do their own investigations it was impossible. As a result, we chose my Geometry Honors class for this project because this involved the smallest number of students (10).

Problems encountered:

We were loaned 3 laptops and used our team members' laptops to do this project. However, I would have much rather used my Integrated Math classes for this project because the curriculum is slower paced so I could afford to spend extra time on topics.

Evaluation of Results:

The students did a great job using both tools: TI 83 graphing calculator and *Geometer's Sketchpad*. I was amazed at how quickly they navigated through GSP. A couple of students showed me shortcuts that I would never have figured out on my own. They enjoyed using the laptops in class and most of them were very comfortable using them. I was impressed with the overall results of the project.

Evaluation of Results:

However, as students were working on the final project, many were getting too creative with their logos and kept forgetting that they were to use at least 2 transformations to design their logo. They were constantly reminded to use look at the rubric so they would know how they were going to be assessed.

Summary of experience:

Although we found it difficult to meet the deadline of the project, our team did a good job contributing to the project. We had some difficulty using GSP to do tessellations. However, we managed to collaborate and figure out our problem together. We enjoyed working on the project and learned much more about GSP and the graphing calculator as tools to enhance mathematical learning and interest. As a result of this project, I feel more comfortable using these tools to design more lessons that will maximize student learning.

Curriculum Standards:

Key Idea 4: Modeling and Multiple Representation

- 4A Represent problem situations symbolically by using algebraic expressions, geometric figures and graphs

- 4C Use transformations in the coordinates plane

Curriculum Standards:

Key Idea 3: Operations

- **3C Recognize and identify symmetry and transformation on figures**

Curriculum Standards:

Key Idea 5: Measurement

- **Use geometric relationships in relevant measurement problems involving geometric concepts**