

WAMC Lab Template

Math Concept(s): **Transformational Geometry, measurement geometry, percentages**

Source / Text: **HMH GoMath**

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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

- Students will design individual t-shirt logos personalized to them (using basic geometric shapes).
- Students will include different transformational geometry elements within their design. Students will have to fill in a specific amount of area.
- An extended version of this project would be for students to have their design scaled properly, cut out via hot pen and spray their logo design on an actual t-shirt.

Lab Plan

Lab Title: T-shirt Logo Design

Prerequisite skills: Ability to use and measure with rulers, coordinate plane familiarity, algebra familiarity

Lab objective: To have students create design elements and manipulate basic geometric shapes to create interesting designs. This is an extension of their PART 1 of the Logo Design project.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- 8.GA.1 Verify experimentally the properties of rotations, reflections, and translations:
- 8.GA.3 Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.

Standards for Mathematical Practice:

- MP 4: Model with mathematics
- MP 5: Use appropriate tools strategically.

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- ELA-SPEAKING & LISTENING.SL.7.2 Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.

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- N/A

Technology

- TECHNOLOGY LITERATE and FLUENT 1.a Students articulate personal learning goals, select and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working toward their goals.

Engineering

- N/A

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
21st Century Skills (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<u>Accountability</u>
<input checked="" type="checkbox"/> Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<u>Leadership and Responsibility</u>
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> Manage Goals and Time	<u>Leadership and Responsibility</u>
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input checked="" type="checkbox"/> Work Independently	<input type="checkbox"/> Guide and Lead Others
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<input type="checkbox"/> Be Self-Directed Learners	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Make Judgments and Decisions	<input checked="" type="checkbox"/> Apply Technology Effectively	<u>Social and Cross-Cultural</u>	
<input type="checkbox"/> Solve Problems		<input type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input type="checkbox"/> Work Effectively in Diverse Teams	
<input type="checkbox"/> Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Graphing paper
- Rulers
- Math Compass
- Scissors
- Computer Art program (canva)
- Extension:
 - Hot Pen stencil cutter
 - Blank stencils
 - T-shirts
 - Colored Fabric Spray

Set-Up Required:

- Students will need a flat surface to create their designs. Students will need computers to finalize the design.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- **LEARNING AND INNOVATION – Think Creatively –** Students will design their own logo that is a simple representation of themselves or something they enjoy.
- **INFORMATION, MEDIA, & TECHNOLOGY SKILLS – Apply Technology Effectively –** Students will use the design website, canva, to transfer their graph paper logo into a digital format.
- **LIFE & CAREER SKILLS – Work Independently –** Students will keep pace with their own timeline to create, design, and present their own logo.

Cooperative Learning:

- During the design process—students will be able to talk to other peers to think critically about the different types of transformations and what differentiates them from each other.

Expectations:

- Students will be allowed to spend about 20 minutes brainstorming but will have to go ahead with a design decision to budget enough time to apply the algebraic reasoning with their design.

Timeline:

- This particular project will take place after the majority of the lesson (5 day lesson), with 3 days of exploratory learning and then designing on the 4th day. This is Part 2 out of a two part project.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- 10.1% of the workforce is currently self-employed. That's almost 16.2 million people. Either being a freelance designer or learning how to design and market your own business has great personal impact of employability.

Career Applications

- **Digital Marketing –** Developing and implementing a digital marketing design with strategies in line with the business goals.
- **Advertising Designer –** Developing eye-catching campaigns with the effective use of type, photography, illustration and color. Research target market and trends to determine what customers find interesting.
- **Graphic Designer –** A creative professional who creates designs or visual concepts that deliver information through imagery, art and photographs. A graphic designer works with clients, team members, and stakeholders to understand their needs and produce content that aligns with their specifications and brand guidelines. A graphic designer uses design software to complete projects and revises them based on client feedback.

Optional or Extension Activities

- An extended version of this project would be for students to have their design scaled properly, cut out via hot pen and spray their logo design on an actual t-shirt.
 - This would require students needing to have negative space taken into consideration with creating their logo.

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- This would also require the logo to be a certain size for the t-shirt and take up a certain percentage of the chosen area.

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Lab instructions

Design your Own Logo

- Design your own logo that represents yourself OR your interests on a piece of graphing paper with a cartesian plane in the middle that you draw yourself.
- You MUST use a straight edge or a ruler for ALL LINES and COLOR is expected.
- Your logo should include more than one of the following transformations:
 - Translation
 - Reflection
 - Rotation
 - Dilation
- Your GOAL is for your logo to go through all four quadrants of the cartesian plane.
- You must DESCRIBE how your shape(s) has been transformed algebraically.
- Finally, take a picture of your completed logo and put it in at the end of your presentation.
- You should write a paragraph on another slid explaining how your logo represents your personality or interest for full credit.

STEP BY STEP INSTRUCTIONS:

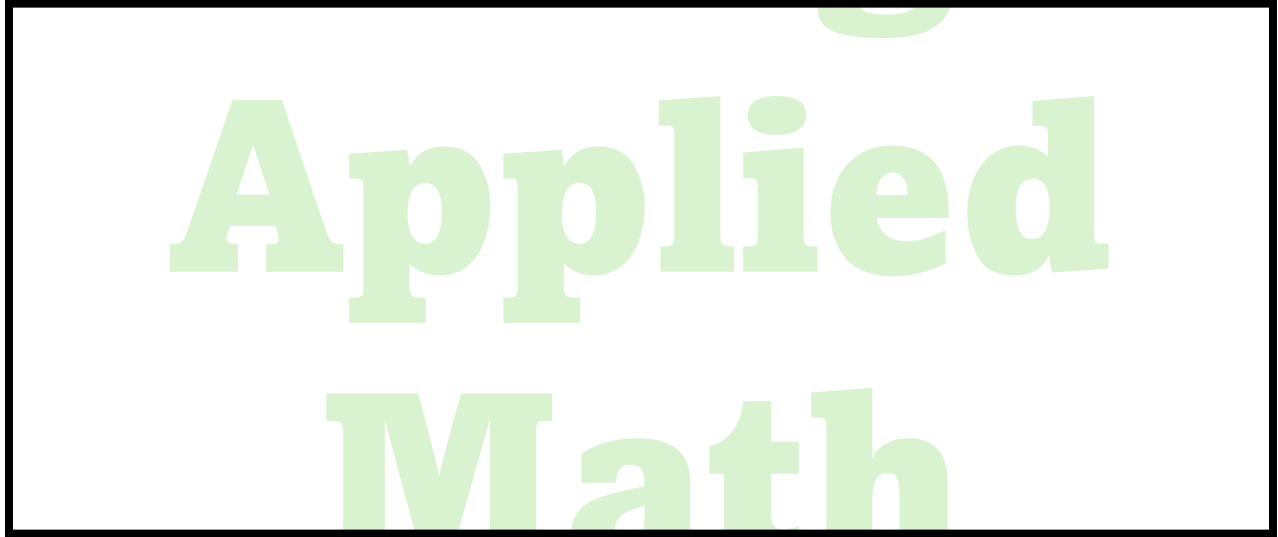
- STEP 1: Create a logo with simplistic shapes
 - Include all four transformations
 - Translations (copy/paste the shape, move it)
 - Reflection (flip the shape)
 - Rotation (turn the shape)
 - Dilation (enlarge or reduce the shape)
- STEP 2: Decide the colors of your design
- STEP 3: Transfer your logo into a digital format

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Student Handouts – Transformational Geometry

Washington

Create/Draw your logo design here:



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Identify by recreating each element of the design and the specific transformation below.

Write the **algebraic representation** as well.

Translation:



Reflection:



Rotation:



Dilation:



Rubric (assessments)

Mathematical Measurements:

Standard Measured	Level 1 – Below	Level 2 – Approach	Level 3 – Meet	Level 4 - Exceed
Student was able to accurately represent a TRANSLATION via image and algebraically.				
Student was able to accurately represent a REFLECTION via image and algebraically.				
Student was able to accurately represent a ROTATION via image and algebraically.				
Student was able to accurately represent a DIALTION via image and algebraically.				

Design Measurements:

Standard Measured	Level 1 – Below	Level 2 – Approach	Level 3 – Meet	Level 4 - Exceed
Image is original in design and represents the student or their interests.				
Image is in full color.				