# Math 8 Unit 4: Transformations

Content Area: **Math**
Course(s):
Time Period: **Marking Period 3**
Length: **4 weeks**
Status: **Published**

## Course Pacing Guide

| Unit | MP/Trimester | Weeks |
|---|---|---|
| Integers, Equations, and Inequalities | 1 | 8 |
| Rational Numbers and Proportions | 1/2 | 5 |
| Geometry and Measurement | 2/3 | 9 |
| Transformations | 3 | 4 |
| Functions | 3/4 | 7 |
| Data Analysis and Probability | 4 | 4 |

## Unit Overview

This unit introduces students to transformations in the coordinate plane, which is heavily emphasized in Geometry. Students will transform figures by reflections, rotations, dilations, and translations. This unit requires a strong understanding of graphing in the coordinate plane.

## Enduring Understandings

If the sum of the measures of two angles is 90, the angles are complementary

If the sum of the measures of two angles is 180, the angles are supplementary

When two different lines intersect, the pairs of opposite angles are vertical angles

A transversal is a line that intersects two or more lines at separate points

Angle relationships formed by transversals through parallel lines are: corresponding angles, alternate interior angles, and alternate exterior angles. All of these relationships results in congruent angle measures

Interior angles are formed by two adjacent sides in a polygon

The angle that is adjacent to an interior angle is an exterior angle

A transformation of a figure changes its location, size, and/or orientation

A transformation called a translation slides a figure in the coordinate plane

A transformation called a reflection reflects, or flips, a figure over a line

The line of symmetry of a line of reflection that divides a figure into two parts that are mirror images

A transformation called a rotation turns the figure about a fixed point, called the center of rotation

If rotating a figure 180 or less about its center maps the figure onto itself, it has rotational symmetry

A transformation called a dilation stretches or shrinks the figure

The scale factor of a dilation is the ratio of the corresponding side lengths of the figure and its image

## Essential Questions

If two angles are both vertical and complementary, what are their angle measures?

What is the difference between alternate interior angles and alternate exterior angles?

Explain how to find the measure of each interior angle of a regular polygon?

If point A was moved to the left 4 units and up 3 units, describe the translation of point A using coordinate notation.

When a point is reflected in the y-axis, what coordinate do the point and its image have in common?

What type of transformation results when you switch the coordinates of a point and multiply the new x-coordinate by -1?

If a figure in Quadrant II is dilated by a scale factor of 3, how do you know in which quadrant its dilated image will appear?

## New Jersey Student Learning Standards (No CCS)

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|---|---|
| MA.8.G.A.1 | Verify experimentally the properties of rotations, reflections, and translations: |
| MA.8.G.A.1b | Angles are transformed to angles of the same measure. |
| MA.8.G.A.3 | Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. |
| MA.8.G.A.5 | Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. |
| MA.8.G.B.8 | Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. |

## Interdisciplinary Connections

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| LA.W.8.6 | Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others. |
| TECH.8.1.8.C.CS4 | Contribute to project teams to produce original works or solve problems. |
| TECH.8.2.8.C.8 | Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers. |

## Technology Standards

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| TECH.8.1.12.D.CS3 | Exhibit leadership for digital citizenship. |
| TECH.8.1.12.F.CS3 | Collect and analyze data to identify solutions and/or make informed decisions. |
| TECH.8.1.12.E.CS4 | Process data and report results. |
| TECH.8.1.12.C.CS4 | Contribute to project teams to produce original works or solve problems. |
| TECH.8.2.12.C.CS2 | The application of engineering design. |
| TECH.8.1.12.F.CS4 | Use multiple processes and diverse perspectives to explore alternative solutions. |

## 21st Century Themes/Careers

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| CAEP.9.2.8.B.3 | Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career. |
| CAEP.9.2.12.C.3 | Identify transferable career skills and design alternate career plans. |

## Financial Literacy Integration

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| PFL.9.1.8.A.2 | Relate how career choices, education choices, skills, entrepreneurship, and economic |

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| | conditions affect income. |
| PFL.9.1.8.A.6 | Explain how income affects spending decisions. |
| PFL.9.1.8.B.9 | Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books). |
| PFL.9.1.8.D.1 | Determine how saving contributes to financial well-being. |
| PFL.9.1.8.D.5 | Explain the economic principle of supply and demand. |
| PFL.9.1.8.E.1 | Explain what it means to be a responsible consumer and the factors to consider when making consumer decisions. |
| PFL.9.1.8.F.3 | Relate the impact of business, government, and consumer fiscal responsibility to the economy and to personal finance. |

## Instructional Strategies & Learning Activities

- Provide access to online textbook
- Provide access to review problems/extra practice
- Provide access to answer keys for self-checking
- Tic-Tac-Toe
- Scavenger hunts
- Partner work
- Pair-Square
- Clock partners
- Supplemental worksheets
- Transformations pennant activity
- Transformations workbook (completed whole class, partner, and independently)
- "He Said, She Said" dilations activity

## Differentiated Instruction

- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Tiered Learning Targets
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building

- Self-Directed Learning
- Debate
- Student Data Inventories
- Game-Based Learning
- Grouping
- Rubrics
- Jigsaws
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Mentoring
- Assessment Design & Backwards Planning

## Formative Assessments

- Daily homework checks
- Quiz
- Chapter Test
- Exit Tickets
- Warm-Ups

## Summative Assessment

- Unit Test
- Unit Project

## Benchmark Assessments

Students will take NJSLA Algebra 1 Benchmark B

## Alternate Assessments

- Modified homework
- Modified quizzes
- Modified tests
- Modified projects

## Resources & Technology

- Google docs, spreadsheets, slides
- TI graphing calculator
- Chromebooks
- Promethean board
- Websites: Desmos, Geogebra, EdPuzzle, Quizlet
- Google classroom

## BOE Approved Texts

Holt Larson Pre-Algebra 9780547614830

## Closure

- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Kids write notes to peers describing what they learned from them during class discussions.
- Have students fill out a checklist with the objectives for the day.
- Have students complete an exit ticket without putting their name on it. Hand back exit tickets the next day in class and have students correct as a warm up.
- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice, Please," or "I Need Some Help!"
- After writing down the learning outcome, ask students to take a card, circle one of the following options, and return the card to you before they leave: "Stop (I'm totally confused. Go (I'm ready to move on.)" or "Proceed with caution (I could use some clarification on . . .)"

## ELL

- Alternate Responses
- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- E-Dictionaries
- Google Translate

## Special Education

- Shorten assignments to focus on mastery of key concepts.
- Specify and list exactly what the student will need to learn to pass.
- Evaluate the classroom structure against the student's needs (flexible structure, firm limits, etc.).
- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom (mobiles, etc.).
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Provide an unobstructed view of the whiteboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit as much time as needed to finish tests.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Have test materials read to the student, and allow oral responses.
- Divide tests into small sections of similar questions or problems.
- Allow the student to complete an independent project as an alternative test.
- Allow take-home or open-book tests.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).

- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Permit a student to rework missed problems for an additional credit grade.
- Average grades out when assignments are reworked, or grade on corrected work.

## 504

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

## At Risk

- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking

- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting
- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Cue/model expected behavior
- Use peer supports and mentoring
- Chart progress and maintain data

## Gifted and Talented

- Offer the Most Difficult First
- Pretest for Volunteers
- Offer choice
- Speak to Student Interests
- Allow G/T students to work together
- Tiered learning
- Focus on effort and practice
- Encourage risk taking