Essential Question
(Domain 1: Planning and Preparation-Component 1c: Designing Coherent Instruction)

- EQ1. How can the coordinate plane help me understand properties of translations?
- EQ2. How can I tell if two figures are similar?

Background Summary:

Prior to this lesson, students will have already been introduced to the following:

- A1. Write the ordered pair of the original figure when the image is given or vice versa.
- A2. Add and subtract integers on a number line
- A3. Identify the x and y-axis on a coordinate plane as horizontal and vertical lines

Lesson Objective:

- SWBAT identify the properties of translations on a coordinate plane

Standards
(Domain 1: Planning and Preparation- Component 1a: Demonstrating Knowledge of Content and Pedagogy)
CCSS.MATH.CONTENT.8.G.A.1
Verify experimentally the properties of rotations, reflections, and translations:

CCSS.MATH.CONTENT.8.G.A.2
Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

CCSS.MATH.CONTENT.8.G.A.3
Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

CCSS.MATH.CONTENT.8.G.A.4
Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Vocabulary
(Domain I: Planning and Preparation - Component 1e: Demonstrating Knowledge of Students.)

Prep Work/Materials
(Domain 1 Planning and Instruction- Component 1e: Designing Coherent Instruction, Domain 3 Instruction-Component 3c: Instruction Engaging Students in Learning)

Cross Curricular Connection
(Domain I: Planning and Preparation - Component 1a: Demonstrating Knowledge of Content and Pedagogy, Component 1b: Demonstrating Knowledge of Students.)

Transformations
Translation
Pre-Image
Image
Prime: ‘

Worksheet
Lego Mindstorm Kit (ideally 1 for each group of 3)
Pencil/Marker attachment for Lego Mindstorm
Big/small graph papers,
Notebooks
Pencils

Math
Technology
Science
ELA
Art
Social Studies/History

Differentiation
(Domain I Planning and Preparation-Component 1e: Designing Coherent Instruction, Domain 3: Instruction - Component 3b: Using Question and Discussion techniques Domain 3: Instruction - Component 3c: Engaging Students in Learning)
A translation is when a figure slides to a different location. The shape and size does not change (congruent).

Coordinate plane rules: \((x, y) \rightarrow (x \pm h, y \pm k)\) where \(h\) and \(k\) are the horizontal and vertical shifts.

Note: If movement is left, then \(h\) is negative. If movement is down, then \(k\) is negative.
- Multiple Entry Points/ Scaffolding on Transformations

### Procedure
(Domain 1 Planning and Preparation-Component 1e: Designing Coherent Instruction, Domain 3: Instruction - Component 3b: Using Question and Discussion techniques Domain 3: Instruction - Component 3c: Engaging Students in Learning)

- Teacher introduces the scenario in worksheet form.

**Scenario:**
- You are trying to beat your friend’s score....

http://robertkaplinsky.com/work/ms-pac-man/

### Student Engagement
(Teacher Assessment)

- Opportunities for students to initiate higher-order questions & extend/enrich the discussion.
- Open-ended questions with multiple correct answers.
- Fully aligned with instructional outcomes.
- Permits student choice.
- Appropriately paced to allow time needed to intellectually engage with and reflect upon learning.
- Students serve as resources for one another.
- Student led cooperative peer group work

### Assessment (Formative or Summative)
(Domain 1 Planning and Instruction- Component 1e: Designing Coherent Instruction, Domain 3 Instruction- Component 3c: Engaging Students in Learning, Domain 3 Instruction- Component 3d: Using Assessment in Instruction)

### Student Engagement
(Teacher Assessment)
Based on the pacing and accomplishment of each lesson, Worksheets will be provided to complete.
Students are also required to finish the Exit slip at the end of the lesson.

- Integrated into instruction.
- Students contribute to assessment criteria.
- Students self-assess & are aware of characteristics of high-quality work.
- Specific & timely feedback.
- Set child-friendly goals with students.

### Additional Resources

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### Next Steps:

- Properties of Reflections
- Properties of Rotations
- Properties of Dilation
- Combination of Transformations
- Later on relating to shapes: Pythagorean Theorem and Similar triangles