California State University Chico

School of Education

SSP LESSON PLAN TEMPLATE

WHO	Who is Learning?

TEACHER: Kamille Delgardo (CT Emily Abshier) **DATE:** 3 October 2025

INQUIRY-BASED LESSON TITLE: (A student-friendly non yes/no question that the lesson aims to answer)

CPM CC Integrated 1 Lesson 3.1.1 - How can I see it? Spatial Visualization and Reflections

CONTENT AREA: Integrated Math I

GRADE LEVEL(S): 9-12

NUMBER OF ELD STUDENTS AND LEVELS:

Numerous reclassified native Spanish speakers.
One English Learner in a Structured English Immersion Program
Levels (As of 2022):

- **Oral**: 3 out of 4
- **Written**: 2 out of 4
- **Listening**: somewhat/moderately
- **Speaking**: well developed

NUMBER OF IEP and/or 504 STUDENTS:

504 - 4
IEP - 4

Based on an IEP meeting I attended last week for a student in this class I will try to make sure the student is wearing glasses. He is prescribed them and does better wearing them, but does not like to wear them.

STUDENTS' ASSETS:

Students with **interests in art** will be able to help their classmates with the idea of symmetry.
Students on **sports teams** may be able to connect reflections to the practice of having a counterpart in another team (e.g., blocking a player trying to shoot in basketball).

STUDENTS' LEARNING NEEDS:

Students should make use of prior knowledge of plotting points and graphing on the Cartesian coordinate system. They should know how to graph a line in slope-intercept form to draw a reflection over.
As this is the start of a new unit, students will be dipping their toes into the concept of spatial reasoning.

LESSON LENGTH: 50 minutes

WHAT — What are students learning?

CONTENT STANDARD(S) & MATHEMATICAL PRACTICE STANDARD(S):

CA Math Content Standards

Mathematical Practice Standards

Content: **Mathematics I G-CO.2, 4, 6 "Congruence"**

- **2.** Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
- **4.** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
- **6.** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Practice:

- 7. Look for and make use of structure.
    - Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well-remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression x^2 + 9x + 14, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see 5 – 3(x – y)^2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

CONTENT-SPECIFIC LEARNING GOAL(S):

Students will use their spatial visualization skills to investigate reflections.

ENGLISH LANGUAGE DEVELOPMENT STANDARD(S):

CA ELD Standards

Grades 9-10 Part I: "Interacting in Meaningful Ways"

- A. Collaborative 1. Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics
- A. Collaborative 3. Offering and justifying opinions, negotiating with and persuading others in communicative exchanges
- C. Productive 12. Selecting and applying varied and precise vocabulary and other language resources to effectively convey ideas

ENGLISH LANGUAGE DEVELOPMENT GOAL(S) FOR ELD STUDENTS:

Students will describe components, actions, and shapes in spatial reasoning, including flipping for reflections and

- Shapes are *reflected* or *flipped*

IEP GOAL(S) FOR IEP STUDENTS (if applicable):

- Our ADHD student will self-regulate by taking short breaks outside, as needed. We have moved his seat to be next to the door for easier access.
- Students will raise hands to ask appropriate questions or answer questions posed to the class.

ACADEMIC/CONTENT LANGUAGE DEMANDS AND PLANNED SUPPORTS:

Language Function:

- Students will be able to explain what strategy(ies) they used to solve a problem.
- Students will be able to describe how they reflect shapes over lines.

Vocabulary:

1. Subject-specific meanings:
    a. Reflection
    b. Line
2. Academic vocabulary:
    a. Reflect
    b. Explain
    c. Observe
    d. Describe
    e. Defend
    f. Summarize
3. Subject specific words:
    a. Symmetry
    b. Inverse
    c. Algebraic

Discourse:

- Explaining solution steps
- Interpreting graphic representations

Syntax:

- Long or elaborate phrasing

Supports:

- Students will use appropriate mathematical vocabulary and to **discover and interpret the reflections across lines**.
- Reflection (vocabulary):
    - Work through textbook problems as a class and in groups

WHY — Why does this lesson matter? (Rationale)

RELEVANCE:

Reflections deepen conceptual understanding by allowing for visualization and analysis of geometric transformations, thereby building spatial reasoning and the understanding of symmetry. Recognizing reflections is a skill that will be important for further study in geometry.

PRIOR KNOWLEDGE:

Students should have knowledge of graphing, axes, and the Cartesian coordinate system.

HOW — How is Learning Being Facilitated?

CREATE HEALTHY CLASSROOM COMMUNITY:

Since the last observation I have put students' names on cards from an old deck of playing cards. I will encourage participation from all students by drawing them at random.
I will encourage healthy discussion through turn-and-talks.
I will try to select students to share their work as I circulate and see how they're doing.

ACADEMIC LITERACY (Listening, Reading, Writing, Speaking):

ACCOMMODATIONS, MODIFICATIONS & UDL CONSIDERATIONS:

- A Spanish version of the textbook is available in print and on Chromebook.
- Mrs. Riley will be pushed in from the resource classroom to assist.

CO-TEACHING Strategy(s) AND/OR PARAPROFESSIONAL SUPPORT (If applicable)**:**

I will each take the lead on each question. CT Mrs. Abshier, Education Specialist Mrs. Riley, and I will circulate through groups individually after each main lesson.

INFORMAL ASSESSMENT(S):

Ask leading questions as we circle around:
- How would you describe this shape?
- How can you verify your answer?
- Why is or isn't this a reflection? How can you tell?
- Would this look the same in a mirror? What would be different?

FORMAL ASSESSMENT(S):

When I regain class control after each section I will gauge their understanding of reflection.

MATERIALS NEEDED: (List equipment and materials necessary for the lesson.)

- Lesson 3.1.1 Resource Page

LEARNING ACTIVITY SEQUENCE: (Procedure)

0.0 - New unit means no homework to check. Pass out group tests in current groups. New seats assigned (not filmed due to missing permission slips).
Recording will start once students are in their new seats. Pass out new homework logs and ask them to write their names on them.

1. **Engaging Introduction**:

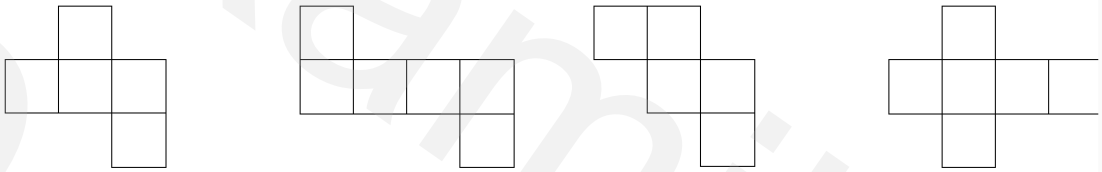
Let students know we're starting a new unit and our first topic is about something called reflections. Let's get into pairs and practice reflecting!
Play the mirror game for 1 minute total: the student nearest to the door is the leader. Have students face each other and "mirror" the leader's movements for 30 seconds. At 30 seconds switch leaders.
Get students seated again and ask what they noticed about reflecting – when you raise your right hand did your partner raise their right or left hand?

2. **Learning Activities**:

3-1. BUILDING BOXES

Which of the nets (diagrams) below would form a box with a lid if it was cut out and folded along the interior lines? Be prepared to explain your answer. After your team has discussed how each would fold, use the *3D Nets* CPM interactive eTool to "fold" each net. Click and drag on the outside of each figure to rotate it. Note: all of the nets are in the same eTool. Click the 'notes' icon in the upper left corner. From that menu, click 'Select Nets'.

a. b. c. d.



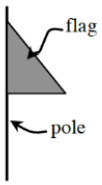
Have students discuss in groups whether they think each shape would form a box with a lid.
Bring up volunteers to the smartboard to use the CPM 3D Nets interactive eTool to fold each net.
Show with a Rubik's Cube that cubes have six sides.

3-2. Have you ever noticed what happens when you look in a mirror? Have you ever tried to read words while looking in a mirror? What happens? Discuss this with your team. Then write the following words as they would look if you held this book up to a mirror. Do you notice anything interesting?

a. GEO b. STAR c. WOW

Ask students whether each of these words would be readable if you held it up to the mirror. Ask for thumbs-up if they think so and thumbs-down if they think not. Pick students and ask them why they think yes or no.
Remind them what they discovered during the "mirror game."
Utilize the smartboard to write each word and reflect it laterally. Ask why the word is legible or not.
Ask whether each letter in the word is legible.
Ask if they can think of another word that would be legible when reflected.

3-3. When Kenji spun the flag shown at right very quickly about its pole, he noticed that a three-dimensional shape emerged.



a. What shape did he see? Draw a picture of the three-dimensional shape on your paper and be prepared to defend your answer.

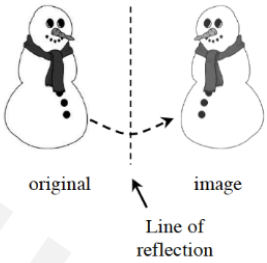
b. What would the flag need to look like so that a **sphere** (the shape of a basketball) is formed when the flag is spun about its pole? Draw an example.

c. Hunter did not spin the triangular flag all the way around its pole. He only turned it 180°. On his paper he recorded the resulting flag image, rather than what he saw while it was moving. He wrote, "The flag seems to have flipped over the pole." Which way is the flag pointing now?

Demonstrate the flag pole in front of the class.
Have students discuss in groups the questions in 3-3.
While circulating around groups select students to share their answers for a, b, and c.

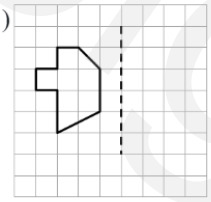
3-4. REFLECTIONS

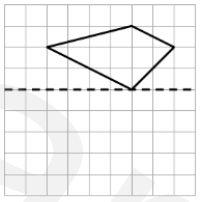
The shape created by Hunter in problem 3-3 was the result of reflecting the figure over a pole. A reflection across a line is shown in the diagram at right. The reflected figure is called the **image** of the original figure.

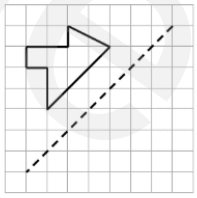


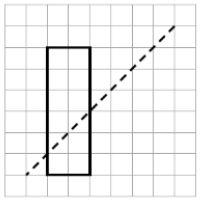
a. Why do you think the image is called a reflection? How is the image different from the original?

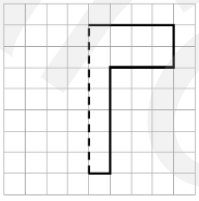
b. On the Lesson 3.1.1 Resource Page, use your visualization skills to predict the reflection of each polygon across the given line of reflection. Then draw the image of the original polygon.

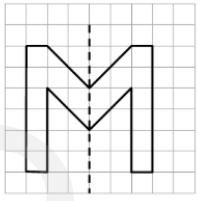
(1) 

(2) 

(3) 

(4) 

(5) 

(6) 

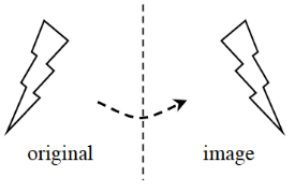
I will pass out the 3.1.1 resource page to each student. I will ask the class part A and get them to recall what we learned from the mirror exercise (reflections are *opposite*, *flipped*, *symmetric*).

Work through problem 1 together on the smartboard to give an example of how to draw a reflection across a line. Give control to students to do problems 2-6 together individually or in groups.

While circulating, select students to come up and draw 3 and 4 reflections on the smartboard when we come back together.

3-5. Sometimes, a motion appears to be a reflection when it really is not. How can you tell if a motion is a reflection? Consider each pair of objects below. Which diagrams represent reflections across the given lines of reflection? Study each situation carefully and be ready to explain your thinking.

(1)



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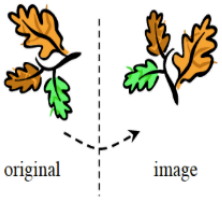

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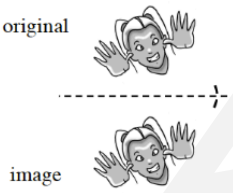

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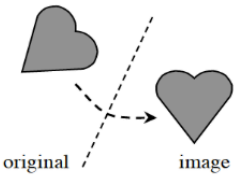

Work through 1-4 as a class. I will poll students for thumbs-up or thumbs-down if they think each motion is a reflection. Ask thumbs-up and thumbs-down why they think yes or no while checking for appropriate vocabulary usage.

3-6. CONNECTIONS WITH ALGEBRA

What other ways can you use reflections? Consider how to reflect a graph as you answer the questions below.

a. On your Lesson 3.1.1 Resource Page, graph ΔGLM with vertices $G(1, 3)$, $L(2, 7)$, $M(5, 6)$, and the line $y = x$.

b. Now reflect the triangle over the line $y = x$. What do you observe? What happens to the x- and y-coordinates of the vertices?

c. How does your answer to part (b) relate to the equation of the line of reflection?

Introduce the problem – we'll be plotting our own shape (a triangle) then reflecting it over a line.
Let students work in groups or individually on their Resource Page.
As we circulate, check that they're plotting the points G, L, M and the line $y = x$ correctly.
Ask them to compare the coordinates of the original vertices and the reflected vertices.
If they're struggling, remind them they can reference the previous exercise. If you folded the paper along the line, would the shapes match up?
When we come together to go over, make sure to plot each point and its reflection.
Make sure they see that the coordinates are inverted. Introduce the term *inverse* as reflection over $y = x$.

3. **Learning Closure:**

Can anyone think of places where reflections or symmetry occur?
How many of us are artists? Have you ever seen reflection or symmetry in art?
What about construction or architecture?
Aren't most animals' halves reflections right down the middle?
See if you can't notice some of these this weekend as we continue to develop spatial reasoning.

REFLECTION

ASSESSMENT RESULTS:

LESSON OBSERVATION FOCUS: *What would you like your supervisor to focus on and provide feedback for during the lesson? (Related to TPEs or previous observation goals.)*

Student engagement, classroom management, lesson pacing.