

Lesson Plan

Course II Regents

Euclidean Geometry

Review of Similarity: Construct-a-Concept

10th grade

NYS Mathematics, Science, and Technology Learning Standards Addressed

Standard 1: Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

Standard 3: Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.

Standard 6: Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

Standard 7: Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

Objectives: Knowledge & Skill Concept Application

The students will distinguish between examples and non-examples of similar figures. This lesson is meant to review a subject previously studied.

Materials:

- Student ♦ Copy of SIMILARITY[CONSTRUCT-A-CONCEPT](HANDOUT) vSTUDENT.DOC
Teacher ♦ Copy of SIMILARITY[CONSTRUCT-A-CONCEPT](HANDOUT) vTEACHER.DOC
 ♦ Overhead copy of student version
 ♦ Overhead projector and markers
 ♦ _____ copies of SIMILARITY[CONSTRUCT-A-CONCEPT] (HOMEWORK).DOC

Anticipatory Set:

“Today we’re going to review a concept that you’ve already studied before, but perhaps not in this way. On the overhead I have examples that demonstrate a specific relationship, and non-examples that do not. Let me tell you a few that are examples and non-examples, then you tell me what other images belong in each group.”

The students should realize that we are talking about similarity and discover that proportions and congruences exist between similar figures.

Lesson Body:

1. Sorting and Categorizing – After passing out handouts, the teacher will indicate on the overhead classic examples of similarity (such as #2) with the word “EXAMPLE”. Then a typical non-example (like #1) with the word “NON-EXAMPLE”. Then another example (perhaps #20) and then a non-example (like #3). After a giving the students a few moments to think, the teacher will then open up the floor to the class to provide more examples and non-examples
2. Reflecting and Explaining – After an example or non-example is offered, the teacher will either agree or disagree with their choice, and ask the students why they chose their set and for a particular category. Ask appropriate questions using references to the given examples and non-examples to justify or counter their choice. Encourage the students to use the back of the paper for notes as they attempt to find the relationship.

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The teacher should expect that most students would work on the classic Euclidean polygons first. Inferences to the traits of similarity will be made

- i. Corresponding angles must be equal
 - ii. Corresponding sides must be in consistent proportion to other corresponding sides.
3. Generalizing and Articulating – Students should realize that we are talking about similarity and may even use the word after 3 or 4 examples. The students should also begin to see agreement or disagreement with the two necessary traits of similarity. The teacher will now ask the entire class for *example* or *non-example* status of a specific pair of images. This should be a non-typical example like #7 or #9. If necessary, the two rules can be written on the board for reference. Students must justify their reasoning.

If students cannot make a guess or there is a lot of disagreement, the teacher will offer to answer a question that can help clear things up. The teacher should lead them toward questions that clarify one of the two traits of similarity. Types of leading questions are (i) What if you knew the length of a side? (ii) Could naming points or side on the figures help? (To indicate “corresponding parts”) (iii) Why would you want to know if a pair of angles is congruent? Appropriate markings should be made on the overhead figures to answer requests for desired information.

4. Verifying and Refining – The sets will be tested one at a time to determine if they are examples or not. The students should begin to expand the notion of similar polygon into similar figures. The students should also see that the two rules still apply, even when the corresponding sides and angles aren’t obvious. Revisit steps 2 and 3 as necessary.

Once we’ve gone through all the examples, the teacher will ask what to write in the blank on the bottom of the overhead for the students to copy.

Closure:

“Similarity is a relationship that doesn’t just occur on graph paper or in a mathematics classroom. It’s a concept found throughout our lives and is something we’ve used to create the world around us. Similarity is an important relationship that we’ll use as a tool to make some exciting discoveries regarding simple and complex figures.”

Homework/Assessment:

Complete SIMILARITY[CONSTRUCT-A-CONCEPT] (HOMEWORK).DOC.

“Look around your home tonight and find two examples of similar objects, and two non-examples. Explain why your choices are examples or not, using both math terms and your own ideas. And for the non-examples, what would you change about them to make them examples?”

The assignment should be discussed in the first few minutes of the next class. The paper can either be handed in, or kept in the student’s journal.

Extensions:

- ❖ What properties can be changed to make a non-example into an example?

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- ❖ Bonus question for #11: What is the name of the specific proportion used? (scale)
- ❖ What happens when the ALT button is held down? The CTRL button?
- ❖ Why is similarity important in the world? (allows you to work on enormous objects or very small objects aka: scale models)

Reflections:

What did I set out to do in this lesson, and why did I plan to do it that way?

Did I accomplish my goal and objectives? How do I know?

What have I learned about myself and my students that will help me be a better teacher?