

INSPIRE GK12 Lesson Plan



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| Lesson Title | Symmetry of Road Signs |
| Length of Lesson | 1 day |
| Created By | Kylie Nash |
| Subject | Math |
| Grade Level | 10 th – 12 th (Geometry) |
| State Standards | 9 th -12 th Geometry |
| DOK Level | DOK 2 |
| DOK Application | Compare, Make Predictions, Identify Patterns, Collect, Calculate, Understand |
| National Standards | 9 th - 12 th Geometry |
| Graduate Research Element | Safety signs and labels are an area of warning and risk communication in a range of fields related to safety and human factors. |

Student Learning Goal:

State Standards for 9th – 12th Geometry: Geometry

2e) Determine the effects of rigid (translations, rotations, and reflections) and non-rigid (dilations) motions and compositions when performed on objects on the coordinate plane (DOK2).

3f) Determine and justify if a given shape could be tessellated (DOK2)

3i) Given the pre-image or image, find figures obtained by applying reflections, translations, rotations, and dilations; describe and justify the method used (DOK2)

National Standards for 9th -12th Geometry Standard:

- Use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture.
- Understand and represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function, notion and matrices.
- Explore relationships (including congruence and similarity) among classes of about them, and solve problems involving them.

This lesson plan is to serve as a very basic introduction to symmetry and lead up to a more developed lesson such as crystals and tessellations. Students should be able to recognize line symmetry and understand, and use lines of symmetry, folds, matches, and reflections and determine if “no” lines of symmetry exist.

Materials Needed (supplies, hand-outs, resources):

Writing utensils, and handouts and PowerPoint presentation, markers, colored pencils, tape, rulers, construction paper

Lesson Performance Task/Assessment:



Students will be able to learn about symmetry and identify different symmetric shapes based on highway sign design. Students will complete example problems that will strengthen their critical thinking skills. Students will get practice and experience with problems that they may encounter in an upcoming exam or nine-week exam. Students will practice using the worksheet provided and completions of PowerPoint examples provided. Students should be able to answer questions related to topics learned in any 9-week school term. Students are to create highway signs and present the signs to their classmates and identify symmetry and be able to identify the message of the sign.

Lesson Relevance to Performance Task and Students:

Students will be learning and studying while learning about environmental objects that they encounter on a daily basis and never really think about. This activity will help strengthen math skills through an application that is familiar and fun to them. Students will learn concepts related to identifying different types of lines of symmetry. These lessons and performance tasks will strengthen the students, interest, knowledge and understanding of mathematical concepts of angle measurement and polygon shape design through the use of hands on activities to synthesize and interpret concepts learned in the classroom.

Anticipatory Set/Capture Interest:

This topic should be introduced to students by discussing why this is important and how it related to Human factors and ergonomics. You could discuss warning signs being triangular and mandatory signs being circular (the human factors element). The students have been selected by the city to redesign the highway/warning signs to be more ergonomically aesthetic and pleasing, so they must create new sign that are understandable and aesthetically pleasing to the human eye.

Guided Practice:

The instructor should demonstrate folding to match both sides. Introduce concepts of line and symmetry and a shape being symmetrical or not. With a large shape and mirror, show the class how a symmetrical shape shows reflection along its line of symmetry, but not against any other line.

Note: Make sure they understand that the shape is already symmetrical but the symbols in it might not be.

Independent Practice:

Students will get practice working example problems of symmetry and create and design their own highway or warning signs. Students should have total freedom over their designs.

Remediation and/or Enrichment:

Remediation:



Individual IEP

Enrichment/Extension:

Students will be introduced to the topic of Tessellations

Check(s) for Understanding:

1. What types of symmetry did you learn about?
2. Compare two sides of a shape. Do they match? Differentiate between the shapes and the picture or symbol on the shape.
3. Test again using a mirror. How many lines of symmetry are imbedded in their fellow classmates' safety sign have?
4. Do you have a better understanding and improved knowledge of the topics learned in the classroom?
5. Do you think that with the skills and knowledge learned through this exercise will help you be successful on the upcoming exam?

Possible Alternate Subject Integrations:

- Physics
- Physical Science
- Language/Literature (looking at alphabet symmetry)
- Engineering principles

Teacher Notes:

www.numeracysoftware.com

http://www.nationalschoolspartnership.com/resources/total/lessons_plans/Road_sign_symmetry.pdf