Understand similarity in terms of similarity transformations (G.SRT.1-3)

**Standard G.SRT.1**: Verify experimentally the properties of dilations given by a center and a scale factor.

a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

### Concepts and Skills to Master
- Recognize the impact of different centers and scale factors on the image of a figure.
- Recognize the length of the resulting image is proportional to the length of the original segment based on the scale factor.
- Recognize that corresponding sides of the image and pre-image in a dilation will be parallel.

### Related Standards: Current Course
- II.G.C.1, II.G.C.5, II.G.CO.9, II.G.CO.10, II.G.SRT.2, II.G.SRT.3, II.G.SRT.4, II.G.SRT.5, II.G.SRT.6, II.G.SRT.7, II.G.SRT.8, II.G.GPE.4, II.G.GPE.6, II.F.BF.3

### Related Standards: Future Courses
- III.F.BF.3, III.F.TF, III.M.GM.3, P.N.VM.5

### Support for Teachers

#### Critical Background Knowledge
- Understand the concept of a ratio (6.RP.1) and represent proportional relationships (7.RP.2)
- Describe the effect of dilations on two-dimensional figures using coordinates (8.G.3)
- Know precise definitions of angle, circle, perpendicular line, parallel line and line segment (I.G.CO.1)

#### Academic Vocabulary
- dilation, center of dilation, scale factor, similarity

#### Resources
- **Curriculum Resources**: https://www.uen.org/core/core.do?courseNum=5620#71532
Understand similarity in terms of similarity transformations (G.SRT.1-3)

**Standard G.SRT.2**: Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain, using similarity transformations, the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

### Concepts and Skills to Master

- Decide whether two figures are similar using properties of transformations.
- Understand that in similar triangles corresponding sides are proportional and corresponding angles are congruent.
- Recognize that a sequence of a dilation and one or more rigid motions results in an image that is similar to the pre-image.

### Related Standards: Current Course

| II.G.C.1, II.G.C.5, II.G.CO.9, II.G.CO.10, II.G.SRT.1, II.G.SRT.3, II.G.SRT.4, II.G.SRT.5, II.G.SRT.6, II.G.SRT.7, II.G.SRT.8, II.G.GPE.4, II.G.GPE.6 |

### Related Standards: Future Courses

| III.F.TF, III.G.MG.3, P.N.VM.5 |

**Support for Teachers**

**Critical Background Knowledge**

- Understand the concept of a ratio (6.RP.1) and represent proportional relationships (7.RP.2).
- Describe the effect of dilations on two-dimensional figures using coordinates (8.G.3, 8.G.4).
- Know precise definitions of angle, circle, perpendicular line, parallel line and line segment (I.G.CO.1).
- Know that corresponding pairs of sides and angles are congruent in congruent figures using rigid transformations (I.G.CO.7).

**Academic Vocabulary**

- similarity, corresponding parts, \( \cong \), \( \sim \)

**Resources**

*Curriculum Resources*: [https://www.uen.org/core/core.do?courseNum=5620#71535](https://www.uen.org/core/core.do?courseNum=5620#71535)
Understand similarity in terms of similarity transformations (G.SRT.1-3)

**Standard G.SRT.3:** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Concepts and Skills to Master
- Use similarity transformations to show that the AA similarity criterion establishes similarity for triangles.

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<thead>
<tr>
<th>Related Standards: Current Course</th>
<th>Related Standards: Future Courses</th>
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</thead>
<tbody>
<tr>
<td>II.G.C.1, II.G.C.5, II.G.CO.9, II.G.CO.10, II.G.SRT.1, II.G.SRT.2, II.G.SRT.4, II.G.SRT.5, II.G.SRT.6, II.G.SRT.7, II.G.SRT.8, II.G.GPE.4, II.G.GPE.6</td>
<td>III.F.TF, III.G.MG.3, P.N.VM.5</td>
</tr>
</tbody>
</table>

Support for Teachers

**Critical Background Knowledge**
- The sum of the measures of the angles in a triangle is 180 degrees (8.G.5)
- Explain criteria for triangle congruence (I.G.CO.8)

**Academic Vocabulary**
- similarity, transformation, AA

**Resources**
- **Curriculum Resources:** [https://www.uen.org/core/core.do?courseNum=5620#71536](https://www.uen.org/core/core.do?courseNum=5620#71536)
Prove theorems involving similarity (G.SRT.4-5)

**Standard G.SRT.4**: Prove theorems about triangles. (Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.)

Concepts and Skills to Master

- Prove theorems about triangles. (Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.)
- Use similarity transformations to make and prove conjectures about situations involving similar triangles.

Related Standards: Current Course

- II.G.C.1
- II.G.C.5
- II.G.CO.9
- II.G.CO.10
- II.G.SRT.1
- II.G.SRT.2
- II.G.SRT.3
- II.G.SRT.5
- II.G.SRT.6
- II.G.SRT.7
- II.G.SRT.8
- II.G.PE.4
- II.G.PE.6

Related Standards: Future Courses

- III.G.MG.3

Support for Teachers

Critical Background Knowledge

- Understand that a figure is similar to another if it can be obtained from the first by a sequence of transformations (8.G.4)
- Establish facts about angles created when parallel lines are cut by a transversal (8.G.5)
- Explore and explain proofs of the Pythagorean Theorem (8.G.6)

Academic Vocabulary

Resources

**Curriculum Resources**: https://www.uen.org/core/core.do?courseNum=5620#71542
Prove theorems involving similarity (G.SRT.5)

**Standard G.SRT.5:** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

<table>
<thead>
<tr>
<th>Concepts and Skills to Master</th>
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</thead>
<tbody>
<tr>
<td>• Find lengths of measures of sides and angles of congruent and similar triangles.</td>
</tr>
<tr>
<td>• Solve problems in context involving sides or angles of congruent or similar triangles.</td>
</tr>
<tr>
<td>• Prove conjectures about congruence or similarity in geometric figures using congruence and similarity criteria.</td>
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</tbody>
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<tr>
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<td>III.G.MG.3, III.F.TF, P.F.TF</td>
</tr>
</tbody>
</table>

Support for Teachers

**Critical Background Knowledge**

- Understand that a figure is congruent to another if the second can be obtained from the first by a sequence of rigid transformations (8.G.2) and use definition of congruence (I.G.CO.7)
- Understand that a figure is similar to another if it can be obtained from the first by a sequence of transformations which may include a dilation (8.G.4)
- Establish facts about angles created when parallel lines are cut by a transversal (8.G.5)
- Explore and explain proofs of the Pythagorean Theorem (8.G.6)

**Academic Vocabulary**

corresponding angles, corresponding sides

**Resources**

Curriculum Resources: https://www.uen.org/core/core.do?courseNum=5620#71543