# UNIT ARC OF LEARNING™ (AoL)

| Stretching and Shrinking: Proportional Reasoning in the Context of Similarity (Scale Drawings) (AoL) | | | | | |
|---|---|---|---|---|---|
| ■ Proportional Reasoning<br>■ Similar Figure | Introduction<br>*Setting the Scene* | Exploration<br>*Mucking About* | Analysis<br>*Going Deeper* | Synthesis<br>*Looking Across* | Abstraction<br>*Going Beyond* |
| **Investigation 1. Enlarging and Reducing Shapes** | | | | | |
| Problem 1.1 Solving a Mystery with Proportional Reasoning | 1.1 | | 1.1 | | |
| Problem 1.2 Rubber Band Stretcher Experiment: Drawing Similar (Scale) Figures | 1.2 | 1.2 | 1.2 | | |
| Problem 1.3 Scaling Up and Down with Percents | 1.2 | 1.2 | 1.3 | | |
| Mathematical Reflection | | MR | MR | | |
| **Investigation 2. The Mug Wump Family: Similar Figures** | | | | | |
| Problem 2.1 Drawing Wumps Experiment: Making Similar Figures | | 2.1 | 2.1<br>2.1 | | |
| Problem 2.2 Hats Off to the Wumps: Changing a Figure's Size and Location | | | 2.2 | | |
| Problem 2.3. Mouthing Off and Nosing Around: Scale Factors | | 2.3<br>2.3 | | | |
| Mathematical Reflection | | MR<br>MR | | | |
| **Investigation 3. Scaling Perimeter and Area** | | | | | |
| Problem 3.1 Using Proportional Reasoning to Rep-tile: The Area Connection | | | 3.1 | 3.1 | |
| Problem 3.2 Designing Under Constraints: Scale Factors and Similar Shapes (Scale Drawings) | | | 3.2 | 3.2<br>3.2 | |
| Problem 3.3 Out of Reach: Finding Lengths with Similar Triangles | | | | 3.3<br>3.3 | |
| Mathematical Reflection | | | | MR<br>MR | |
| **Investigation 4. Similar Figures and Ratios** | | | | | |
| Problem4.1 Equivalent Ratios Within Similar Figures | | | 4.1 | 4.1 | |
| Problem 4.2 The Shadow and Mirror Experiments: Finding Heights | | | | 4.2<br>4.2 | |
| Problem 4.3 More Imposters: Pulling It All Together | | | | 4.3<br>4.3 | |
| Mathematical Reflection | | | | MR<br>MR | |

Knowledge of similarity is important to the development of students' understanding of the geometry in their environment. In their immediate environment and in their studies of natural and social sciences, students frequently encounter phenomena that require familiarity with the ideas of proportional reasoning applied to the study of enlargement, scale factors, area growth, indirect measurement, and other similarity-related concepts. Similar figures are another name for scale drawings. A scale drawing is usually an enlarged drawing, a shrunken drawing, or a replica of the original figure. In this unit, for convenience, the original figure and its image are similar figures. This unit uses the two terms interchangeably.

Using the context of number, the grade 6 unit *Comparing Quantities* provided an introduction to the basic concept of ratio, including equivalent ratios, unit rates, and rate tables. It included strategies for solving problems such as using tables, graphs, equivalent ratios, tape diagrams, and numeric reasoning.

To be fully developed, proportional reasoning needs to be revisited in various contexts. In this unit, the geometric concept of similarity is used to strengthen students' understanding of proportion. Similarity will be revisited in grade 8 when the effects of transformations on geometric figures are studied, including which transformations maintain similarity. Proportional reasoning continues throughout grade 7 using different mathematical contexts in the units *Comparing and Scaling, Moving Straight Ahead, How Likely Is It?, Filling and Wrapping,* and *Samples and Populations*.