



## TEACHER PAGE

### Lesson: Area of Combined Shapes – Turtle Combo

Teacher-Author: Connie Dolezal

ASSET Animator: Jeff Kaslik

**New Arizona Math Strand 4 Geometry and Measurement**

**Grades 9-12**

**Articulated 4MH4-01** Calculate the area of geometric shapes composed of two or more geometric figures.

**Old Arizona Math Standard 4 Geometry**

**Grades 9-12**

**4MP2-PO7** Find the area of a geometric figure composed of a combination of two or more geometric figures, given an appropriate real-world situations and the formulas.

#### **Learning Objectives: Students will be able to:**

- explain the computation of the area of a figure composed of more than one polygon
- determine the area surrounding objects, sometimes called negative space.

#### **Entry knowledge:**

Students should have familiarity with area formulas for simple polygons.

#### **Overview and Content:**

Students will see examples of a method of calculating the areas of a figure made up of several shapes or polygons. They will use area formulas to calculate answers.

Another aspect of this concept is finding the area of the space surrounding a shape, the answer to which is accomplished in a like manner.

#### **Engage Students:**

Use an exercise with students making straight-edged tessellations of various shapes. From the drawings or cutout shapes, place several together and ask for a method of solving for the total area.

#### **Follow-up:**

Look for objects in the classroom, or in magazines, that are comprised of many simple polygons, make a collage with no over lapping and calculate the area. Pick's Theorem involves an ancient game of making shapes from a set of irregular polygons and calculating that area. This fascinating bit of quasi-proven Archimedean work, called a Stomachion, is worth a peek at the website below. From SAY WHAT? students need to fully understand apothem. In SO WHAT! there is a practical twist to the concept of the lesson. DIG DEEPER carries student learning to another level of complexity by using the given dimensions of 3-D figures and finding the area of the combined figures. In TALK ABOUT IT! students and partners divide a shape into the fewest possible divisions. They check the drawings of each other, add dimensions and calculate the area of the combined shapes. Finally, they get to name the shape.

#### **Assessment:**

Students must correctly calculate areas of various combined shapes and the areas of the space around the shapes.

<http://www.mcs.drexel.edu/~crrres/Archimedes/Stomachion/Pick.html>

