



Healing Through The Arts®

Where those who are healing find strength,
hope and inspiration through the arts.

Math, Lesson 1 – *Mandalas and Geometry*

Lesson goal – To make connections between mathematics and their world

Target students – All levels

Learning Objective – Students will enhance their knowledge of circles in geometry

Outcome – Students will create mandalas to represent what is important in their universe.

Standards – The following educational standards are addressed in this lesson:

- Common Core G-C.1 – G-C.5
- PA 2.9.11.F / M1.B.2.2
- M11.C.1.1

Materials / Resources – The following resources will be required for this lesson:

- Ruler or straight-edge
- Compass
- Protractor
- Geometer's Sketchpad (optional)
- Spirograph (optional)

Description of Lesson (recommended duration: 1-2 weeks)

1. Before students begin, have them spend some time researching mandalas. They should answer a few questions, such as:
 - What are the basics of a traditional mandala?
 - What natural objects share features of a mandala?
 - What parts of a circle will I include? Why?
 - What aspects of symmetry will I include? Why?
 - Will this mandala represent me, a member of my family, of the environment, etc.?

- What symbols should I include? (i.e., what is important to me, my family, my school, my community, etc.)
 - What colors should I use? Why?
2. Using a compass, students should draw a large circle.
 3. Find the center of the circle and create a dot.
 4. Allow students to use software; i.e., Geometer's Sketchpad to begin creating their mandala.
 5. At this point, students should feel completely free to express themselves.

Examples of Differentiation:

Below Grade Level:

- Arrange the project so that students are more directed. For example, give students a list of mandala basics and have them find their meanings.
- Give students a list of circle tools they must use.
- Choose one type of symmetry for each student's mandala.
- Have students create their mandala symbol list as a separate assignment.
- Give students a circle-with-center template or a specific mandala template.
- Allow students to use software or games; i.e., Geometer's Sketchpad or Spirograph to begin creating their mandala.

Above Grade Level:

- Have students follow the basics of a traditional mandala; i.e., concentric circles, four quadrants, etc.
- Have students choose a mandala from a particular culture and explain their choice.
- Have students use at least two types of symmetry.
- Have students base their mandala on a natural object.
- Have students create their mandala as a multi-page project using Geometer's Sketchpad, perhaps even including a custom tool or script.