

**Center for Talent Development—Northwestern University**  
**2002-2003 Saturday Enrichment Program**  
**Session III**

**Thinking About Circles**

Instructor: TJ Leone

**Course Description**

Using Circular Reasoning software, students explore and illustrate geometric concepts related to circles, such as radius, central angle, arc, chord, segment, and sector. As they use the software to manipulate various attributes of circles, they will also learn geometric properties of circles and acquire a concrete grasp of important theorems as they develop a higher level of geometric reasoning.

**Objectives**

The purpose of this course is threefold:

To give students rich experiences with geometric objects they manipulate in software to understand and create definitions of geometric terms used in high school geometry.

To give students experience in solving geometry problems by making use of known facts and software-based constructions.

To introduce students to geometric propositions and informal proofs.

**Evaluation process**

Students will have the opportunity to demonstrate their learning through tests, class discussions, and documents they create in software.

**Text/resources used**

Teacher developed handouts and lessons

Circular Reasoning software

**Course Schedule**

Student will engage in whole group discussions on the following topics:

Circle parts (arc, chord, radius, segment, sector, central angle, diameter, semicircle)

Kinds of angles (acute, right, obtuse, straight, reflex)

Pairs of lines (parallel lines, perpendicular lines, perpendicular bisector)

Pairs of angles (vertical, supplementary, complementary, congruent pairs made by parallel lines cutting a transversal)

Regular polygons (internal and external angles)

Properties of a circle

Dividing up a circle (relating equivalent fractions and fractions of a circle to degrees in a circle)

Using a protractor

Students will participate in the following activities:

- Name that thing/Draw that thing – Students pair off. One student describes a geometric object or relation while the other student tries to name it or draw it. This exercise helps students develop precision in language used to describe shapes, which makes them better at understanding and generating definitions of geometric objects and relations.
- Can you make it? – Students are challenged to construct various objects with Circular Reasoning software. For example, can you make two sectors with the same central angle but differently sized arcs?
- Illustrate your point – Students use software to create figures and text that illustrate some geometric property or argument.

TJ is a software developer in Northwestern University's School of Education and Social Policy with a BA in Math and MS in Computer Science from the City College of New York. He is a former Montessori teacher and certified substitute teacher for the state of Illinois. He has pursued graduate studies in education and Computer Science at Northwestern. TJ designed and built the Circular Reasoning software and accompanying curriculum used in this class.