

**Geometry**  
**Fall 2008**  
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Description

In Geometry there is a play between the concrete and the theoretical, between an orange and the formula for the volume of a sphere. We derive geometric formulas from objects to convince ourselves that the formulas are based in reality and that patterns discovered by an early mathematician can be rediscovered. It begins simply enough, using a piece of string and a ruler to measure the circumference and diameter of circular objects and discovering an approximate value for  $\pi$ .

Students gradually add Geometric formulas and theorems to their repertoire. Algebra is used to derive new formulas from the ones students already know. They memorize 15 formulas for area, surface area, and volume, are able to demonstrate 7 constructions and are able to apply 40 theorems to formal two column proofs.

Other topics include, isometries, tessellations, Celtic knots, and Mobius strips. The second term includes a project in architecture. Work with coordinate geometry and similar triangles leads to applications of basic trigonometry.

Tests are given at the end of each topic ( usually every three weeks). This gives feedback on what was understood and where more clarification is needed. The process of effectively studying for and calmly taking tests is, in itself, a useful skill.

**Expectations**

You will be studying Geometry for 4 hours a week. I will start class on time and expect you to be at the table ready with pencil and paper. Please support the class by staying focussed on Geometry for the entire hour. Small classes lack critical mass unless everyone is willing and prepared to contribute. Everyone will feel comfortable participating and taking risks with new material as long as there is a respectful atmosphere.

You will need your own calculator, which should include trig functions and square roots. Protractors, compasses and other materials will be provided. There will be homework only when you need to study for a test or complete a long project. You are responsible for making up work missed because of an absence.

I expect well presented work that clearly communicates your understanding. At the end of each class, please file your work dated and titled neatly in your folder.

There will be tests on each topic. The midterm and final exams will be cumulative. All tests must be completed with at least an 80% or retaken during lunch. There will be no retakes on the two exams but you will have some choice of topics

#### Expectations for honors

All tests will be completed with at least an 80% correct without any retakes. You will complete all topics on the mid-term and final exams.

You will research a topic related to Geometry and teach a one hour class which should include your presentation and a chance for students to practice what they have learned. You will give them feedback on their work. Topics might include fractals, Pythagorean proofs, orienteering with map and compass, or navigation.