

# **Comparing Different Geometries Syllabus**

## **OMLI Summer 2007**

### **Instructional Team:**

Dave Damke ([ddamcke@comcast.net](mailto:ddamcke@comcast.net))

Maria Fung ([fungm@wou.edu](mailto:fungm@wou.edu))

Dianne Hart ([dkhart@math.oregonstate.edu](mailto:dkhart@math.oregonstate.edu))

Lyn Riverstone ([lyn@science.oregonstate.edu](mailto:lyn@science.oregonstate.edu))

### **Course Focus and Goals:**

Welcome to the OMLI Comparing Different Geometries course. This mathematics course is designed to develop content knowledge for teachers who are teaching mathematics, with a focus on geometry. To be an effective mathematics teacher it is important that you be fluent and comfortable with your own understanding of the main ideas of Euclidean (school) geometry. In this course you will learn about two kinds of non-Euclidean geometries – taxicab and spherical geometries, and this knowledge will enhance your understanding of the geometry in the K-12 mathematics curriculum.

### **Course Requirements:**

1. *Attendance and class participation:* Your participation in our class activities and discussions is important not only for your own learning, but also the learning of others. Your participation will be assessed, and it is considered to be a large part of the grade you will receive in this course. As a teacher, you have to be able to get your head around other people's thinking and figure out if what they are saying makes sense; therefore, listening and interacting with others is a central expectation in our class. The socio-mathematical norms expected for satisfactory class participation include:

- Asking each other questions that press for mathematical reasoning, justification, and understanding
- Basing explanations on mathematical ideas that go beyond a description or summary of procedures
- Being accountable (both individually and collectively) for reaching consensus through mathematical argumentation and proof
- Comparing strategies and results for mathematically significant similarities and differences and sharing those that differ mathematically
- Using mistakes as an opportunity for new learning about mathematics, i.e., as a context for rethinking conceptions, examining contradictions, and trying alternative strategies
- Sharing your solutions, undeveloped ideas, feelings of disequilibrium, and curiosities with the group, as well as responding to classmates' ideas, statements and questions

Participating actively in class also means that you are **expected** to present your solution to homework problems or share your group's in-class work during whole-class discussions.

2. **Classwork:** Each person is responsible for doing her or his best and adhering to the community agreements and class protocols. Each class session, an instructor will be sitting with and observing a particular group. The instructor will be noting everyone's contributions to the completion of the group tasks. He or she will be looking for evidence of:
  - **Conceptual Understanding:** The concepts of the task are translated into thoroughly developed mathematical ideas and perhaps connected to other mathematical ideas.
  - **Communication:** Problem-solving processes are clearly communicated using words, symbols, diagrams, and/or pictures.
  - **Accuracy:** Answers, computations, measurements, etc. are accurate, labeled with correct units, etc.
  - **Engagement:** Each student is staying fully engaged with the mathematical task and adhering to mathematical norms and protocols.
3. **Homework:** There will be a total of 3 out-of class homework assignments. These homework assignments will include problems that will help students develop new mathematical knowledge, as well as provide extensions of class-work. You are expected to work together outside of class on homework assignments; however, each person must turn in an individual write-up. Attached you will find a rubric which we will use to grade your assignments.
4. **Reflection/summary index cards:** Occasionally, students will be asked to write a brief (index card-sized) summary of the main ideas of that day's lesson, along with reflections and questions about the mathematical concepts involved. In addition, students may sometimes be asked to write your response to a particular question.
5. **Project:** During the third week of class each group will be assigned a project from taxicab or spherical geometry. A project will consist of a big problem or a series of smaller problems that develop a new mathematical idea or connect existing ideas within the different kinds of geometries. Groups will be responsible for making a poster with the solution of their project problem, and will present their work during the last two days of class. Students will also complete an evaluation of your own contribution to the project as well as that of your group members.

**Grading and Evaluation:**

It is very important to the instructors of this course that each member of our class does the best they can with each learning task. We need a classroom where risk taking is safe and each individual is respected. We want all participants to make a serious attempt at taking on something difficult. We do not want the stress of grading to interfere with our classroom climate so being clear about satisfactory assessment criteria is our goal. We will all give frequent individual feedback and are willing to address group or individual concerns. We expect completion of quality work. **Grading criteria are given below.**

<b>Written Work:</b> <ul style="list-style-type: none"><li>▪ 3 homework assignments</li><li>▪ Index card summaries and reflections</li><li>▪ Project self- and group-assessment</li></ul>	<b>45%</b>
<b>Class Participation:</b> <ul style="list-style-type: none"><li>▪ Contribution to daily cooperative group work</li><li>▪ Presentation to whole class of individual and group solutions</li></ul>	<b>30%</b>
<b>Group Project</b>	<b>25%</b>

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### **Homework Assessment Rubric**

Each of the 3 homework assignments will be worth 15 points. If you receive a score lower than 12 on any given assignment, you need to revise your work and turn it again to your instructor within two class days of its return.

<b>Mathematical Content</b>	<b>Organization</b>	<b>Connections and Extensions</b>
Use of accurate mathematical reasoning, processes, and justification: Throughout = 5 pts. Most of the time = 3 pts. Occasionally = 1 pt. Not at all = 0 pts.	Work is complete – all mathematical processes and reasoning are included: Throughout = 2 pts. Most of the time = 1 pt. Occasionally or not at all = 0 pts.	Investigation of “what if” questions and “I wonder” ideas = 1/2 pt.  Recognition of AHA! moments and important mathematical ideas = 1/2 pt.
Use of valid mathematical language and symbols: Throughout = 2 pts. Most of the time = 1 pt. Occasionally or not at all = 0 pts.	Work is clear – easy to follow and uses correct English: Throughout = 2 pts. Most of the time = 1 pt. Occasionally or not at all = 0 pts.	Use of mistakes as an opportunity to learn = 1/2 pt.  Connections to other ideas and concepts in the course and in mathematics in general = 1/2 pt.
Verification of work and answer(s) = 1 pt.	Effective organization of solution = 1/2 pt.	Solution using more than one method or technique = 1/2 pt.