

TITLE OF LESSON

Geometry Unit 1 Lesson 4 – Geometric Concepts 2: Postulates  
*Prove it! What's on the outside? What's on the inside? Of Geometry*

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TIME ESTIMATE FOR THIS LESSON

One class period

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ALIGNMENT WITH STANDARDS

California – Geometry

**1.0** Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.

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MATERIALS

None

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LESSON OBJECTIVES

- To give students an introduction to some basic geometric concepts
  - To impart a sense of fun and confidence in discussing geometry
  - To introduce the idea of the postulate
  - To introduce the idea of the theorem
  - To distinguish between postulates and hypotheses and theorems
  - To begin proving theorems in Geometry
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EXPLANATION OF LESSON

*Postulate* is a term that is not known to most people. However we do know what a fact is and have some sense of an assumption. We will relate these terms to the idea of postulate.

A *Hypothesis* is a statement we believe to be true. It has not been proven to be true or false

*Theorems* are statements that need to be and can be proven. Once a hypothesis has been proven it takes on the status of theorem. The use of theorems will work in well with the lessons on proofs

We will be able to motivate the students by using their own knowledge to help define geometrical concepts. In addition we will use “art” or at least the construction of figures as well as positioning of the students in the shape of geometrical objects to make the class fun. We can also incorporate music if we think of lines as sets of note such as 2 C notes and a plane could be 2 C notes and a G note. We can make this fun while continuing to move closer and closer to the pure abstraction that characterizes Geometry.

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FOCUS AND MOTIVATE STUDENTS

- 1) Homework Check – Stamp/initial complete homework assignment.
  - 2) **Agenda** – Have students copy the agenda.
  - 3) Present Homework – (5 minutes) Have each student present 2 or three of their examples that they have of the various geometric concepts.
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ACTIVITIES – INDIVIDUAL AND GROUP

1. Review Terms – (10 minutes) Review the previous lesson on the six terms. List the six terms on the board. (Point, Line, Plane, Ray, Line Segment, Angle). Ask the question “Who can tell me what the definition of these terms are?” Have the student demonstrate the term by use of the board or by using other students to form the figure or by some other method such as music.

2. Lecture/Discussion: Postulates – (10 minutes) Define the term *postulate*: A postulate is an assumption. It can be in the form of a known fact or it can simply be an assumed fact. It does not have to be proved. For instance, “the sun rises in the East” is considered to be a known fact. This would not generally have to be proved. We can just state this fact and use it as the basis of proving something. We could also say something like: “Assume that I live in Oakland.” I may not really live in Oakland, but we could assume that I do for the sake of an argument. It is something like saying, “What would the world be like if I did live in Oakland?” Have a discussion about postulates. Can you think of any postulates? Have the class come up with some postulates that are considered to be facts. Make up some assumptions such as “Assume that the earth is flat” or “Assume that lines are not straight.” Have the class brainstorm for ideas of other postulates.
3. **Notetaking** – (20 Minutes) List the following six postulates, and have the students write each postulate in the *Postulates and Theorems* section of their binders.
  - 1) A line contains at least two points.
  - 2) A plane contains at least three noncollinear points.
  - 3) Through any two points there is exactly one line.
  - 4) Through any three noncollinear points there is exactly one plane.
  - 5) If two points lie in a plane then the line joining them lies in that plane.
  - 6) If two planes intersect then their intersection is a line.

Spend 3 minutes on each postulate. Define the terms collinear and noncollinear. (Collinear means contained in or on the same line. Noncollinear means not contained in or not on the same line.) Have them add these terms and definitions to the terms and definitions sections of their binders.) Ask for volunteers to draw an example or demonstration of the postulate on the board. Ask for volunteers to demonstrate the concept with people in the class or with an object. See if anyone can demonstrate the concepts using pieces of paper etc.

4. Discussion – (10 Minutes) Define the term theorem: A theorem is something that can be proved from a postulate. Define the term hypothesis. A hypothesis is something that might be true but has to be proven. It could be of the form it might be true that “2 lines intersect in one and only one point”. When we have shown a hypothesis to be true we call it a theorem. Spend the rest of the class discussing these two concepts. Have the class come up with examples of hypotheses and theorems. Again there are terms you will be coming back to again and again. They may seem vague and abstract now (because they are) but the students will have plenty of practice with them.
5. Homework Review – Explain the homework. Field questions.

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#### HOMEWORK

Come up with 5 examples of a hypothesis and how you might prove them so that they would then be theorems.

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#### GROUP ROLES

None

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#### DOCUMENTATION FOR PORTFOLIO

None