

Geometry Unit 2 Reasoning and Proof

Unit Topic and Length (This is your focus for lesson planning for the next 12 days):

This topic introduces reasoning. Students will observe patterns leading to making conjectures; solve equations giving their reasons for each step and connect this to simple proofs; and prove geometric relationships using given information, definitions, properties, postulates and theorems.

Common Core Content Standards:

G-CO.C.9 Prove theorems about lines and angles.

Mathematical Practice Standards:

1. Making sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

Student Actions

- Learn and accurately use geometric vocabulary and notation
- Prove geometric theorems
- Deductive reasoning
- Logical reasoning

Teacher Actions

- Provide list of vocabulary used in unit
- Logic statement flip chart
- Chart over properties
- Provide time for students to write 2 minute statements every 10 minutes about concepts

BIG IDEAS/ENDURING UNDERSTANDINGS

Central concept, provides a real-world context, & continues through to reflection

Students will:

- Observe patterns leading to making conjectures.
- Solve equations giving their reasons for each step and connect this to simple proofs.
- Prove geometric relationships using given information, definitions, properties, postulates, and theorems.

ESSENTIAL QUESTIONS

Focuses big idea on what is relevant to the student. Provides provocative questions that foster inquiry, understanding, and transfer of learning.

- How can you make a conjecture and prove that it is true?

MISCONCEPTIONS:

Students have common errors with the following:

- Inductive Reasoning: Students might conjecture by inductive reasoning without considering possible counterexamples. (page 81A)
- Deductive Reasoning: Students might incorrectly use the Law of Detachment. They may see that the conclusion of a statement is true and assume that the premise is true. (page 81B)
- Proofs: Working with proofs is often a daunting task for many students. The number of mathematical properties, theorems, definitions, etc. can be overwhelming. (page 81B)

CONTENT (noun):

Students will be able to:

- Congruence
- Conjecture
- Deductive Reasoning
- Hypothesis
- Conclusion
- Conditional
- Converse
- Inverse
- Contrapositive
- Counterexample
- Biconditional
- Negation
- Definitions
- Laws of Detachment
- Laws of Syllogism
- Logical Reasoning
- Reflexive Property
- Transitive Property
- Symmetric Property
- Multiplication Property
- Addition Property
- Subtraction Property
- Substitution Property
- Postulate
- Distributive Property
- Properties of congruency
- Two-column Proof
- Property of Equality

SKILLS (verb):**Prerequisite skills:**

To be successful with the material in this chapter, students should understand the following concepts:

- Evaluating expressions
- Solving equations
- Segments and angles
- Understand graphs

Skills:

- Looking for patterns and sequences
- Write two column proof

KEY TERMS / VOCABULARY:

include language notes, vocabulary documents, graphic organizers, and/or anchor charts

biconditional statement, conclusion, conditional statement, conjecture, contrapositive, converse, counterexample, deductive reasoning, equivalent statements, hypothesis, inductive reasoning, inverse, Law of Detachment, Law of Syllogism, negation, proof, theorem, truth value.

ASSESSMENT EVIDENCE AND ACTIVITIES:

Initial Assessment: "Get Ready" page 79, questions 1-17. Asks questions on evaluating expressions, solving equations, and segments and angles..

FORMATIVE ASSESSMENT:

Short term assessments used gauge student understanding and adjust instruction

- Each lesson has a lesson check that has a "Do you know HOW?" and a "Do you UNDERSTAND?" set of questions. These are in the e-text and have a link.
- Study Guide Questions that go with the unit test in MathXL (Sunnyside Group Mock class)

SUMMATIVE ASSESSMENT (Needs to be completed-33 questions ready to be reduced)****End of unit assessment of learning****Computer Scored Items**

- Meeting Proficiency -
- Developing Proficiency -
- Insufficient Progress -

Assessment Map**Constructed Response**

- Meeting Proficiency -
- Developing Proficiency -
- Insufficient Progress -

Student recording sheet**Rubric****LEARNING PLAN & ACTIVITIES:**

Focus on mathematical practices

- Lesson 2-1 Patterns and Inductive Reasoning (Prepares for G-CO.C.9, G-CO.C.10, and G-CO.C.11) two days; pg 86 Hw (11, 35, 40, 50, & 54)
- Lesson 2-2 Conditional Statements (Prepares for G-CO.C.9, G-CO.C.10, and G-CO.C.11) two days; pg 93 Hw (11, 17, 28, 31, & 37)
- Lesson 2-3 Biconditionals and Definitions (Prepares for G-CO.C.9, G-CO.C.10, and G-CO.C.11) one day; pg 102 Hw (9, 25, 30, 33, & 43)
- Lesson 2-4 Deductive Reasoning (Prepares for G-CO.C.9, G-CO.C.10, and G-CO.C.11) one day; pg 110 Hw (9, 17, 18, 28, & 30)
- Lesson 2-5 Reasoning in Algebra and Geometry (Prepares for G-CO.C.9, G-CO.C.10, and G-CO.C.11) one and a half days; pg 117 Hw (5, 11, 20, 22, & 23)
- Lesson 2-6 Proving Angles Congruent (G-CO.C.9) one and half days; pg 125 Hw (7, 13, 14, 25, & 26)

Notes about areas of emphasis and areas that might be an enrichment if time permits

- “Get Ready” for the chapter - Great for the students to check for Prerequisite skills
- After Lesson 2-2 Concept Byte: Logic and Truth Tables (Prepares for G-CO.C.9, G-CO.C.10, and G-CO.C.11)

ADDITIONAL RESOURCES:

For teachers:

Power point [Inductive reasoning](#)

Lesson notes [Conditional statements](#)

Lesson notes [Conditional statements if...then](#)

Lesson notes [Biconditional Statements](#)

Lesson notes [Proving Angles](#)

For students:

Khan Academy [Inductive reasoning](#)

Virtual nerd [Conditional/Biconditional statements](#)

Khan Academy [Deductive Reasoning](#)

Khan Academy [Vertical Angle Theorem](#)