



# Simply Elementary, Watson!

## Inductive and Deductive Logic



K20 Center, Kate Raymond, Melissa Gunter  
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<b>Grade Level</b>	9th – 10th Grade	<b>Time Frame</b>	2-3 class period(s)
<b>Subject</b>	Mathematics	<b>Duration</b>	120 minutes
<b>Course</b>	Geometry		

### Essential Question

What are the differences between inductive and deductive logic?

### Summary

In this lesson, students explore the differences between inductive and deductive logic.

### Snapshot

#### Engage

Students discuss their methods for finding missing parts of a pattern to introduce the exploration.

#### Explore

Students explore inductive and deductive logic through separate activities.

#### Explain

The terms "inductive" and "deductive" are introduced in relation to the exploration.

#### Extend

Students use the Internet to search news articles for inductive and deductive arguments.

#### Evaluate

Students develop an inductive and deductive argument for finding the sum of interior angles in a tridecagon or 13-gon.

## Standards

*Oklahoma Academic Standards Mathematics (Geometry)*

**G.RL.1.2:** Analyze and draw conclusions based on a set of conditions using inductive and deductive reasoning. Recognize the logical relationships between a conditional statement and its inverse, converse, and contrapositive.

**G.2D.1.2:** Use the angle relationships formed by lines cut by a transversal to determine if the lines are parallel and verify, using algebraic and deductive proofs.

## Attachments

- [Engage Pattern - Spanish.docx](#)
- [Engage Pattern - Spanish.pdf](#)
- [Engage Pattern.docx](#)
- [Engage Pattern.pdf](#)
- [Inductive and Deductive Logic Handouts A and B - Spanish.docx](#)
- [Inductive and Deductive Logic Handouts A and B - Spanish.pdf](#)
- [Inductive and Deductive Logic Handouts A and B.docx](#)
- [Inductive and Deductive Logic Handouts A and B.pdf](#)

## Materials

- Engage Pattern (attached)
- Handouts A and B (attached)
- Writing utensils
- Classroom Display (chalkboard, dry erase board, document camera, etc.)
- Internet access for student groups

# Engage

For this [Give Me Five](#) activity, display the pattern from "Engage Pattern". Ask the students: What patterns do you notice? Describe (or draw) the next set of blocks in the pattern.

Ask five students to share out their thoughts.

Come to a consensus about what the next iteration of the pattern should look like.

## Teacher's Note

The point of this engage is to start a discussion about how we reason and know things about patterns. There are multiple ways to examine and think about this problem. Any solutions that students can reasonably justify should be validated.

## Explore

Split students into groups of three or four. Provide half of the groups with Handout A and the other half with Handout B. Give students enough time to complete the handouts. Walk around and monitor groups as they work. Help students who are struggling, but be careful not to direct them outright.

Some good questions to ask might be:

- Why do you think that?
- Does the whole group agree?
- What have you tried already?

As groups complete their work, have them pair with another group that had the opposite handout to discuss their results.

## Explain

Ask the class to present their results quickly and share how they reached their conclusions. Make sure they take note of the arguments presented. After all groups have shared, ask the class which arguments they found the most convincing.

Define inductive and deductive.

Inductive: the process of observing data, recognizing patterns, and making generalizations about those patterns.

Deductive: the process of showing that certain statements follow logically from agreed-upon assumptions and proven facts.

Allow students to work in their groups to determine which arguments presented were inductive and which were deductive.

## Extend

Have student groups to use the Internet to search news articles for one example of an inductive argument and one example of a deductive argument. Through a presentation in the medium of their choice, the groups should present their arguments and clarify any misconceptions they had about inductive vs. deductive reasoning. The presentations should also address the pros and cons of inductive and deductive reasoning and which kind of arguments are most convincing.

## Evaluate

Provide students the prompt: What is the minimum of the sum of the interior angles of a polygon with 13 sides? What is the maximum? Construct (or find) both an inductive and deductive argument to support your answer.

This could be done in class as a group or alone as homework.

## Resources

- K20 Center. (n.d.). Give Me Five. Strategies.  
<https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f506b3f9>