

# Place Value: How Computers Communicate

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What Student Will Need:
Computer, phone, or any device with internet access An account in the self-directed learning resource, connected to me as the teacher An account in the communication resource, connected to me as the teacher PDF Handout (created from this lesson form)
Lesson Objective:
The objective of this lesson is to provide a real-life context of how the parts of a computer communicate to teach about base 2. The students will learn the problem-solving skills of linking to something you already know and recognizing patterns are illustrated. Students are expected to have a better understanding of place value after this lesson.
Details:
I will provide students with the PDF handout that has the links to the resources needed in this lesson.
Review:
<u>Review Content</u> This is Part 1 of a lesson that will teach you how the parts of computers talk to each other. This lesson should take about 45 minutes.

Lesson Flow:
<u>Lesson Content</u> This video reviews the Base 10 place value system and compares and contrasts the Base 2 place value system. Problem-solving skills are pointed out. The context of computers communicating in binary code is introduced and will be further explained in Part 2. Students will learn to convert numbers from Base 2 to Base 10 and vice versa.
<u>Youtube Version</u>
<b>Instructions for Student:</b> Watch the presentation.
<u>Self-Directed Resource</u> These worksheets include examples and scaffolding to help the students with converting from Base 2 to Base 10 and vice versa.
<u>Base 10 to Base 2</u>
<b>Instructions for Student:</b> Convert the numbers on these worksheets as instructed. Some helpful scaffolding has been included as you first practice converting because it takes awhile before you automatically know the place values for Base 2.

Communication With Student

The students need to have accounts in FlipGrid so that their data is saved, and you can give them feedback. You will be able to select a few of the video responses of the students to share with the class. You can look at this using student ID "12345". My prompt is:

What do you think the place values for Base 3 would be? Explain.

**Instructions for Student:**

Answer the prompt.  
Type "12345" to access.

Additional Support

**Instructions for Student:**

Watch this video for some tips on how to convert from base 2 to base 10 or vice versa.

Deep Dive/Challenge

**Instructions for Student:**

Watch this video and pause it, as instructed, to see if you can convert these base 10 numbers to base 2.

Collaborate with Teachers:

Collaboration with Teachers

Assessment Tool:

Assessment Tool

This is a very short quiz about reading binary numbers. Although Khan Academy labels it as appropriate for AP Computer Science, we have seen average third graders able to successfully answer these questions after this lesson.

Additional Links:

Khan Academy's Introduction to Base 2.

Youtube Video explaining computers and binary

This is a YouTube Video that explains what this lesson taught, in different words and graphics. It may be good for review. This video includes a few more ideas and explanations about how computers use binary.