

Strategy Scenario

Strategy: Imagery

Content: Computer Literacy

Title: Bits to Bytes

Time Required: 10 minutes

Number of Participants: 10

Target Audience: Adults (faculty, residents, students and staff of USA COM)

Goal of Activity: To define bytes as one character of memory, made up of bits or 0's and 1's, and differentiate between 8088 processors and later processors based on the number of bits per byte used by each processor.

Purpose of Script: To provide a mental image of how a computer encodes information in RAM and translates binary numbers into characters

Learning Outcome(s), Gagne's Taxonomy: Intellectual Skills (concrete concepts)

Learning outcome(s), HEO Taxonomy: Comprehension

Learner Characteristics: Adults with some higher education.

Entry Skills: Students require no computer background. Some knowledge of place value number systems such as base 10 and base 2 will help but is not essential.

Setting: Classroom

Media: Power Point slide presentation and data projector

Process:

- 1 Using an illustration of a light bulb, the teacher defines a bit as one piece of data, encoded on an electrical circuit which is either on or off, on = 1 and off = 0. If enough time the light bulb is compared to the original vacuum tubes used in early electronic equipment.
- 1 The teacher asks the class to imagine a computer chip blown up to the size of one wall of the classroom. It is covered in Christmas twinkle lights laid as closely together as possible blinking on and off seemingly randomly.
- 1 The teacher asks how the computer can translate these lights into words and images. The students are given an opportunity to speculate. If no one

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has the correct answer, the teacher explains that the computer groups the lights into sections of 8 bits and translates this into one character. Each unique binary number is assigned a character.

- 1 The students are shown an image of 8 light bulbs which is translated into a binary number which is equal to the letter f.
- 1 The teacher defines a byte as at least 8 bits which define one character (letter, number, punctuation mark, etc.) of data.
- 1 The students are then shown a chart which illustrates the later processors and the number of bits per byte used in those processors. The teacher explains that most software today uses 32 bits per byte for processing data. The more bits per byte the computer uses, the faster the processing occurs.

Strategy Assessment:

At the end of this section of a larger presentation on computer hardware, the teacher uses questioning to assess the learners comprehension of the concepts. The following questions are asked.

“You have learned a lot about how computer memory works and that it is measured in bytes. (Kilo, Mega, Giga, and Tera) Who would like to tell me what a byte is in your own word?” The teacher can then write their answers on a white board or flip chart to insure all concepts are mentioned and reiterated.

“Can anyone explain to me in their own words how the computer sees these characters?” . . . “What are these light bulbs called?”

A competency based class might have a written test. Generally, this is not required of adults in a computer literacy training program.

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References:

West, C., Farmer, J., & Wolff, P. (1991). *Instructional Design: implications from cognitive science*. Englewood Cliffs, NJ: Prentice Hall.