

Huffman Codes

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Mathematics

Grades 6-12

- Mathematical Reasoning
- Statistics and Data Collection
- Representations
- Number and Operations

Purpose: This activity will introduce students to decision trees in order to decipher codes. The student will be applying mathematical concepts to real world applications and modeling methods that are used widely on a day to day basis.

Materials:

- Activity sheets
- Pencil
- Paper

Time required: 1-2 days depending upon the amount of time you want to spend on the topic.

Lesson Procedure: Place the “first code “ worksheet on the overhead as a warm-up for students entering the classroom. Have them try to decipher the code. Students will soon realize that there is more than one answer to the problem. Have students come up with ideas that may work to solve the problem and write those ideas on the board. Hopefully one student will mention the length of each code....

With this in mind introduce the “simple code” worksheet. Have students decode the message on the page. Have students respond to how the numbers are sequenced and the length of the code and it’s difficulty. Computers are a good example of this kind of code and much easier for them to decipher.

Next introduce the “No Problem” worksheet. Place a word on the board and show students how you would write a code for a particular word. Have them come up with their own codes and share them with their neighbors. For homework have the students complete the “Get Huffy” worksheet and also come up with a 10-15 letter phrase on an index card that will be redistributed at random on the following day for classmates to decode.

Explorations and Extensions:

- Students can create their own encrypted messages to be passed around the room or placed in a jar for choosing.
- Students can write their names on their papers in code for the teacher to decipher.
- Have more advanced students create their own coding tree and messages to be deciphered from it.

Assessments and Evaluation Tools:

Create an encrypted message and a coding tree exercise for the students to complete on their own. Check for accuracy and understanding.

Content Standards:

NCTM 1: Numbers and Operations

NCTM 2: Algebra

NCTM 5: Data Analysis and Probability

NCTM 6: Problem Solving

NCTM 7: Reasoning and Proof

NCTM 8: Communications

NCTM 10: Mathematical Representations

Personal Comments: This would be a great activity for placing in the student's portfolio. This is also a great activity for integration in all subject areas.

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Peer Feedback: