MATH
Can Take You Places

LESSON 2
"Penny"
by Michael Torres

CONCEPT AREA Equivalency

GRADE LEVEL 4-6

TIME ALLOTMENT 60 minutes

LESSON OVERVIEW In this lesson, students will find the decimal equivalents of fractions of a dollar.

LESSON ACTIVITIES OVERVIEW Students will use 100 pennies to show equivalency between fractions and decimals. Students will start by dividing the 100 pennies first into two equal groups, then into four equal groups, five equal groups and ten equal groups.

LEARNING OBJECTIVES Students will be able to:
- Convert halves, thirds, fourths, fifths, sixths, eighths and tenths to their decimal equivalent.
- Convert halves, thirds, fourths, fifths, sixths, eighths and tenths to their percent equivalent.

STANDARDS (TEKS) **From the Texas Essential Knowledge and Skills (TEKS) for Math for grades 4-6:**

Fourth Grade: 4.1C; 4.2E, G

Fifth Grade: 5.1C; 5.3F, H

Sixth Grade: 6.1B; 6.2B; 6.11A

MEDIA COMPONENTS Video: *Math Can Take You Places* #002 "Equivalency"
Internet:

"The World of Math Online" is a Web site which includes a section of games that students will have fun playing. http://www.math.com

MATERIALS Per class:
- Pencil
- Candy bar
- Mechanical pencil
- 12-oz. can of soda

Per group of students:
- Bag of 100 pennies (Have students bring their own or use a substitute material.)
- Circular cut-outs that represent pennies to be divided into thirds, sixths and eighths

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PREP FOR TEACHERS

Note:
The following concepts will be covered during this lesson: **fraction**, **equivalency**, **percent**, **monetary equivalencies and decimals**. Students may need to review the concepts prior to beginning the activities, especially if your class includes students who are acquiring English as a second language (ESL).

- How you group your students will dictate how many pennies each student is responsible for bringing.
- It is very important that pennies are used at the onset of this activity instead of other monetary equivalencies.
- Fourth-grade teachers may want to show the decimal equivalent for thirds, sixths and eighths as extensions at a later date instead of as part of this activity.
- Make sure to reinforce the fraction equivalencies; i.e, 2/4 is equivalent of 1/2 and so on.
- This can be a good discovery activity if you are patient. Allow the students to flow with the lesson. A few might catch on quickly and want to move on, while others might struggle.
- Make sure that each group actually divides the pennies to reinforce parts of a whole.

INTRODUCTORY ACTIVITY: SETTING THE STAGE

Watch the segment of the *Math Can Take You Places* equivalency video where Mrs. Garcia and her class write the equations for Central and Eastern time zones. Stop after the students on-screen offer the correct solutions to the sample problem. Begin discussing the term, "equivalency," and how it means that what's on the left side of the equals sign is the same as what's on the right side.

1. On a table at the front of the classroom, have four items with their costs indicated as a fraction of a dollar. The pencil should be marked as 1/10 of a dollar. The mechanical pencil should be marked as 1/2 of a dollar. The candy bar should be marked as 3/5 of a dollar. The can of soda should be marked as 3/4 of a dollar.

2. Ask students, "Would you know the cost of these four items if fractions were used instead of the dollar and cents signs that are normally used?

3. Most students will know that the mechanical pencil is worth fifty cents.

LEARNING ACTIVITIES

1. Ask one of the students to explain how (s)he would describe to a younger person that one half of a dollar is the same as fifty cents.

2. Depending on that student's explanation you can solicit another, if needed.

3. You want the student to convey that the denominator of the fraction determines that the 100 pennies would be divided into two equal groups. If a student is unable to clarify this situation, have the students then divide their pennies into two equal groups. How many pennies are in each group? Since the mechanical pencil is worth one out of two groups, then the pencil costs 50 cents.

4. Next, have the students divide the 100 pennies into ten equal groups. How many pennies are in each group? Since the pencil is 1/10 of a dollar, then the pencil costs ten cents, which is one of the ten groups. How many groups of pennies would be needed to make 50 cents? Reinforce that 5/10 is equivalent to 1/2. Ask the students if they can

replace ten pennies with another monetary denomination?

5. Now have the students divide the 100 pennies into four equal groups. How many pennies are in each group? How many groups does it take to make 50 cents? Reinforce that 2/4 of a dollar is the same as 1/2 of a dollar. Since the soda's price shows that it is worth three out of the four groups of a dollar, then the soda costs 75 cents. Ask the students if they can replace the 25 pennies with another monetary denomination? They should respond that one could replace the pennies with a quarter.

6. Now say: "Can you now figure out how much the candy bar would cost if it were marked as 3/5 of a dollar?"

7. Have the students write down their steps for how they would go about finding the equivalent amount in pennies of 3/5 of a dollar. ** Give students approximately five minutes to write down this information and then have them exchange with another group.

8. Each group should follow the directions given by the other group. If the directions are not accurate, then have the students discuss how the directions should be changed.

CULMINATING ACTIVITY Have students create fraction, decimal and percent equivalents. Also have each group write a number sentence describing the costs of the items using variables. For example, since the candy bar is equal to half of a dollar, a sample number sentence could be:
Half of a Dollar = 50 Pennies or 1/2D = 50P"

CROSS-CURRICULAR EXTENSIONS Music
Ask the music teacher to speak to the class about how musicians use fractions to read music. Let the students work in groups to write their beats using musical time signatures.

REAL-WORLD CONNECTIONS Discuss and define a "budget" and its uses. Help the students budget the average amount of money they receive each month. Use an Excel spreadsheet to display the data. Brainstorm ways to spend their money more wisely.

ASSESSMENT Ask the students the following questions, instructing them to write their solutions for later grading:
1. What is 7/10 of a dollar? (*$.70*)
2. Is 75 cents equal to 12/16 of a dollar? Explain your answer using words. (*Yes. 12/16 can be reduced to ¾. ¾ of a dollar is $.75.*)
3. Eighty cents is what fraction of a dollar? (*8/10 reduces to 4/5.*)
4. What is 4/4 of a dollar plus 4/5 of a dollar minus 6/8 or a dollar? (*$1.05*)

STUDENT HANDOUTS None