MATH Can Take You Places

LESSON 4
"Identical Twins"
by Nancy Lachowicz

CONCEPT AREA Equivalency

GRADE LEVEL 6

TIME ALLOTMENT 60 minutes

LESSON OVERVIEW Students will gain an understanding of equivalency by engaging in different activities. They will understand that the quantity or expression on the left side of the equal sign must equal or represent the same quantity that is on the right. Students will be introduced to variables, which represent an unknown quantity in an equation. They will also learn how to solve an equation for the value of the variable.

LESSON ACTIVITIES OVERVIEW Students will brainstorm different forms of equivalency, make a human equivalent problem, work in groups, play the game, "Identical Twins," create word problems to go with equation and do assessment and extension activities.

LEARNING OBJECTIVES Students will be able to:

- Formulate an equation from a problem situation.
- Use letters (variables) to represent an unknown in an equation.
- Generate equivalent forms of fractions, percents and decimals.
- Understand that equivalency is everywhere in "real-world" situations.

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

Grade 6
6.1(B), 6.3(B), 6.5(A)

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

MATERIALS Per Class:

- Twenty four 5" x 8" index cards
- Large "Equal" sign
- "Identical Twins" laminated cards

Per Pair:

- 2 dice or number cubes
- 2 different colored pencils or pens
- "Percent Tic-Tac-Toe" handout

PREP FOR TEACHERS

- Prepare classroom materials, including index cards.
- Cue video as needed for discussion.

Note:
The concept of ***fact families*** will be covered during this lesson. Students may need to

review the concept prior to beginning the activities, especially if your class includes students who are acquiring English as a second language (ESL).

INTRODUCTORY ACTIVITY: SETTING THE STAGE

1. Generate discussion by taking responses from students regarding the "equal sign" displayed on the front board. Call on three student volunteers to come to the front of the room. Place two students on the left of the equal sign and one on the right.

2. Ask the following guided questions:
   a. What have we created?
   b. Is it balanced? Why or why not?
   c. What needs to be done to demonstrate balance or equivalency? (*Take one student away on the left.*)
   d. How could we write this as an equivalent expression? (2 - 1 = 1)
   e. Explain that rational numbers come in all different forms. You can express them as fractions, decimals and percents.

      Ex: $\frac{50}{100}$ = 0.50 or 50%

   f. Think of everyday experiences where you have encountered fractions, decimals and/or percents (for example: in sports, newspapers, weather reports, etc.).

3. Explain that an integer is any whole number, its opposite and zero. Say that all integers are rational numbers. Rational comes from the term "ratio." A rational number can be written as the ratio $\frac{a}{b}$ where both a and b are integers and $b \neq 0$.

The following numbers are all rational numbers as they can be expressed as a ratio in $\frac{a}{b}$ form:

5 and –21

$5 = \frac{5}{1}$ and $-21 = \frac{-21}{1}$

4. Explain the importance of comparing rational numbers using the following discussion threads:
   a. Checking ratings, etc.
   b. Comparing cost
   c. Organizing information
   d. Collecting and displaying data

5. "When we compare rational numbers, it is easier to compare them if they have something in common; i.e., a common denominator, decimal form, percent form, etc."

Examples would include .075 and $\frac{7}{10}$. We would change 0.75 to $\frac{75}{100}$ and change $\frac{7}{10}$ to its equivalency $\frac{70}{100}$. We could conclude that 0.75 is the greater

of the two fractions because when the denominators are the same, we can easily compare the two numerators and see that 70 is more than 7.

6. We also know that 1 = 100%; therefore, 2 = 200%. To convert a rational number to a percent, multiply the number by 100.

To write the equivalent form of 4.3 as a percent, multiply by 100:

$4.3 \cdot 100 = 430\ \%$

To write the equivalent form of a percent as a rational number, divide the percent by 100:

$875\% \div 100 = 8.75$

LEARNING ACTIVITIES

1. Have students create a word problem that uses these two rational numbers and compares with the inequality sign to show which is larger or smaller.

Examples: Order 5 ¾, 5.8, and 550% from greatest to least:

Hint: Write each rational number in decimal form. Add zeros, so that all have the same number of decimal places. Compare by looking at place value. Order:

5 ¾ = 5.75
5.8 = 5.80
550% = 5.50

Answer: *5.8* > 5 ¾> *550%*

2. Have students create real-life situations to compare their own rational numbers.

3. "Percent Tic-Tac-Toe" is the final activity, or it can be played on a separate day as a review.

CULMINATING ACTIVITY

Say: "We are going to play 'Identical Twins'." After I shuffle the cards, you will each receive a laminated card. When I say 'go' you will look at your card and try to find your identical twin. Every player who finds his/her other twin is a winner."

CROSS-CURRICULAR EXTENSIONS

Math

When all matches are found, have each pair of students create a word problem using their sentence card and giving the answer. Divide the class into two groups and have a contest to see which team can solve the word problems correctly. Play "Percent Tic-Tac-Toe" game using dice or number cubes.

Language Arts

- Read *Shoeless Joe & Black Betsy*, by Phil Bildner, illustrated by D. F. Payne.
- Have students research former Olympic athletes and record their statistics using fractions, decimals and percents. Then, have students present their findings in an oral presentation.

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REAL-WORLD CONNECTIONS Use a newspaper to locate different forms of numbers that represent equivalency; for example: decimals, percents and fractions.

ASSESSMENT Students will complete the Equivalency Assessment worksheet that is posted in the handouts.

STUDENT HANDOUTS
"Identical Twins" Playing Cards
Equivalency Assessment
"Percent Tic-Tac-Toe"

Identical Twins
Playing Cards
p.1

One number is six times another	x = 6y	The sum of three consecutive whole numbers is 15	x + (x+1) + (x + 2) = 15
One number is three less than another number	x = y - 3	One number is five more than another number	x = y + 5
Seven more than twice a number is 15	2x + 7 = 15	Double a number increased by 8 is 24	2x + 8 = 24
Triple a number decreased by 8 is 19	3x - 8 = 19	Forty increased by a number is four times the number	40 + x = 4x
Double a number increased by 4 is 20	2x + 4 = 20		

Identical Twins
Playing Cards
p.2

Seventeen is four more than x	17 = x + 4	Thirty-six is half of x.	x / 2 = 36
x decreased by seven is 23	X – 7 = 23	Two more than twice x is 18	2x + 2 = 18
Eighty-three is 12 less than x	83 = x – 12	The quotient of x divided by three is seven	$\frac{x}{3} = 7$
The product of seven and x is 42	7x = 42	The sum of x and 35 is 85	X + 35 = 83
The difference of x and 17 is 37	x – 17 = 37		

Name_____

Equivalency Assessment

1. Recently, a local newspaper reported that 5 out of 20 people watch television less than 2 hours a day. The rest of the people surveyed said they watch television between 2 and 5 hours per day. Which decimal represents the number of people who watch between 2 and 5 hours of television a day?

   A. 0.75
   B. 0.2
   C. 0.25
   D. 0.6

2. Mr. Jones distributed 64 sheets of graph paper to his geometry class. Each student received 2 sheets of graph paper. Which equation can be used to find s: the number of students in the class?

   A. s = 64 x 2
   B. s = 64 - 2
   C. s = 64 + 2
   D. s = 64 / 2

3. Order the following from least to greatest:
   1/2 0.25 3/5 75/100

_____

4. On Friday, Lake Rock Middle School reported 25% of their student body absent. What fractional part of the student body was not absent?

   A. 1/4
   B. 2/5
   C. 1/5
   D. 3/4

5. One of the top professional basketball players scored the following points in the last five games: 36, 21, 18, 25, 30. Which equation could be used to determine the player's average?

   A. a = (36 + 21 + 18 + 25 + 30) / 5
   B. a = (36 + 21 + 18 + 25 + 30) x 5
   C. a = 2 (36 + 21 + 18 + 25 + 30)
   D. not here

Equivalency Assessment
Answer Key

1. A
2. D
3. 0.25, 1/2, 3/5, 75/100
4. D
5. A

PERCENT TIC-TAC-TOE

16%	100%	40%
50%	20%	25%
33%	75%	60%

80%	50%	25%
66%	83%	40%
33%	75%	20%

16%	25%	20%
40%	100%	75%
66%	50%	60%

16%	100%	40%
50%	20%	25%
33%	75%	60%

Materials: Two 1-6 number cubes (or dice), two different colored pens, calculator (optional)

Objective: Recognize equivalent fractions and percents

Directions: This game is played like Tic Tac Toe. Players take turns tossing the number cubes and arranging the numbers into a fraction. Each player determines the equivalent percent and circles it on the Tic Tac Toe grid. If the equivalent percent cannot be found, the player must pass. Players must calculate the equivalent percent and prove their reasoning. (They may use a calculator if the teacher chooses.) Play continues until someone gets 3 in a row, column or diagonal. If neither player gets a Tic Tac Toe, each equivalent percent matched is worth 5 points. Players add up their points to determine the winner of the game.

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Te Lleva a Muchos Lugares

LECCIÓN 4

"Gemelos Idénticos"

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Nombre_____ Fecha_____

Jugando a las Cartas

Un número es seis veces más que otro	x = 6y	La suma de tres números enteros consecutivos es 15	x + (x+1) + (x + 2) = 15
Un número es menos tres que otro número	x = y - 3	Un número es cinco más que otro número	x = y + 5
Siete más un número duplicado es 15	2x + 7 = 15	El doble de un número más 8 es 24	2x + 8 = 24
El triple de un número menos 8 es 19	3x - 8 = 19	Cuarenta más otro número es cuatro veces ese número	40 + x = 4x
El doble de un número más 4 es 20	2x + 4 = 20		

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Diecisiete es cuatro más que x	17 = x + 4	Treinta y seis es la mitad de x.	¿ Esto no debería ser x / 2 = 36?
x disminuído siete es23	X – 7 = 23	El doble de x más dos es 18	2x + 2 = 18
Ochenta y tres es x menos 12	83 = x – 12	El cociente de x dividido entre tres es siete	X ------- = 7 3
El producto de siete y x es 42	7x = 42	La suma de x y 35 es 85	X + 35 = 85
La diferencia de x y 17 es 37	x – 17 = 37		

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Nombre_____

Evaluación de la Equivalencia

1. Recientemente, un periódico local informó que 5 personas de cada 20 miran televisión menos de 2 horas por día. El resto de la gente en la encuesta dice que mira televisión entre 2 y 5 horas por día. ¿Cuál decimal representa el número de personas que miran televisión entre 2 y 5 horas por día?

   A. 0.75
   B. 0.2
   C. 0.25
   D. 0.6

2. El Sr. Jones distribuyó 64 hojas de papel para gráficos en su clase de geometría. Cada estudiante recibió 2 hojas para gráficos. ¿Cuál ecuación debe ser usada para encontrar el valor de s: el número de estudiantes en la clase?

   A. s = 64 x 2
   B. s = 64 - 2
   C. s = 64 + 2
   D. s = 64 / 2

3. Ordene lo siguiente de menos a mayor:
   1/2 0.25 3/5 75/100

_____

4. El viernes, la escuela intermedia Lake Rock informó que el 25% de sus estudiantes estuvo ausente. ¿Cuál es la parte fraccional del cuerpo estudiantil que no estuvo ausente?

   A. 1/4
   B. 2/5
   C. 1/5
   D. 3/4

5. Uno de los mejores jugadores de baloncesto profesional marcó los siguientes puntos en los últimos cinco juegos: 36, 21, 18, 25, 30. ¿Cuál ecuación puede ser usada para determinar el promedio del jugador?

   A. a = (36 + 21 + 18 + 25 + 30) / 5
   B. a = (36 + 21 + 18 + 25 + 30) x 5
   C. a = 2 (36 + 21 + 18 + 25 + 30)
   D. no está aquí

LECCIÓN 4
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Evaluación de la Equivalencia
Clave de las Respuestas

1) A

2) D

3) 0.25, 1/2, 3/5, 75/100

4) D

5) A