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What is the Temperature?

Objectives

Upon completion of this lesson student will:
- ➢ Choose a scale and graph data in tables.
- ➢ Identify the independent and dependent variables.

Materials/Tools Needed

TI83-plus and LCD, graph paper transparency, overhead projector,

Grouping/ Target Audience

Work in pairs. Students in first semester Math A.

NCTM Standards

Algebra
Understand patterns, relations, and functions.
Communications
Use mathematical language to explain operations.
Problem Solving
Build new mathematical knowledge through problem soving.

NYS Standards

Modeling/Multiple Representation
  Students use mathematical modeling/multiple representation to provide a means of
  presenting, interpreting, communicating and connecting mathematical information
  and relationships.
Patterns/Functions
  Students use patterns and functions to develop mathematical power, appreciate the
  true beauty of mathematics, and construct generalizations that describe patterns
  simply and efficiently.

Key Terms

Independent variable, Dependent variable,

Lesson Outline

1. **Focus and Review**
    Ask the students: What have you learned about graphs that you could use to describe the pattern in a table of numbers. Students will work in pairs to graph and describe the trend of data in a given table.

2. **Objectives**
    Today we are going to learn how to graph data from a real world problem involving weather.

3. **Teacher input**
    *   Discuss the differences between the independent and dependent variable and how they are determined.
    *   Describe how to find the independent and dependent variable in a table and on a graph.
    *   Review the use of the TI83-plus with students. Go over how to list data in a table and then use the information to make a graph.

4. **Guided practice**

    Give each pair of students data on the altitude and temperature that was taken as a balloon was released from the ground:
    *   Have the students make a table of the data with the independent value on the left and the dependent variable on the right. Ask students from each pair to put the data on a transparency on the overhead. Discuss with students why altitude is the independent variable and temperature is the dependent variable.
    *   Have the students enter the data in list 1 and list 2 in the graphing calculator. Model this with by projecting the calculator on the overhead screen. Ask for a volunteer to use the overhead calculator.
    *   Have the students produce a line graph of the data on their calculators and compare it to the graph you produce.
    *   Discuss with the students the following questions. Remind the students to write their answers down after discussing them with their partner and discuss them as a group.

    1. Which variable is the dependent and which is the independent? Explain.
    2. What scale did you use to graph the data? Why?
    3. Predict the temperature in between the values given on the table.
    4. Write a sentence describing the relationship between temperature and altitude.

5. **Independent practice**

   Give each pair of students the data collected on the average heartbeat of people 15 to 45 year of age in increments of 5 years. Give them graph paper to use in this assignment. Tell them that they can use their graphing calculators to do the work but that they will have to produce a chart and graph on paper, along with the answer to the questions on the handout. They can use the information on altitude and temperature chart and graph as a model. Circulate the room to help students who are having trouble with the calculator part or the paper and pencil part of the exercise. When the time is up have both students sign the paper that is turned in and collect them. Tell students you will review them and hand them back the next day.

6. **Closure**
   Ask students to discuss what kind of information a chart and graph can give about data. What is the difference between what a charts can tell you and what a graph can tell you? If you were asked to predict the next data point, which would you, use? Why?

The Spinner Game

1. Draw your spinner below and include the correspondence. (Either numbers or colors).

2. Play the game 20 times and record your data in the chart below.

Winning Spinner		
Spinner	Tally	Frequency
A		
B		
Total		

3. Do you think this is a fair game? Explain.
4. Combine your spinner data with the data for the other teams and record the data below.

Winning Spinner	
Spinner	Frequency
A	
B	
Total	

5. Does this data change your opinion about whether this is a fair game?

Extensions: Play a new version of the game with the following rules:
- This is a game for two players.
- The fist player chooses a spinner from spinners A, B, or C (with 1, 6, and 8).
- The second player chooses a spinner from the two remaining spinners.
- Both players spin at the same time. The player who spins the greatest number wins.

Play the game using a different combination of spinners. (Play 20 times each.) Then answer the following.
1. How does allowing the first player to choose a spinner affect the fairness of the game?

Is there a strategy for choosing spinners that would give one player an advantage over the other? Explain.