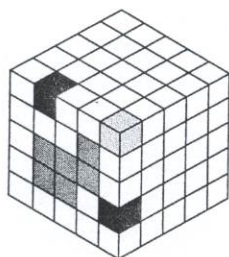


Experiment 17

Cube Faces

Teaching Notes



In this experiment, students build a large cube using sugar cubes. The number of cubes on an edge of the large cube is the *independent variable*, and the number of sugar cubes with exactly two faces to the outside of the large cube is the *dependent variable*.

Equipment

sugar cubes or small, individual blocks
washable felt-tip markers, 1 per group
graph paper, 1 sheet per student

Procedure

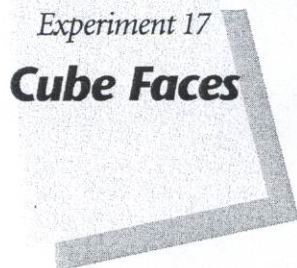
Have each group of two students make a 6 by 6 by 6 cube from individual sugar cubes. The number of cubes on an edge is the *independent variable* (in this case, 6).

Students mark all of the outside faces of the cube with the markers. Next, they take the cube apart and count the number of sugar cubes with exactly two sides marked. This value is the *dependent variable*.

Next, they bury the marked sugar cubes inside a new construction to build a clean 5 by 5 by 5 cube, then repeat the process for 4 by 4 by 4, 3 by 3 by 3, and 2 by 2 by 2 cubes.

Extension

If students have experience with higher-degree equations, suggest that they investigate letting the dependent variable be either the number of cubes with no sides marked or the number of cubes with exactly one side marked.



Collect the Data

Name _____

Partner _____

Draw a diagram of the experiment, indicating variables.

Describe the procedure for the experiment.

The independent variable, x , is _____ Units _____

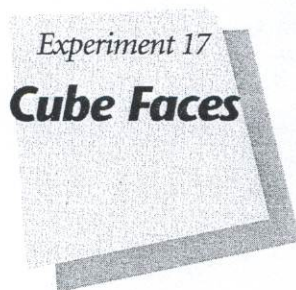
The dependent variable, y , is _____ Units _____

Data Collection

Independent Dependent

Points to Be Graphed

x y



Experiment 17 Cube Faces

Name _____

Find the Equation

After plotting your data on graph paper, draw a straight line through two of your points. Choose the line that best fits your data. Circle the points on your graph and copy their coordinates below.

Your points: (____, ____) and (____, ____)

Use these points to find the equation of your line. Show your work.

Find the slope of the line.

Find the y -intercept of the line.

Write the equation of the line.

$$y = \frac{\quad}{\quad} x + \frac{\quad}{\quad}$$

rational form

$$y = \quad x + \quad$$

decimal form

Rewrite the decimal form of the equation, using the names of the variables instead of x and y .

$$\quad = \quad + \quad$$

Experiment 17
Cube Faces

Name _____

Interpret the Data

Write the decimal form of your equation here. $y = \text{_____} x + \text{_____}$

Use this equation to answer the questions. Show your work.

1. How many blocks would have exactly 2 sides marked if your cube were 10 blocks on an edge? _____
2. How many blocks would be needed for the edge of a cube if there were 216 blocks with 2 sides marked? _____
3. How many blocks would have exactly 3 sides marked if your cube were 10 blocks on an edge? _____