

Activity 7

How Totally Square Part II

As an extension to Activity 6, **How Totally Square**, students will discover the formula for the perimeter of a square.

Activity

The fifth grade students planning their end of the year banquet want to know how many students can sit around each square table they create by pushing student desks together.

Pass out the color tiles. Have the students again create squares using the color tiles. (1*1, 2*2, 3*3, 4*4...) Ask them to record on the Student Activity sheet how many students can sit around the tables created.

Here is an example of a Student Activity sheet.

Length of 1 Side	Number of Students That Can Sit at Table
1	4
2	8
3	12
4	16
5	
6	

Ask the students:

- ♦ What do we call the distance around the table or the number of students that can sit around it? (Perimeter)

Concept

- ♦ Measurement

Skills

- ♦ Finding the perimeter of a square
- ♦ Patterning

Materials

- ♦ Student Activity sheets (page 34)
- ♦ TI-73 calculators
- ♦ Square color tiles

- ◆ Do you see a pattern between the number of students that can sit around a table the length of each side of the table? (Yes) What? (The length of a side times 4.)
- ◆ How would you explain this pattern? What is this pattern? (The formula for the perimeter of a square.)
- ◆ How many people can sit at a table with a length of 15?
- ◆ What is the smallest table that can hold 50 people?
- ◆ Are the values in the **Number of students** column odd or even? Why?

Help students write the pattern they see as a formula. How can we write our pattern as a formula with variables?

1. We know that the total number of students that can sit at a square table is the length of the side times 4.
2. Let y represent the total number of students and x , the length of the side of the square. The formula can be written as $y = x * 4$

Have the students create a table on the calculator to investigate this problem further.

1. Press $\boxed{Y=}$ and be sure that the cursor is at the right of $Y1$. (Press \boxed{CLEAR} if there is already an equation in this spot).
2. Have the students enter the formula they generated (for example, press $\boxed{x} * 4$).
3. Set up the table as shown in the screen at the right.
4. Press $\boxed{2nd} \boxed{TABLE}$ to see the table format.

Tip: The table will begin with 0. Explain to students that if you have a side that measures 0, then you have 0 square. You may want them to start with 1 instead..

```

Plot1 Plot2 Plot3
Y1=X*4
Y2=
Y3=
Y4=

```

```

Plot1 Plot2 Plot3
Y1=X*4
Y2=
Y3=
Y4=

```

X	Y1	
0	4	
1	8	
2	12	
3	16	
4	20	
5	24	
6	28	
X=1		

Wrap-Up

Ask the students these questions about the table:

- ♦ *If there are 110 students in the fifth grade, what are some possible square table arrangements to seat all 110 students?*

Example:

Number of Tables	Dimensions of Table	Number of People per Table	Total Number of People
5	5*5	20	100
1	2*2	8	8
1	1*1	4	4
TOTAL # OF STUDENTS			112

- ♦ *How many different arrangements can you find? (Have students record their answers on the Student Activity sheet. Explain how close to 110 their answers should be.)*

Assessment

Have students create their own square table arrangements and then have a partner determine the different possible arrangements (similar to the **Wrap-Up** problem). For example, a student may decide to find possible arrangements to seat 60 people. The student would tell his or her partner to find arrangements to seat 60 people and then they would compare answers. They may both have different arrangements, but as long as they are both correct, it is okay.

Describe the table needed to seat your school's basketball team.

Extension

- ♦ Using your arrangements from the **Wrap-Up**, determine how much money it would cost to cover the tables if material was \$2.99 a yard. (Have students calculate the cost to cover only the top of the tables.)



Name _____

Date _____

Activity 7

How Totally Square, Part II

As you use the tiles to create square tables, record your information in this table. Look for any patterns that develop as you work.

Length of Sides	Number of Students Sitting around Table

1. Describe the pattern you see.

2. Can you describe your pattern as a formula?

3. What is this a formula for?

4. If there are 110 students in the fifth grade class, what table arrangements will seat all 110 students? (A few extra chairs are okay.)

Number of Tables	Dimension of Tables	Number of People per Table	Total Number of People
Total Number of Students			