


NEW to Vmath®!



A Focus on Conceptual Development

Vmath®

 **HANDS-ON**
Lessons

 **Gizmos**
Lessons

Math Intervention That Works



Vmath[®] is a research-based math intervention system designed specifically for struggling learners in grades 3-8. It combines print material with easy-to-use online technology and hands-on manipulatives to teach the essential skills and strategies proven to accelerate and motivate at-risk students.

Through a systematic approach, *Vmath* creates successful learning experiences for students and develops confident, independent learners of mathematics.

Building the Foundation for Success

Vmath ensures year-round support of the core math curriculum by consistently reinforcing three key areas that support a balanced instructional approach and providing a basis for expanded learning and application of mathematics.

Conceptual Understanding

Basic Skills and Computational Fluency

Communication, Reasoning, and Problem-Solving

Through a strong focus on these areas, *Vmath* builds conceptual understanding, foundational skills, and the ability to apply mathematics in problem-solving contexts.

Vmath includes Hands-On and Gizmos™ lessons to help struggling students develop a deeper understanding of math.



DISCOVER

HANDS-ON Lessons

Manipulatives, or representative models, are proven to help teach students important mathematical concepts. The new *Vmath* Hands-On Lessons enable active, exploration of abstract concepts using manipulatives commonly found in a math classroom.

The following manipulatives are used in the *Vmath* Hands-On Lessons:

Level D

- Base 10 pieces
- Fraction Strips
- Counters

Level E

- Base 10 pieces
- Fraction Strips
- Counters
- Rulers

Level F

- Base 10 pieces
- Fraction Strips
- Counters

Level G

- Fraction Strips
- Counters
- Unit Cubes

Level H

- Counters
- Fraction Strips
- Algebra Tiles

Level I

- Fraction Strips
- Algebra Tiles
- Counters

Gizmos Lessons

Gizmos are based on scientific research showing that computer-based manipulatives are effective drivers of student success (McREL, 1998).

Students using Gizmos gained an average 43 percentage points compared to a control group. The effect size of Gizmos is 1.0, which is educationally meaningful and statistically significant.

The award-winning ExploreLearning Gizmos in *Vmath* help struggling students make connections in math.

Gizmos are online, interactive simulations that help students visualize the targeted concepts as they explore and expand their understanding.

Gizmos are:

- Engaging and easy-to-use
- Flexible to support many different learning styles
- Accessible anytime, anywhere



Level G Gizmos

- Sums and Differences with Decimals
- Improper Fractions and Mixed Numbers
- Percents, Fractions, and Decimals
- Reflections
- Perimeter, Circumference, and Area
- Mean, Median, and Mode
- Using Algebraic Expressions
- Real Number Line – Activity A

Level H Gizmos

- Order of Operations
- Finding Fractions and Area Models
- Adding and Subtracting Integers
- Multiplying Fractions
- Points in the Coordinate Plane – Activity A
- Classifying Quadrilaterals – Activity A
- Area of Parallelograms – Activity A
- Percent of Change
- Scatter Plots – Activity A

Level I Gizmos

- Real Number Line – Activity B
- Square Roots
- Percents and Proportions
- Using Algebraic Equations
- Proving Triangles Congruent
- Area of Parallelograms – Activity A
- Slope – Activity A
- Solving Inequalities Using Multiplication and Division



HANDS-ON GUIDED DISCOVERY

Lesson 15

For use before Module 8 Measurement Lesson 5 Area of Triangles

Texas Edition: For use before Module 6 Measurement Lesson 3 Area of Rectangles

Objective

To use grid paper to model the area of a rectangle and a triangle

Materials

- Copy Master: Centimeter Grid Paper
- colored pencils or crayons
- scissors
- rulers



Lesson Notes

Before beginning the lesson, be sure each student has a Student Book, a copy of Copy Master: Centimeter Grid Paper, colored pencils or crayons, scissors, and a ruler.

Remind students that the area of a figure in this lesson is measured by finding the number of square centimeters needed to cover the figure. Have students shade one square on their copy of Copy Master: Centimeter Grid Paper. Tell students that a square on the grid paper measures 1 centimeter on each side. The area of the square is 1 square centimeter.

This conceptual lesson is designed to help students model the area of a rectangle and a triangle. Tell students that either side of a rectangle can be the length, but the longer side of the rectangle generally is the length and the shorter side is the width. Show students that a right triangle has two straight sides, called legs, which are the height and the base.

Geoboards and/or tangrams, if available, are other

Review previously taught or prerequisite skills.

GET READY

Problem 1 Look at Rectangle 1 in problem 1. Use a blue pencil to trace the length of the rectangle. How many centimeters long is the rectangle? (8 centimeters) Use a red pencil to trace the width of the rectangle. How many

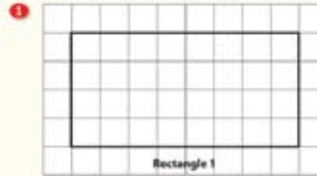


Lesson 15

Modeling Area of Rectangles and Triangles Using Grid Paper

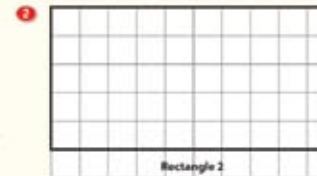
Name _____ Class _____ Date _____

GET READY



length of rectangle = 8 cm
width of rectangle = 4 cm
Area of rectangle = 32 cm²

DISCOVER



Area of rectangle = 50 cm²
number of right triangles = 2
Area of one triangle = 25 cm²

Focus on conceptual development of essential math concepts.

centimeters wide is the rectangle? (4 centimeters) Use a green pencil to write 1 in the top left square. Then write 2 in the next square and continue until you have numbered all the squares in this rectangle. How many square centimeters does the rectangle cover? (32 square centimeters) What is the area of the rectangle? (32 square centimeters)

DISCOVER

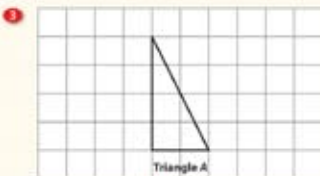
Problem 2 Look at Rectangle 2 in problem 2 onto the centimeter grid paper. This rectangle is 10 centimeters long and a width of 5 centimeters. Use scissors to cut out the rectangle. Count the squares inside the rectangle. What is the area of the rectangle? (50 square centimeters) Use a ruler to draw a diagonal line from the top left corner to the bottom right corner. Use scissors to cut along this line. What have you done to the rectangle? (Cut it in half.) What figures do you have? (two right triangles) Put one triangle on top of the other. What is noticeable about the size and shape of the triangles? (They are the same.) How could you find the area of one of these triangles? (Divide the area of the rectangle by 2.) Why does this work? (One triangle is half of the rectangle.) What is the area of one triangle? (25 square centimeters)

Problem 3 Look at Triangle A in problem 3. Use Triangle A to draw a rectangle with the same height and width as the right triangle's height and base. What is the length of the rectangle? (4 centimeters) What is the width of the rectangle? (2 centimeters) Use a ruler to draw a diagonal line from the top left corner to the bottom right corner. What do you notice? (Two right triangles

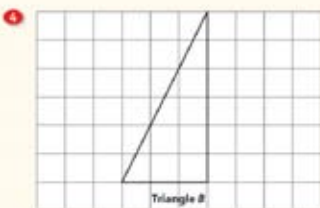
Detailed lesson support and notes help teachers effectively teach the lesson.

Lesson 15

Lesson 15



Area of rectangle = 8 cm^2
Area of Triangle A = 4 cm^2



Area of rectangle = 18 cm^2
Area of Triangle B = 9 cm^2

Examples show how to incorporate manipulatives into other lessons in the modules.

were formed that are the same size as Triangle A.) **What is the height of these triangles?** (4 centimeters) **What is the base?** (2 centimeters) **What is the area of the rectangle?** (8 square centimeters) **How can you find the area of one of the triangles?** (Divide the area of the rectangle by 2.) **What is 8 divided by 2?** (4) **How does the area of the rectangle compare with the area of the triangle?** (The area of the triangle is half of the area of the rectangle.) **What is the area of the triangle?** (4 square centimeters)

Problem 4 Look at Triangle B in problem 4. Use Triangle B to draw a rectangle. On grid paper, draw a rectangle that has a length of 6 centimeters and a width of 3 centimeters. Use a ruler to draw a diagonal line from the top left corner to the bottom right corner. What is the area of the rectangle? (18 square centimeters) How can you use the rectangle to find the area of Triangle B? (Divide the area of the rectangle by 2.) (9) **What is the area of the triangle?** (9 square centimeters)

Students make connections between mathematical concepts and processes.

DISCOVER BOX

How can you use a rectangle to find the area of a right triangle? (On grid paper, use the triangle to draw a rectangle. Draw a rectangle that has a length equal to the height of the triangle, and a width equal to the base of the triangle. First, find the area of the rectangle. Then, divide the area of the rectangle by 2. This number is the area of the triangle.)

EXPLORE MORE

Problem 5 Now that students have used rectangles to find the area of triangles, have them complete problem 5 on their own. They will need a copy of Copy Master: Centimeter Grid Paper.

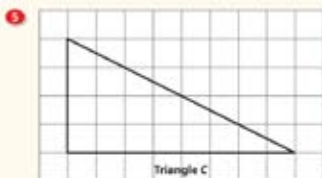
DISCOVER BOX

How can you use a rectangle to find the area of a right triangle?

On grid paper, use the triangle to draw a rectangle. This rectangle has a length that equals the height of the triangle and a width that equals the base. First, find the area of the rectangle. Then, divide the area of the rectangle by 2. The area of the triangle is half the area of the rectangle.

EXPLORE MORE

Find the area of the right triangle.



Area of Triangle C = 16 cm^2

Lesson Adaptations for Module 8

Lesson 8.6

Hands-On Lesson 15 uses grid paper to model the areas of triangles and rectangles and to explore the relationship between the formulas for the areas. You can also use grid paper to explore the relationship between the area of a parallelogram and the area of a rectangle. First, have students draw a parallelogram on grid paper. Then, have students cut and reassemble the parallelogram to form a rectangle with the same base and height. Have students cut off a right triangle from the left side of the parallelogram and attach it to the right side.

Lesson 19

For use before Module 10 Data, Probability, and Statistics Lesson 5 Scatter Plots

Texas Edition: For use before Module 8 Data, Probability, and Statistics Lesson 5 Scatter Plots

Objective

To explore the meanings of positive and negative correlations

Materials

- Gizmo: Scatter Plots—Activity A

Gizmos Log In Instructions

- Log in to VmathLive using the Username and Password provided in VPORT.
- Select the Gizmos tab.
- Click on the Scatter Plots—Activity A Gizmo link.

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and are ready to work at the computers.

Complete problem 1 before students log in to the Scatter Plots—Activity A Gizmo.

Note that the Gizmo uses the term *trend* instead of *correlation*. Introduce students to this terminology.

If students have additional time, have them answer Assessment Questions 1, 3, and 4 in the Gizmo. They can click on the Check Your Answers button to see how well they did on the assessment.

Step-by-step instructions help teachers feel comfortable and eliminates the guesswork in how Gizmos work.

Lesson 19

Scatter Plots—Activity A

Name _____ Class _____ Date _____

GET READY

Gizmos Log In Instructions
When you are told to log in to the Gizmo as follows:
• Log in to VmathLive using your Username and Password.
• Select the Gizmos tab.
• Click on the Scatter Plots—Activity A Gizmo link.

1 a. The slope is **positive**.

b. The slope is **negative**.

DISCOVER

2. Click on the Positive trend button.
In general, as the x -values _____, the y -values _____.
Click on the TABLE tab.
Look at the values in the x column.
The x -values are **increasing** from the top of the column to the bottom.
Look at the values in the y column.
In general, the y -values are **increasing** from the top of the column to the bottom.
Click on the CONTROLS tab.
Check Show actual trend line.
There is a **positive** correlation between the x - and y -values.

Level 10 Module 10 • Data, Probability, and Statistics

Students visualize targeted concepts as they explore and expand their understanding.

GET READY

Review previously taught or prerequisite skills.

Problem 1 Look at problem 1. The slope of a line is positive when the line rises from the left of the graph to the right of the graph. The slope of a line is negative when the line falls from the left of the graph to the right of the graph. Look at the graph of the line in problem 1a. Is the slope of the line positive or negative? (positive) Why? (The line rises from left to right.) Look at the graph of the line in problem 1b. Is the slope of the line positive or negative? (negative) Why? (The line falls from left to right.)

DISCOVER

Problem 2 Have students log in to the Scatter Plots—Activity A Gizmo using the instructions in the box. Look at problem 2. Click on the Positive trend button. Look at the points from the left side of the graph to the right side. Do the points tend to rise from left to right? (yes) So, as the x -values increase, the y -values tend to increase. Click on the TABLE tab. Look at the values in the x column. Is each x -value in the table greater than the x -value above it? (yes) So, the x -values are increasing from the top of the column to the bottom. Look at the values in the y column. Is every y -value in the table greater than the y -value above it? (no) But most of the y -values in the table are greater than the y -values above them. So, in general, the y -values are increasing from the top of the column to the bottom. Click on the CONTROLS tab.

Lesson 19

3. Uncheck Show actual trend line.
Click on the Negative trend button.
In general, as the x -values increase, the y -values decrease.
Click on the TABLE tab.
Look at the values in the x column.
The x -values are increasing from the top of the column to the bottom.
Look at the values in the y column.
In general, the y -values are decreasing from the top of the column to the bottom.
Click on the CONTROLS tab.
Check Show actual trend line.
There is a negative correlation between the x - and y -values.

DISCOVER BOX

- Uncheck Show actual trend line. Check Adjust trend.
Drag the slider all the way to the right. What happens to the points? What kind of correlation exists?
The points form a straight line that rises from left to right. There is a positive correlation.
Check Show actual trend line. What can be said about the slope of the line?
The slope of the line is positive.
Uncheck Show actual trend line.
Drag the slider all the way to the left. What happens to the points? What kind of correlation exists?
The points form a straight line that falls from left to right. There is a negative correlation.
Check Show actual trend line. What can be said about the slope of the line?
The slope of the line is negative.

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Gizmo Lesson 19 • Scatter Plots—Activity A

Lesson 19

EXPLORE MORE

Use the Gizmo to answer each question. First, uncheck Show actual trend line and Adjust trend.

4. Click on the Positive trend button several times to generate different scatter plots. Then describe how the plots are similar.
Sample answer: In all the plots, the points generally increase from left to right.
5. Click on the Negative trend button several times to generate different scatter plots. Then describe how the plots are similar.
Sample answer: In all the plots, the points generally decrease from left to right.

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Level 11 Module 10 • Data, Probability, and Statistics

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Check Show actual trend line. Do the points generally follow the path of the line? (yes) Is the slope of this line positive or negative? (positive) Because points tend to rise in the general path of a line with positive slope, there is a positive correlation, or positive trend, between the x - and y -values.

Problem 3 Uncheck Show actual trend line before starting problem 3. Then click on the Negative trend button. Look at the points from the left side of the graph to the right side. Do the points tend to fall from left to right? (yes) So, as the x -values increase, the y -values tend to decrease. Click on the TABLE tab. Look at the values in the x column. Is each x -value in the table greater than the x -value above it? (yes) So, the x -values are increasing from the top of the column to the bottom. Look at the values in the y column. Is every y -value in the table less than the y -value above it? (no) But most of the y -values in the table are less than the y -values above them. So, in general, the y -values are decreasing from the top of the column to the bottom. Click on the CONTROLS tab. Check Show actual trend line. Do the points generally follow the path of the line? (yes) Is the slope of this line positive or negative? (negative) Because points tend to fall in the general path of a line with negative slope, there is a negative correlation, or negative trend, between the x - and y -values.

Students make connections between math concepts and the math they do in the classroom.

DISCOVER BOX

Uncheck Show actual trend line. Check Adjust trend. Drag the slider all the way to the right. What happens to the points? (The points form a straight line that rises from left to right.) What kind of correlation exists? (positive) Check Show trend line. Do all the points fall on the line? (yes) Is the slope of the line positive or negative? (positive) Uncheck Show actual trend line. Drag the slider all the way to the left. What happens to the points? (The points form a straight line that falls from left to right.) What kind of correlation exists? (negative) Check Show actual trend line. Do all the points fall on the line? (yes) Is the slope of the line positive or negative? (negative)

EXPLORE MORE

Problems 4 and 5 Have students work individually. Students will use the Gizmo to generate different data sets that are positively and negatively correlated.

Students work independently using Gizmos to solve problems by applying concepts.

Intervention is Our Specialty

Voyager Universal Literacy System[®]

K-3 Core Reading System

Voyager Passport[™]

K-5 Reading Intervention System

Ticket To Read[™]

K-6 Reading Technology

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Vmath[®]

3-8 Math Intervention System

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3-8 Math Intervention System

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