Creative Core Curriculum for Mathematics with STEM Literacy and Arts Grades K-8

Fully aligned to the
Common Core State Standards for Mathematics

TPS Publishing Inc. and partners present
A Mathematics Project Based Toolbox
A collaborative effort for the benefit of all students

Not just a textbook...

a teacher's toolbox!

Explore It   Describe It   Use It

Program Design

- **Exciting projects for all students, leading to content mastery and real world applications**

- **Teacher friendly –shift to project based learning**

- **Low teacher preparation time, no erroneous data**

- **Ecologically responsible; space, cost,and health benefits**

- **Continual visual and written assessment**

- **Improved test scores**

Research Based Strategies

- Consistent with the Common Core Standards for Mathematics, the Creative Core Curriculum has made careful use of a large and growing body of evidence. The evidence base includes:

- **scholarly research;**

- **surveys on what skills are required of students entering college and workforce training programs;**

- **assessment data identifying college- and career-ready performance; and comparisons to standards from high-performing states and nations.**

  The *Standards* draw on conclusions from **TIMSS** and other studies of high-performing countries that the traditional US mathematics curriculum must become substantially more coherent and focused in order to improve student achievement.

  U.K. experience and results.

Two Perspectives on Curricula

Machine/Program

- Raw material in
- Finished product of acceptable quality out
- Train our teachers on how to operate the program
- Works well for standardization and uniformity

Does this program improve test scores?

We have not had an industrial-based society for over 40 years.

Tools

- A wide variety of tools for diverse situations
- Infinitely adjustable
- Teacher as skilled professional
- Works well for individualized instruction

Can our teachers use these tools to maximize learning (as evidenced by increased scores)? The classroom teacher is best able to determine and implement the most effective pedagogy

CA Criteria

- **Focus**: Place strong emphasis where the Standards focus

- **Coherence**: Think across grades, and link to major topics in each grade

- **Rigor**: In major topics, pursue with equal intensity:
  - conceptual understanding
  - procedural skill & fluency
  - applications

Creative Core Curriculum

- CCC precisely follows the Common Core (as shown on each page)

- Real World STEM Applications for each major topic that cut across grades.

- Intensity in Traditional, STEM and Crafting editions matches these three criteria

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Assessment

Smarter Balanced Consortium and PARCC

Formative, Summative and Interim assessment materials:

- **The Assessment database holds thousands of questions by standard and by ability level allowing the teacher to create quizzes**
- **STEM projects by strand by grade**
- **Arts projects by standard by grade**
- **Focus Tutorial can be used to assess student mastery for each standard**
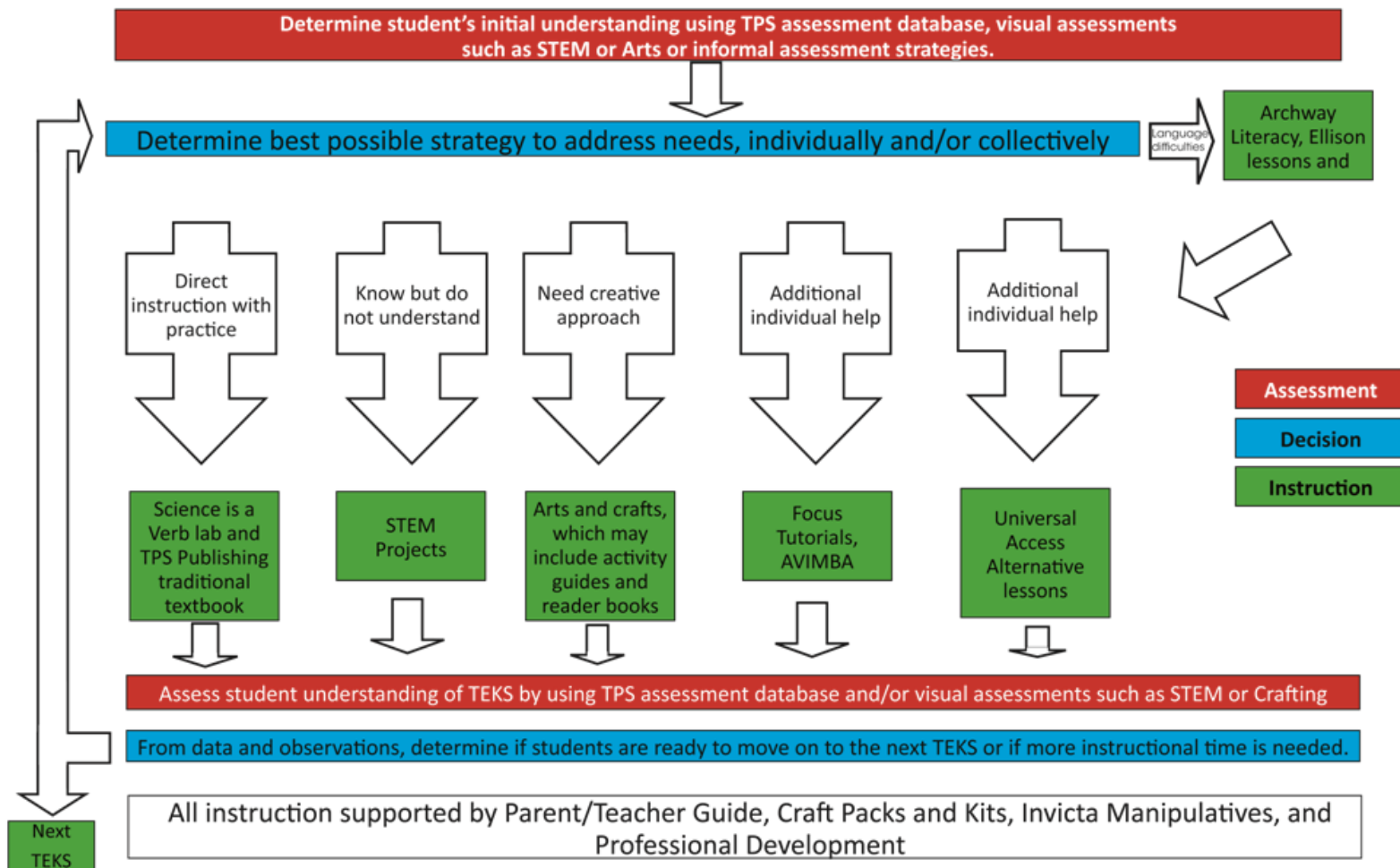- **Web-based interactive homework**

Three key inquiry based components

Traditional Lesson Plans

STEM Learning Cycles

Arts and Crafts Communications Based Projects

Beginning of a strand

Determine student's initial understanding using TPS assessment database, visual assessments such as STEM or Arts or informal assessment strategies.

Determine best possible strategy to address needs, individually and/or collectively

Language difficulties → Archway Literacy, Ellison lessons and

Direct instruction with practice	Know but do not understand	Need creative approach	Additional individual help	Additional individual help
Science is a Verb lab and TPS Publishing traditional textbook	STEM Projects	Arts and crafts, which may include activity guides and reader books	Focus Tutorials, AVIMBA	Universal Access Alternative lessons

- **Assessment**
- **Decision**
- **Instruction**

Assess student understanding of TEKS by using TPS assessment database and/or visual assessments such as STEM or Crafting

From data and observations, determine if students are ready to move on to the next TEKS or if more instructional time is needed.

All instruction supported by Parent/Teacher Guide, Craft Packs and Kits, Invicta Manipulatives, and Professional Development

Next TEKS

Traditional Lesson Plans

The traditional textbooks provide the building blocks of our program and we provide a Teacher and Student Edition for each grade.

Common Core Standards — Grade 4

MEASUREMENT AND DATA
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.MD 1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD 2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Aligning Learning With the Content Standards:

At the end of the section, students will be able to:

- Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.
- Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
- Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Math Language:

Students should become increasingly confident in using such terms and phrases as:

Length, inch, foot, yard, mile, kilometer, meter, centimeter, millimeter, volume, ounce, cup, pint, quart, gallon, milliliter, liter, mass, weight, ounce, pound, ton, gram, kilogram, time, hour, perimeter, area.

Teacher Edition   MEASUREMENT AND DATA 1

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Some words and their meanings

Length is the distance between two given points.

Perimeter is the distance all around a shape.

Area is the surface area of the boundary.

Weight is used to measure the heaviness of an object.

Mass is a measure of the matter in an object.

Volume is the amount of space taken up by an object.

Capacity is the measurement that tells us how much a container holds.

Time is the measurement we use between one event and another; elapsed time.

Temperature is the measure of how hot or cold items are and the degrees in between these two extremes.

Note to Teachers:

Two Systems of Measurement
There are two systems you can use for measuring:
Metric and U.S.

We can use these to measure length, perimeter, area, weight, mass, volume, capacity, time and temperature.

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4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Lesson Plan:

Title:
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit 3

Time Required to Teach This Lesson:
50 minutes

Vocabulary: Length, height, breadth, perimeter, area, inch, foot, yard, millimeter, centimeter, meter, kilometer.

Materials Required in This Lesson:
Square inch, square foot, square yard, square millimeter, square centimeter, square meter.
Laminated sharing boards and dry erase pens (per student).

Objective:
- Students will be able to apply the area and perimeter formulas for rectangles in real world and mathematical problems.

What Students Should Know Already:

Concepts: Students will understand concepts of area measurement.
Students will understand the concept of perimeter.
Students will be able to distinguish between linear and area measurements.

Skills: Students will be able to measure area by counting unit squares.
Students will be able to multiply side-lengths to find areas of rectangle with whole number side-lengths.
Students will be able to calculate perimeter given the side lengths.

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Lesson Structure:

Learning Targets:
- To apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Introduction (5–10 minutes):
Open a discussion relating to a scenario of a farmer who has to fence off a sheep pen because the sheep keep escaping.
Have students suggest how to measure for new fencing.
Lead the discussion to the idea that the perimeter is the distance all around a field or any polygon.
Now relate to a field where the grass has become so poor that it has to be replaced.
Have students suggest how to measure for new grass.
Lead the discussion to the idea that the area is the interior of the field.
Explain that the area is the interior of a field or any figure.

Middle (15–20 minutes):

Students have come across perimeter and area in Grade 3 and should already be familiar with the method of calculating these. It should be possible to cover both areas easily in one 50-minute lesson, but if students are insecure about these concepts, it may be better to split this into two lessons, one on perimeter and one on area.

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Guided teaching:

- Draw a rectangle on the board something like this :

6 yards

3 yards   3 yards

6 yards

Ask students to suggest ways, that if this were a family room, the owner could calculate the measurement of the perimeter.
Look for answers that suggest adding the lengths of each of the sides.   *6 yards + 3 yards + 6 yards + 3 yards = 18 yards*

- Look at the page on calculating perimeter by addition in the student textbook.

- Using the same rectangle, ask students if they can see a way to work out the perimeter that involves multiplying. This is something they have done in Grade 3, but may need reminding.
The rectangle has two sides which are 3 yards long.
It has two sides which are 6 yards long.
So we could work it out like this:
$(2 \times 3) + (2 \times 6) = 18$ yards
Or we could do it this way (which is just the same)
$2 \times (3 + 6) = 2 \times 9 = 18$ yards

- Look at the page on finding the perimeter by multiplication in the student textbook.

- Draw a rectangle on the board something like this :

6 inches

4 inches   4 inches

6 inches

- Show that the area is the number of squares that are needed to cover a flat surface. This can be done by covering all the shape with the small squares to show that this is the surface area.
- Then count the number of squares.

This figure is 6 squares wide

and is 4 squares long.

It takes 24 "inch squares" to cover the surface of the figure.
Each small square has sides measuring 1 inch.
The answer is written as 24 square inches.
Suggest to students that there might be a relationship between 6, 4 and 24 and lead toward multiplication facts.
Demonstrate to students that 6 (the length) multiplied by 4 (the height) makes 24.
$6 \times 4 = 24$.

- Use the page on finding area by multiplication in the student textbook.
- Repeat with several more examples using grid squares to check the answers by counting.

-

Activity (20 minutes):

Individual Activity:
- Draw some rectangles on the board with measurements for students to calculate areas and perimeters.
- Have students work through the exercises in the texbook.

Extension Activity:
- Give students some examples of areas and perimeter to work out, which include halves in the edge length.

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4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Support
SEN: Students may need to continue to draw out problems on grids for some time before they can fully understand the formula. Relate it to times tables: 3 rows of 4 squares is the same as 3 lots of 4 or 3 x 4.

ELL: Have students work with a partner to help them understand the language used in the word problems.

Summary: (5 minutes)
· Review how to find a perimeter and an area.

ELL Support
Have students tell you the definition of perimeter and area. Build an array out of cubes and ask what the perimeter is and what the area is. Do this enough times that they understand that to find the perimeter you add the lengths of all the sides and for area you multiply the length of the two sides. Work through several of the Student Exercise sheets to be sure they understand what it is they are to do.

Teacher Assessment Notes:

|	Names/Initials:
Students exceeding objectives:	
Students yet to achieve objective:	
Students Absent:	

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Student Narrative:

Your lawn care business is thriving.

What started out as mowing the neighbor's yard now involves mowing 20 yards in the neighborhood and applying liquid lawn fertilizer.

That requires building a tank on a trailer that you can pull behind your bicycle.

Water weighs 64 pounds per cubic foot.

How much weight can you pull?

What are the dimensions of your tank?

How much plastic sheeting do you need to make the tank?

Since 1 cubic foot is about 8 gallons, how much will you tank hold?

Suddenly, math is getting important.

To calculate the perimeter of a geometric shape, add up the length of all of the sides.
For example, if a rectangle has 2 sides that are 3 ft and 2 that are 4 feet, the perimeter is simply 3 + 3 + 4 + 4 = 14 ft.

To calculate the area, take the width times the length.
For the previous example, it would be 3 × 4 = 12 square feet.

Remember, you multiply, not add, to get the area.

Finally, to get the volume, you multiply the area of the bottom times the height. If our 3 × 4 rectangle was actually the bottom of a box that was 2 feet tall, the volume would be 3 × 4 × 2 = 24 cubic feet.

Notice that the perimeter is measured in linear feet (units of length). The area is measured in "square" units, and volume is measured in "cubic" units.

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Classroom Activity:

Handy Hint

Think of area and perimeter as a fenced field.

Think of the perimeter as the fence.
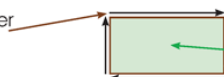
Think of the area as the grass.

The fence is the perimeter and the area is the grass.

Finding the Perimeter by Addition

The perimeter is the distance all around a figure.
Look at this rectangle:

6 inches

3 inches   3 inches

6 inches

You can find the distance around this figure by adding:
6 inches + 3 inches + 6 inches + 3 inches = **18 inches**
You have added the lengths of all the sides together.

Look at this square:

3 inches

3 inches   3 inches

3 inches

Finding a perimeter by addition:
You can find the distance around this figure by adding:
3 inches + 3 inches + 3 inches + 3 inches = **12 inches**
You have added the lengths of all the sides together.

Classroom Activity:

Finding the Perimeter by Multiplication

A rectangle has 2 equal lengths and 2 equal widths.

To find the perimeter of a rectangle, add the lengths to the widths.

5 in

4 in   4 in

5 in

(2 lengths) $2 \times 5 = $ **10 in**
+ (2 widths) $2 \times 4 = $ **8 in**
                10 + 8 = 18 in

To find the perimeter of a square, simply multiply the length of the side by the number of sides.

3 in

3 in   3 in

3 in
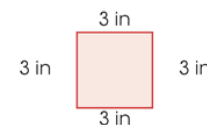
Multiply $3 \text{ in} \times 4 \text{ sides} = $ **12 in**
(3 x 4 is the same as 3 + 3 + 3 + 3 = 12)

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Student Exercise:

Put a check mark in the correct box.

A square handkerchief measures 6 inches by 6 inches.

What is the perimeter of the handkerchief?

20 in ☐   12 in ☐   24 in ☑   30 in ☐

A square table has 4 sides that are 2 ft long.

What is the perimeter of the table?

10 ft ☐   8 ft ☑   20 ft ☐   18 ft ☐

The classroom has two sides of 20 feet and two sides of 15 feet.

What is the perimeter of the classroom?

30 ft ☐   40 ft ☐   60 ft ☐   70 ft ☑

Teacher Tip ▶

Ask for a volunteer student to come up and help you do the first problem and resolve it. Then ask students to do the next problem and try to answer all of the problems on the next page. Choose a student for each question and work through their answer, correcting any misconceptions. Focus them on the multiplication approach.

Student Exercise:

This picture needs a decorative wooden edge around the glass frame. Find the perimeter around the edge of this picture.

1 ft
2 ft   2 ft
1 ft
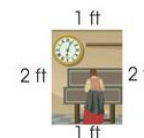
How much wooden edging do you need to buy to frame this picture?

Answer: 6ft___
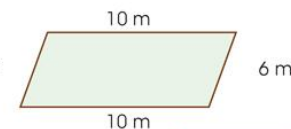
You need to buy some fencing to fence a garden that is 10 meters long by 8 meters wide. Find the perimeter of the garden.

10 meters
8 meters   8 meters
10 meters
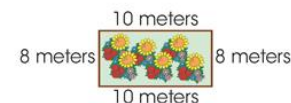
How much fencing do you need to buy?

Answer: 36 meters

How much fencing would you need to buy to go around the edge of this field?

10 m
6 m   6 m
10 m

Answer: 32 meters

Teacher Tip ▶

Ask students to answer the questions. Write the answers on the classroom board and discuss.

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4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Student Exercise:

A square has sides of 2 inches.
What is the area of the square?

4 square inches ✓ 6 square inches ☐ 8 square inches ☐ 10 square inches ☐

A rectangle is 5 meters long by 2 meters wide.
What is the rectangle's area?

7 square meters ☐ 10 square meters ☐ 14 square meters ✓ 24 square meters ☐

A rectangle measures 12 yards by 3 yards.
What is the area of the rectangle?

123 square yards ☐ 72 square yards ☐ 36 square yards ✓ 30 square yards ☐

A rectangle measures 6 centimeters by 7 centimeters.
What is the area of the rectangle?

42 square centimeters ✓ 24 square centimeters ☐ 67 square centimeters ☐ 21 square centimeters ☐

A rectangle measures 15 inches by 5 inches.
What is the area of the rectangle?

25 square inches ☐ 20 square inches ☐ 150 square inches ☐ 75 square inches ✓

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Student Exercise:

The new rug Kevin bought measures 3 feet by 5 feet. What is the area of the rug?

_____ 15 square feet

There is a square pond in Gary's back yard.
One of the sides measures 3 meters.
What is the area of the pond?

_____ 9 square meters

The top of the teacher's desk measures 3 feet by 6 feet.
What is the area of the desktop?

_____ 18 square feet

A stamp is square and has one side that measures 20 millimeters.
What is the area of the stamp?

_____ 400 square millimeters

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4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Student Exercise:

The window in my family room has an area of 30 square feet.
It is 6 feet high. How wide is it? Write a multiplication equation using a letter to represent the unknown factor for each problem.

5 feet ✓   6 feet ☐   15 feet ☐   20 feet ☐

Answer; 6 x a =30 square feet. Students may use any letter for these answers.

The fireplace is 3 feet wide and has an area of 9 square feet.
How high is it?

27 feet ☐   24 feet ☐   6 feet ☐   3 feet ✓

Answer; 3 x b =9 square feet.

The rug in front of the fire has an area of 20 square feet.
It is 5 feet long. How wide is it?

2 feet ☐   3 feet ☐   4 feet ✓   five feet ☐

Answer; 5 x a =20 square feet.

The games board has an area of 4 square feet.
It is 2 feet wide. How long is it?

1 foot ☐   3 feet ☐   18 inches ☐   24 inches ✓

Answer; 2 xc =4 square feet.

My yard is a perfect rectangle. It is 20 meters long and has an area of 300 square meters. How wide is it?

10 meters ☐   15 meters ✓   20 meters ☐   30 meters ☐

Answer; 20 x n =300 square feet.

Teacher Edition   MEASUREMENT AND DATA 3

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Student Exercise:

Mr. Kiamura needs to buy some new fencing for his field.
The field measures 50 feet by 40 feet.
What length of fencing does he need?

_____ 180 feet

He needs to buy some grass seed now, but to work out how much seed he needs, he needs to know the area of the field.
What is the area of the field?

_____ 2,000 square feet

Pia is remodeling her living room.
The room measures 6 meters by 8 meters.
She needs to order some new flooring for the room.
How much flooring will she need?

_____ 48 square meters

Pia is adding a decorative border all around the room.
What length of frieze will she need?

_____ 28 meters

MEASUREMENT AND DATA 3   *Teacher Edition*

TPS Publishing Inc.

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Common Misconceptions:

- Make sure that students recognize which unit of measurement they need to use in different situations.
- Students may use rulers and other measuring tools incorrectly.
- Make sure that students measure with a ruler by placing the object or line to be measured at zero on the ruler.
- Make sure that students are accurate when drawing lines with a ruler.

In the Classroom:

- Give students lots of practical examples to explore.
- Ask students to discuss their answers with you and other students.
- Make sure that students understand how they are to convert measurements.
- Explain to students that there are two systems of measurement in operation.
  - The U.S. system of measurement is the more traditional system for measurement and has been in use for a long time.
  - The metric system is used widely around the world and is based on measurements of tens, hundreds, and thousands.
- Students should be encouraged to draw a picture and model a problem which will help them to reason an answer.

In the Home:

- Talk about units of measurement in relation to household items.
- Point out the measurement intervals on scales, jugs, rulers etc.
- Look for opportunities to discuss quantities on bottles and containers: bath-time, baking, at the gas station, etc.
- Practice using the vocabulary.
- Refer to quart bottles and liter bottles, rather than just bottles.
- Refer to the quantity on the label; pound of sugar, rather than a bag of sugar. This way children learn to make associations with weights and measures.

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STEM Learning Cycles

STEM projects provide project-based, career-targeted challenges related to specific standards

STEM Learning Cycles

A typical teacher lesson plan.

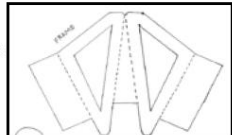**Clear, concise with step- by- step instruction and clear output visuals.**
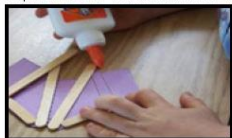
Explore It

The purpose of building the custom mini chopper is so that students can add numbers as they add accessories. Each accessory has a price. Since adding and subtracting up to 100, skip counting by 5s, 10s, and 100s to 1000 and comparing numbers with < and > symbols are important, students will be keeping track of the cost of their chopper as they build it.

Stock Frame

1. Each student is going to design and build a custom mini chopper. All students start with the stock frame, but add accessories. Some parts are required, some are optional. Prices vary by color of the part.

2. Make enough copies of the frame master on cardstock or construction paper for each student. Cut the pieces apart into squares, not along the lines.

3. Help students follow the directions and diagrams to make the frame.

4. Break or cut one craft stick in half to make the down tube. The top tube and down tube are glued flat to the paper. The bottom is glued on top of the other sticks. It does not touch the paper.
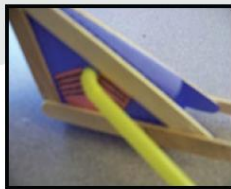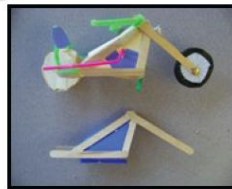
Teacher Project Edition

STEM Learning Cycles

A student's view.

Inviting, Fun and mathematically sound

5. Add up the price of all the parts on your Build Sheet.

Total cost of the parts_____

Selling price of the mini chopper_____

Student Project Edition

STEM Learning Cycles

Higher level thinking and problem solving

DAPIC

Define: Try to figure out exactly what is wrong.

Assess: Come up with lots of ideas about how to fix it and decide which idea is best.

Plan: What do you need and how are you going to do it?

Implement: Make the part or fix the problem.

Communicate: Share your ideas with others in your group. What do they think?

Crafting Projects - Understanding Mathematics Through Art

Students access learning through fun action based, and fully inclusive crafting and reader activity book materials.


150

Die Cutting Exercise

Individual Activity

Lucy says:
1. Die cut the letters to title a poster "Perimeter".
2. Die cut one rectangle.
3. Glue the title, centered, onto a piece of background paper.
4. Glue the rectangle three inches below the title.
5. Measure the sides.
6. Die cut the measurements and label each side.
7. Use multiplication. Calculate the perimeter.

Answer: (2 x 3) +(2 x 4) =14 inches

You now know the perimeter of your die shape. This is important to the company who makes them as they need to package them to ship to customers.
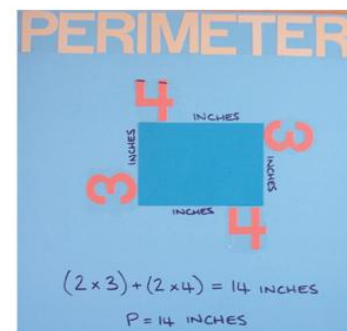
Teacher Edition Grade 4 — G4.MD 3.

Universal Access – RTI student population

In large classrooms a diverse population can often benefit from activity based math, no student book.

English Language Learner (ELL):   & Intensive Level Student:

Give the ELL and Intensive Level students a centimeter ruler and an inch ruler. Discuss the differences in the rulers. Point out to the students that a centimeter is smaller than an inch. Line the two rulers up one underneath the other so that the students can see the difference in their measurements.

```
0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
cm
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```
0      1      2      3      4      5      6
inches
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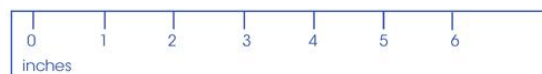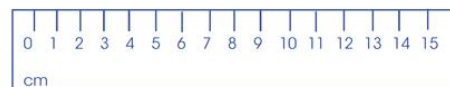
- Have the students measure the tip of their pinky using the centimeter ruler.
- Elicit from the students that the tip of their pinky is approximately one centimeter long.
- Have the students measure their thumb from the knuckle to its tip using an inch ruler.
- Elicit from the students that the length of their thumb from the knuckle to its tip is approximately one inch.

It is important for the students to understand the markings on the ruler. Start with the inch ruler and have the students point to the 1 inch mark, 2 inch mark, … through the 12 inch mark. Have the students point and count as they say the inch number out loud.

Once the students can point and count successively 1 through 12, ask the students to point to random markings. For instance, ask the students to point to the 5 inch mark, or the 9 inch mark. We want them to be able to recognize the demarcations.
Repeat the above activity using the centimeter ruler. It is important for the students to know the markings on the ruler and point them out correctly.
When the students are comfortable using the two rulers, start by giving the students pre-made strips whose lengths are whole numbers. Have the students measure the strips using a 12 inch ruler and a centimeter ruler.
Please note that you will need different length strips for each ruler in order for the lengths to be whole numbers.
After the students become proficient in measuring strips whose lengths are whole numbers, have the students practice approximating the length of a strip that is not a whole number. Give the students different types of verbal problems. By giving verbal problems, you are reviewing comprehension, as well as incorporating the new skills they have just learned.

Universal Access Teacher Classroom Support Guide   *Grade 2*

Tier I: A strong, evidence-based, Tier 1, core curriculum, grounded in the Common Core standards, and rich in which multi-modal, differentiated instruction and STEM and Arts activities, to promote universal access, cross curriculum connections, problem solving, and higher order thinking.

Tier II: Focused tutorials, Archway, AVIMBA ABC and 123 games, Interactive Homework system and reteach and applied math libraries all provide integrated Tier II strategic intervention materials for teachers and students.

Crafting Projects - Modeling Mathematics

Students access learning through fun action based, and fully inclusive crafting and reader activity book materials.

Teachers and students can watch the wonderful aligned videos

Student Workbooks

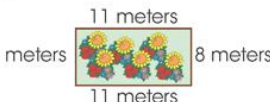Review exercises by standard provide wonderful resources to use before examinations

4.MD 3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Student Exercise:

You need to buy some fencing to fence a rectangular shaped garden that is 11 meters long. One side of the garden is 8 meters wide. Complete the model of the garden. Write in the missing measurement.

11 meters
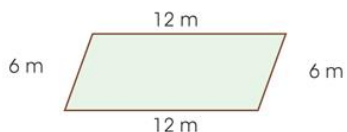
_____ meters   8 meters

11 meters

How much fencing do you need to buy? _____

What is the area of the garden?

How much fencing would you need to buy to go around the edge of this field?
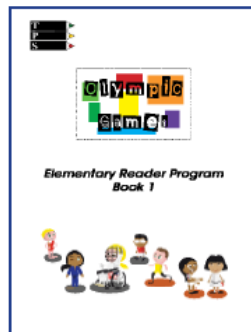
12 m

6 m   6 m

12 m

What is the area of the field?

Teacher Workbook   *Measurement & Data*
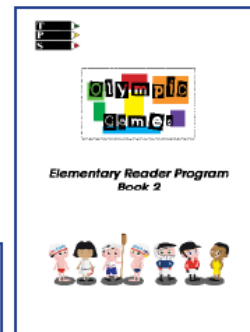
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Activity Readerbooks

The thematic activity reader books engage students with fun characters and stories
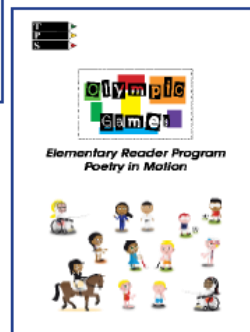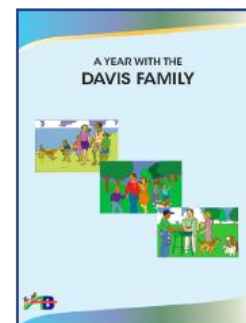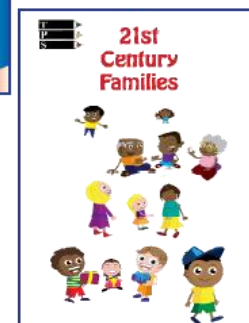
Grade K

Grade 2

Grade 1

Grade 4

Grade 3

Grade 5

Amelia Rose Explores

STEM Activity Readerbook linking Mathematics, Science and Literacy with Crafting activities.
Uses Invicta Education Manipulatives.

Parent Teacher Guide

TPS provide parent ready materials including a series of mathematics with literacy activities.

Use expanded notation to represent numbers (e.g., 3,206 = 3,000 + 200 + 6).

- To help students understand what expanded notation means, it is best to have them build the numbers with base ten blocks on place value boards. After building the numbers, they can actually see and be able to write the value of each digit. This is especially important when a number has a "0" in a place value. They can visually see that there are no blocks in the column and thus does not need to be noted when writing expanded notation, but that a 0 must be used when writing the standard notation of a number.

Find the sum or difference of two whole numbers between 0 and 10,000.

- Have students build the two numbers to be added with base ten blocks on place value boards. Have them combine the base ten blocks from the two numbers and determine how many they have altogether. Be sure they are changing groups of 10 unit cubes for 1 ten rod, and 10 ten rods for 1 hundred flat. They should also draw the two numbers they are adding together (use squares to represent 100, a line to represent 10, and an x to represent each unit cube) and the total. Students need to write a number sentence to show the math they have done. At the beginning of the year students need to build, draw, and write the number sentence to help reinforce what they learned the previous year.
- The "partial products" methods is good for students who no longer need to build the numbers, but are still having problems with place value. Students record the sum of two numbers but do no "trading" (see example below)

```
   797
 +278
    15 (7 + 8)
   160 (90 + 70)
   900 (700 + 200)
 1,075
```

Teacher/Parent Coaching & Literacy Support Guide

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Mathematics in the Real World
Financial Literacy

A component focusing on the link between Mathematics and Finance

1. Distinguish between fixed and variable expenses
2. Calculate profit in a given situation
3. Compare the advantages and disadvantages of various savings options
4. Describe how to allocate a weekly allowance among spending; saving, including for college; and sharing
5. Describe the basic purpose of financial institutions, including keeping money safe, borrowing money, and lending

Student Exercise:

After working really hard after school and on weekends, you have 20 $10 bills in your pocket. Where should you put them? Fill in the first column with some options. In the second and third columns, write down some good things and some bad things about putting it there.

Where to put the money	Good things	Bad things

Look at your options. Where do you think is the best place for your money? Why?
What do financial companies provide to us?

Mathematics Real World Application— Personal financial literacy   Teacher Edition

Assessment Database

Houses over 3,700 assessment questions categorized by grade, standard and student ability level

Graded Assessment Database by Core Curriculum Standard / Grade 4 - Mathematics

Browse + Navigate standards

OPERATIONS AND ALGEBRAIC THINKING

OA.1 OA.2 OA.3

OA.4

OA.5

NUMBER AND OPERATIONS IN BASE TEN

NBT.1 NBT.2 NBT.3

NBT.4 NBT.5 NBT.6

NUMBER AND OPERATIONS—FRACTIONS

NF.1 NF.2

NF.3a NF.3b NF.3c

NF.3d NF.4a NF.4b

Review + Select your standards

Grade 4
○ Below ● At ○ Above

OPERATIONS AND ALGEBRAIC THINKING

OA -Use the four operations with whole numbers to solve problems.:

☐ OA.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

☐ OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

☐ OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must

Select Questions

☑ **1601** Look at the rectangle model. Calculate the perimeter.

☑ **1602** Look at the square model. Calculate the permimeter.

☑ **1603** Look at the model. The perimeter of the garden is 36 meters. What is the missing measurement?

☑ **1604** Each square in this model is one inch. How many square inches is the area of the model?

☑ **1613** Look at the line plot. It shows data recorded in a store where a man has weighed bags of potatoes he has for sale. How many bags of potatoes weighed 11/4lbs?

Home   Preview Questions   Credits

TPS Publishing Inc.

Focus Tutorial

recommended for use for students who really struggle with traditional textbook learning, either due to low EL skills or other special educational needs.

Classroom Activity:

Finding a perimeter by addition:

You can find the distance around this figure by adding:
3 inches + 3 inches + 3 inches + 3 inches =
You have added the lengths of all the sides together.

3 inches

3 inches   3 inches

3 inches
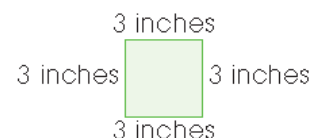
Interactive Homework System

students can complete their assigned homework activities whereever there is an internet connection; no excuse for lost papers anymore!
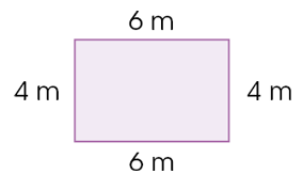
Student Exercise:

The after school science club have been offered two locations to have their sessions. One room is a rectangle shape, the other a square room.

The members of the club decide to choose the room with the largest perimeter.

Calculate the perimeter of each room and confirm which room they choose.

Room A

6 m

4 m   4 m

6 m

(2 lengths) 2 x 6 = 12 m

+ (2 widths) 2 x 4 = ☐ m

☐ m + ☐ m = ☐ m

AVIMBA School and Family Circle

a totally secure system within which families can work with their children and other families to provide additional support to mathematics and science learning, K - 5

Applied Mathematics Library

A library of +200 STEM resources which emphasise the application of Mathematics in everyday life.

Exploring the Idea I

1. Study the three number systems below, using the Hindu-Arabic number system as a guide. How are they similar? How are they different?

Hindu-Arabic	0	1	2	3	4	5	6	7	8	9	10
Babylonian											
Mayan											
Roman Numbers		I	II	III	IV	V	VI	VII	VIII	IX	X

2. Your archeological group has found the following stone in one of their digs. How can you decipher these symbols? How does this system work? Use the following information to help you.

   a. represents 72
   b. represents 602
   c. represents 1,201
   d. represents 40,261
   e. represents 256,261

   Using your calculator and the table above, try to figure out how the Babylonian number system works. What are the characteristics of the system? What might be the purpose of the spaces? How do you represent zero in this system? Write a paragraph in your journal describing the DAPIC method you used to solve this problem.

3. Another archeological group found the following stone with these Mayan numbers. Decipher the code. (*Clue: The place value for the Mayan System is vertical.*) How does the use of spacing in the Mayan System compare to the use of spacing in the Babylonian System?

Unearthing the Code   265

After School Math Club

Creative activities where students develop Mathematics skills whilst completing fun activities.

After School PSHE Club

Arts cross curricular projects cover personal, social and health education topics, including Math links.

Literacy and Reteach Library

A library of resources which link Mathematics and Literacy as well as providing further re teach opportunities.

Common Core State Content Standards — Level 1

Geometry
Mathematics with Literacy

Perimeters

Lateesha wants to figure out how far she has walked after walking around the outside edge of the school parking lot. In other words, Lateesha wants to know the perimeter of the parking lot, because perimeter means the distance around an area or figure.

To find the perimeter, you need to add up all the sides of the area or space. If the parking lot was a rectangle, and it was 220 feet long and 180 feet wide, then we would need to add both of the long sides (220 feet) and both of the wide sides (180 feet).

Perimeter of the parking lot = length + length + width + width
Perimeter of the parking lot = 220 + 220 + 180 + 180
Perimeter of the parking lot = 800 feet.

Therefore, Lateesha walked 800 feet when she walked around the outside of the school parking lot.

If different rectangles have the same perimeter, does that mean they have the same area (remember, area = length x width, or a = lw)? Why or why not?

No. Rectangles can have the same perimeter but different areas. This is because the product of the two values (length and width) is usually different from the sum of the same two values.

Literacy Worksheet   Section 3 — Geometry

Didax Manipulative Kits

Provides a variety of activities to connect the use of manipulatives to written methods, including by grade Common Core kits.
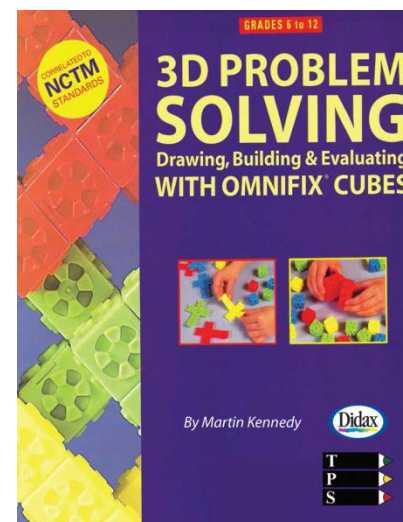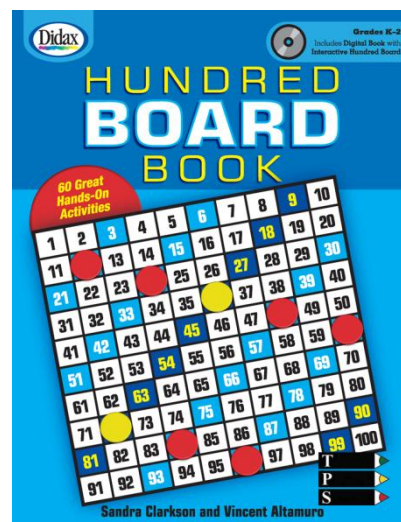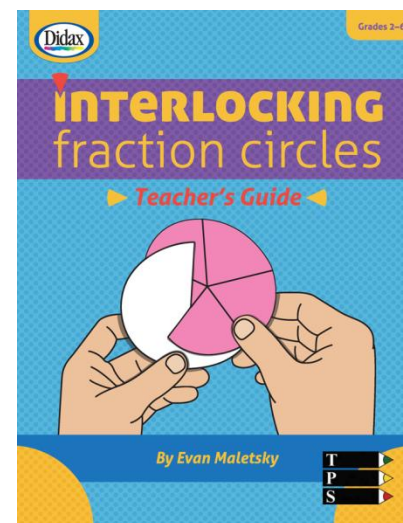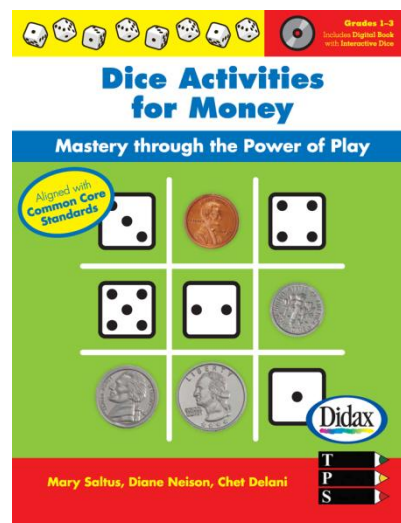
Blackline Master

Reproducible master sheets for commonly used items like charts and tables plus Benchmark tests and literacy.

34

Common Core State Standards Content — Level 3

Measurement and Data with Geometry
Mathematics with Literacy

Relationships in Geometry

Area = πr^2

Solve for r (radius): 16 inches

Solve for **d**, showing all your work: 8 inches

3. There are relationships between the gray parallelogram and the clear triangle. Use the information you know to represent and solve the problems below.

a = ?
h = 4 cm
b = 4.5 cm   b = 1.5 cm

$a^2 + b^2 = c^2$
$1.5^2 + 4^2 = c^2$
$2.25 + 8 = 10.25$
$10.25 = c^2$
$c = 3.2$
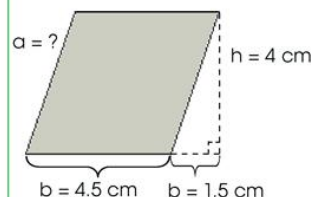
Write a formula (using **b** and **a**) to represent the perimeter of the parallelogram:

2a + 2b

Solve for perimeter:
2(3.2) + 2(4.5) =
6.4 + 9 = 15.4cm

What is the area of the triangle? Show all your work, including the formula using the variables **b** and **h**.

area = $\frac{1}{2}$b x h   area = 3cm²
area = $\frac{1}{2}$(1.5) x 4

Section 2 — Algebra and Functions   Literacy Worksheet

TPS Publishing Inc.

Professional Development

All Professional Development is provided by Illinois State University Center for Mathematics, Science and Engineering.

One of the largest producers of teachers in the nation.

CeMaST is one of the first STEM Centers in the U.S.A.

- Elements of the Creative Core Curriculum program require a paradigm shift for some educators. It is based more on the teacher's ability to ask leading questions than provide predetermined answers. The effective educator will be skilled at managing and facilitating the educational environment.

Does It Work?

How do we learn?

Youtube video and then try it ourselves

Traditional instruction:

- 85% of dropouts say they drop due to Algebra I

- leads to 50% or more of our college students taking remedial courses

- People say they "hate math" or are "not good in math"

Research and Experience

Thank you

TPS Publishing Inc.