

Getting Ready to Teach Unit 7

Learning Path in the Common Core Standards

This unit builds on the geometry and measurement concepts and knowledge that children bring from Kindergarten. The focus of geometry is composing shapes. This helps children build mental images as they compose and describe the new shapes they are building. Children explore 2- and 3-dimensional shapes using unique manipulatives developed for *Math Expressions*. Children also learn some of the important basic concepts about measurement. Concepts are emphasized this year so that they will easily transition to using rulers next year. Measuring time units is also included in this unit. Children work with both analog and digital clocks as they read and tell time using clocks.

Children's work with composing and decomposing shapes, properties of shapes, and equal shares involves the basic reasoning children will apply to work with fractions, congruence, and symmetry in later grades.

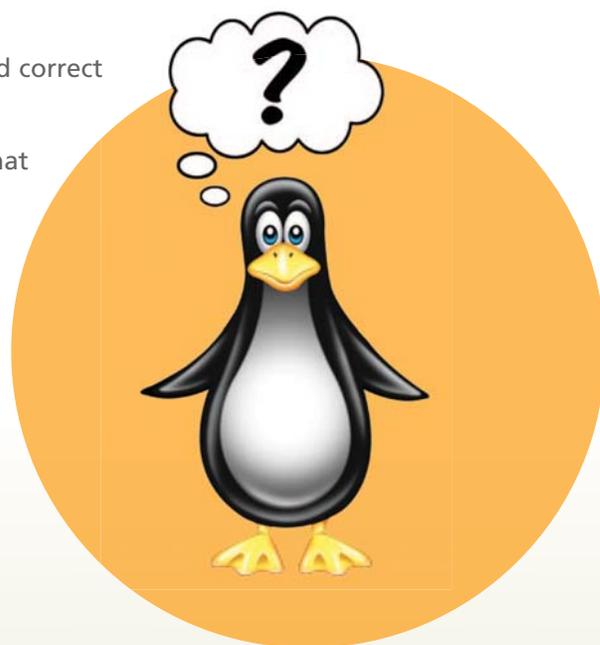
Help Children Avoid Common Errors

Math Expressions gives children opportunities to analyze and correct errors, explaining why the reasoning was flawed.

In this unit we use Puzzled Penguin to show typical errors that children make. Children enjoy teaching Puzzled Penguin the correct way, why this way is correct, and why Puzzled Penguin made an error. Common errors are presented in the Puzzled Penguin feature in the following lessons:

- ▶ **Lesson 2:** Flips the hour hand and shows 9:00 rather than 3:00
- ▶ **Lesson 4:** Draws the hour hand between the wrong two numbers and shows 12:30 rather than 1:30
- ▶ **Lesson 6:** Has difficulty identifying squares and rectangles
- ▶ **Lesson 13:** Does not line up paper clips properly when measuring an object

In addition to Puzzled Penguin, there are other suggestions listed in the Teacher Edition to help you watch for situations that may lead to common errors. As a part of the Unit Test Teacher Edition pages, you will find a common error and prescription listed for each test item.



Measuring Time

Lessons

1

2

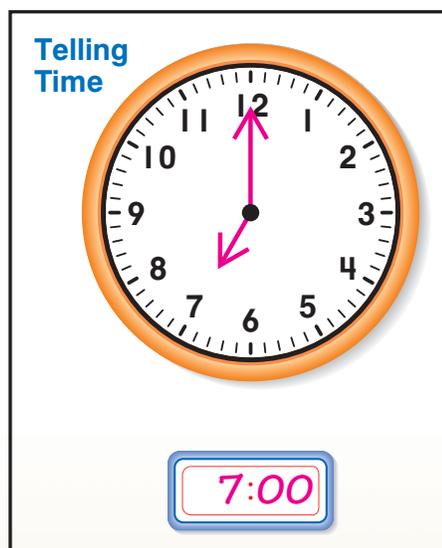
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Time in the Real World Children come to school with understanding of time from their home environments. Some children may have read the numbers on a digital clock. However, the language used at home to express the time may vary greatly. *Half past* comes from reading an analog clock while *nine thirty* comes from reading a digital clock. Both types of clocks exist in our society but digital clocks are slowly replacing analog clocks. Many homes will only have digital clocks but children are still required to read an analog clock as a part of the mathematics curriculum. You may find that the first time children see an analog clock is when they arrive at school.

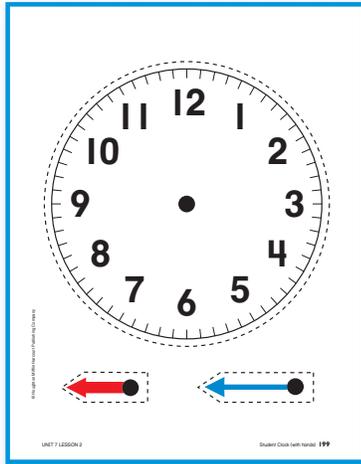
Time Poster In Lesson 1, children describe the parts of an analog clock. *Math Expressions* includes a Time Poster with the Grade 1 materials. It is most important that children can distinguish between the hour and minute hands. When you draw the hands be sure to draw the minute hand longer than the hour hand.



Children are introduced to the expression *o'clock*, which means "of the clock." This language is used for both analog and digital clocks.

Digital Notation The poster includes both an analog clock and a digital clock. This helps children connect the digital notation to the clockface of an analog clock.

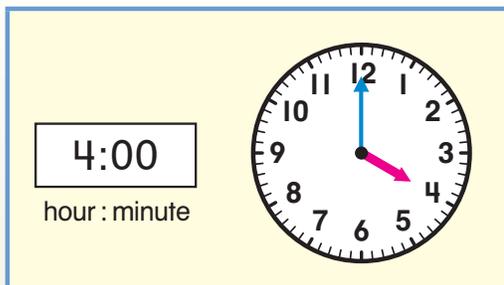
Make a Clock In Lesson 2, children cut out and make their own personal clock for which they can move the hands to show a given time. The hour hand is red and the minute hand is blue. The reason is that the most common error with telling time is to confuse the minute and hour hands. The color differences help children to see the difference in lengths of the two clock hands.



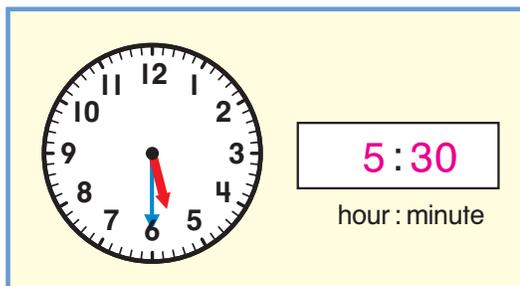
After children make their clock, they begin reading the time in hours on an analog clock and writing the time on a digital clock. The clock hands continue to be blue and red.

Make a Time Book: Our Busy Day Children apply what they have learned about time in hours by making a time book and recording their daily activities on the hour by drawing and coloring pictures. This Lesson 3 activity gives children the opportunity to talk about time during the day and how activities change during the day.

The Hour Hand In Lesson 3, children also draw the hour hand on a clock given the time on a digital clock.



Time in Half-Hours Lesson 4 introduces time to the half-hour. This is a difficult concept because this looks so different on an analog clock as compared to a digital clock. The minute hand on an analog clock points to 6 while the minutes on a digital clock read as 30.



Children need practice with this skill to be successful. In Lesson 5, children practice time in half-hours as well as review time in hours.

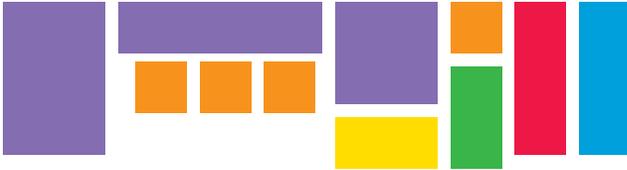


Analyzing 2-Dimensional Shapes

Lessons

6 7

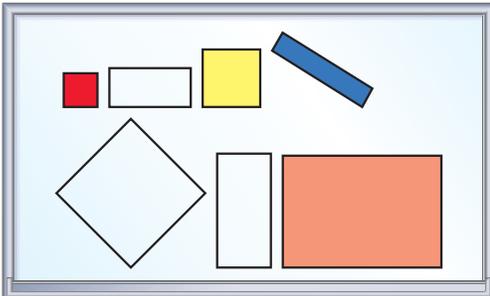
Hands-On Manipulatives *Math Expressions* provides unique geometry manipulatives that enable children to analyze, compose, decompose, and reason about geometric properties of shapes.



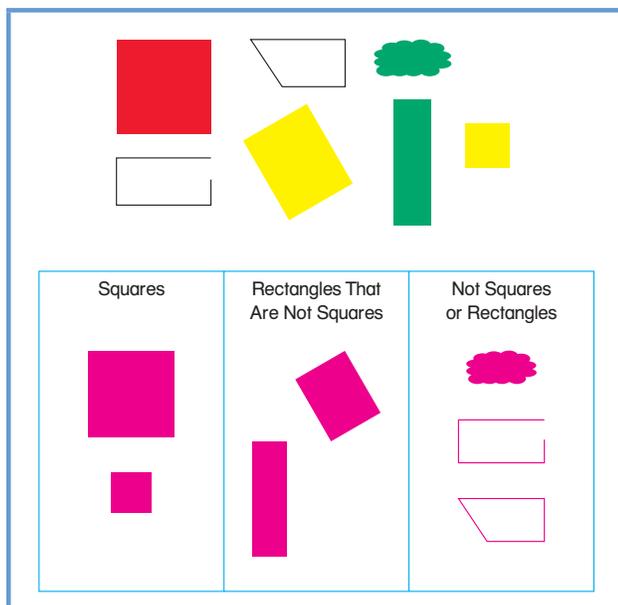
Reasoning about Rectangles (including squares) After comparing different rectangles in Lesson 6, children observe the following attributes:

- ▶ Closed: All rectangles are closed.
- ▶ Four sides: All rectangles have four sides. All rectangles have opposite sides the same length. Squares are rectangles with all sides the same length.
- ▶ Four corners: All rectangles have four corners called square corners.

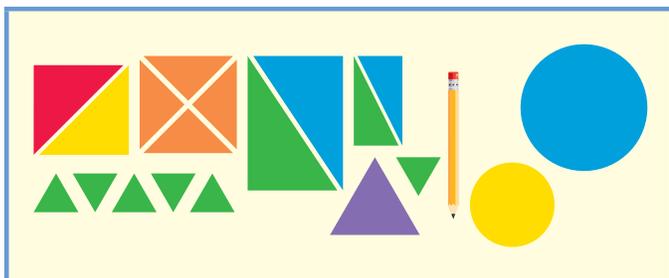
Children also learn that sides and corners (angles) are properties of rectangles. However, orientation, size, and color are not defining properties.



Sorting with Rectangles Children identify and sort rectangles into categories.



Reasoning about Triangles and Circles For Lesson 7, *Math Expressions* provides hands-on manipulatives for reasoning about triangles and circles.



After comparing different triangles children observe the following attributes:

- ▶ Closed: All triangles are closed.
- ▶ Three sides: All triangles have three sides.
- ▶ Three corners: All triangles have three corners. Some triangles have a square corner. Others do not.

After comparing different circles, children observe the following attributes:

- ▶ Closed: All circles are closed.
- ▶ Circles are round, and have no corners.

Children revisit the idea that orientation, size, and color are not defining properties of triangles and circles.

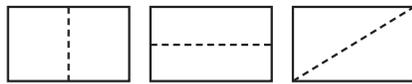
Composing and Decomposing Shapes

Lessons

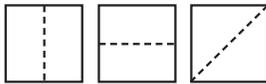


Cutout Manipulatives *Math Expressions* includes cutouts for children to fold into halves and fourths. These simple shapes help children see how they could decompose a figure in different ways to show two or four equal shares in Lesson 8.

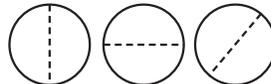
Explore Halves Children discover three possible ways to show two equal shares for rectangles. They find that there are many ways to show two equal shares for circles.



Three Ways

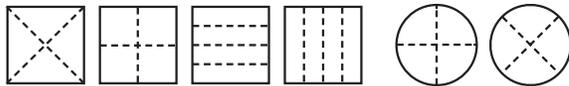


Three Ways



Many Ways

Explore Fourths Children explore folding into fourths using the same figures.

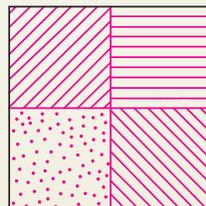


Show One Half and One Fourth Children then use what they know about halves and fourths to draw and color one half and one fourth of a shape.

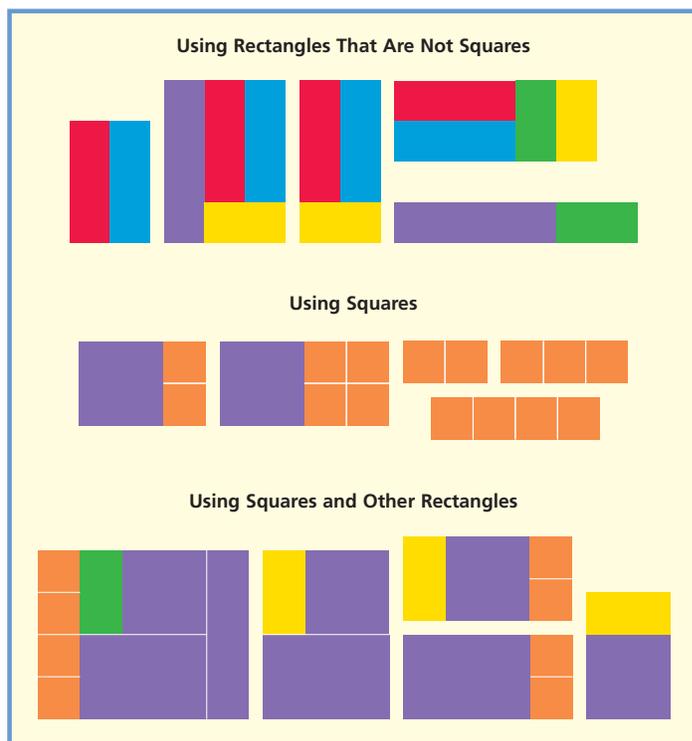


Real World Problems Children apply their reasoning to solve real world problems.

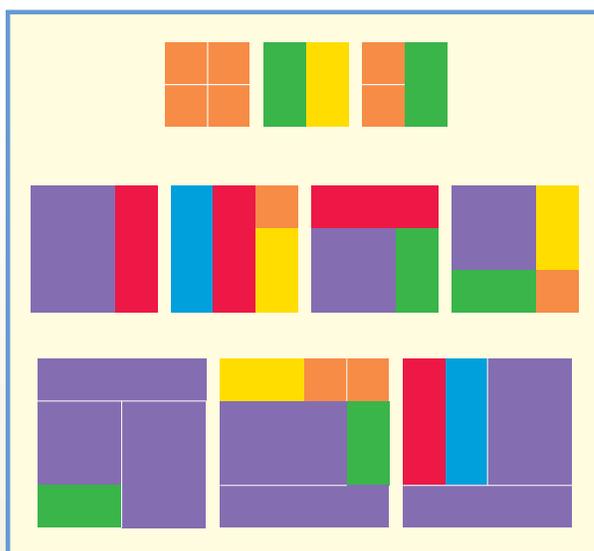
Four friends want to share a sandwich.
How can they cut the sandwich into four **equal shares**? Draw lines.
Color each share a different color.



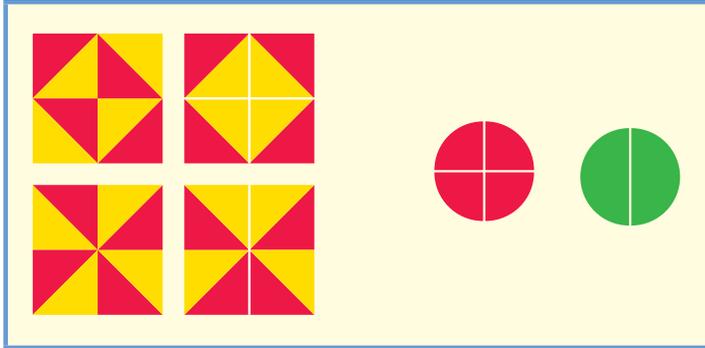
Compose 2-Dimensional Shapes In Lesson 9 children compose rectangles using hands-on manipulatives. They discover that they can make rectangles that are not squares in many different ways using different and same-sized pieces.



Compose Squares They also make squares using many different rectangles.



Compose with Triangles and Circles Children continue to compose new shapes with triangles and circles.



3-Dimensional Shapes

Lessons

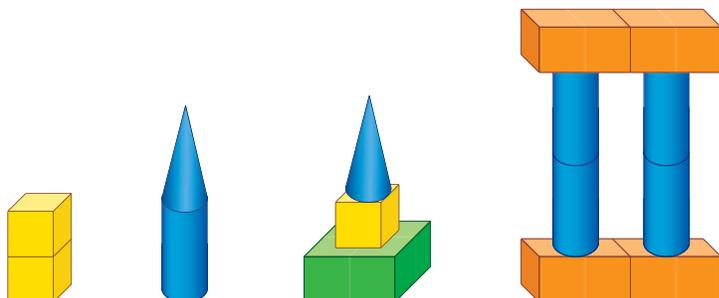
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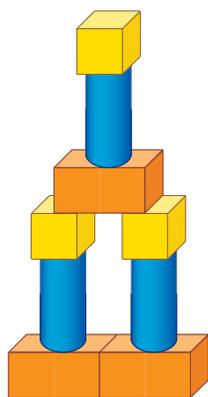
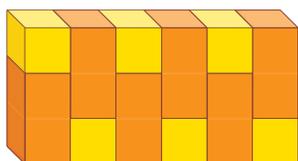
Attributes of Geometric Solids *Math Expressions* provides a unique set of 3-dimensional solids for children to use as they explore solid geometry. In Lesson 10, children discuss the names of the shapes and their appearance, deciding whether a figure can roll, slide, or stack, and whether the surface is curved or flat. They learn the defining properties of a rectangular prism and compose rectangular prisms.

Compose Rectangular Prisms That Are Not Cubes	Compose Rectangular Prisms That Are Cubes

Compose Different Shapes In Lesson 11, children use different types of solids and describe the 3-dimensional shapes they compose.



Use Composite Shapes Children also learn that they can put together composite shapes to make a new shape.



Concepts of Length

Lessons

12

13

Compare and Order by Length In Lesson 12, children discuss the concept of length by comparing which of two items are longer.



Then children discuss how to place three paper strips in order from shortest to longest...



and also from longest to shortest.

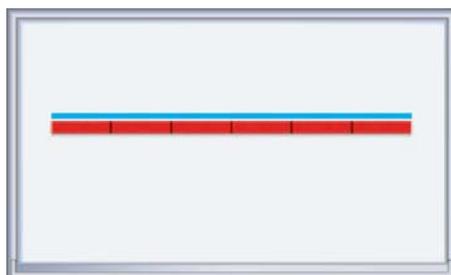


Children next write numbers 1, 2, and 3 to order pictures of three objects from shortest to longest. Finally they draw three lines and label them 1, 2, and 3 to show the order from longest to shortest.

Transitivity Principle for Indirect Measurement Children use what they know about comparing lengths to reason about indirect measurement. This principle states that if the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C.

Measuring with Length Units The Grade 1 Common Core State Standards focus on iteration: expressing the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end. This is the focus of Lesson 13.

Measure with Paper Strips After the teacher draws a straight line on the board, a volunteer uses same-sized paper strips to measure the length of the line. The teacher demonstrates how to line up the first strip with the beginning of the line and helps the child tape the strips to the board below the line.



Be sure children understand that the strips should not have any gaps between them, and they should not overlap. This activity presents the following important concepts for measuring length:

- ▶ Using the same-sized unit for measuring
- ▶ Laying multiple copies of the measuring unit end-to-end without gaps or overlaps

Measure Objects with Paper Clips The next activity gives children an opportunity to measure real world objects with paper clips.



Measure Pictures with Paper Clips Children now use paper clips to measure pictures on the Student Activity Book pages.

Measure in paper clips.

I. Red ribbon

How long? paper clips



Focus on Mathematical Practices

Lesson

14

The standards for Mathematical Practice are included in every lesson of this unit. However, there is an additional lesson that focuses on all eight Mathematical Practices. In this lesson, children use what they know about geometry and measurement to solve real world problems at a picnic.