



San Diego Unified School District

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Instructional Module to Enhance the Teaching of

**H A R C O U R T**

**Math**

**California Edition**

**Grade 3**

**Module 4: Revised**

Geometry

—WORK IN PROGRESS—

San Diego City Schools  
Instruction and Curriculum Division  
**GRADE 3 – MATHEMATICS CURRICULUM MAP**

**MODULE 4 – GEOMETRY**

**Modules represent individual units of study that lead to essential learnings**

**THREADS THROUGHOUT THE YEAR:**

*The threads represent ongoing learning opportunities in which students should be actively engaged throughout all units of inquiry during the entire school year. These items should not be isolated to any one particular unit of inquiry.*

Students will:

- Develop understanding of numbers and the number system and use their understanding to solve problems and recognize reasonable results.
- Develop understanding of and fluency in basic computation and procedural skills.
- Use mathematical reasoning to solve problems.
- Communicate their mathematical thinking by using words, numbers, symbols, graphs and charts.
- Use equations and variables to express generalizations of patterns and relationships.
- Develop logical thinking to analyze evidence and build arguments to support or refute a hypothesis.
- Make connections among mathematical ideas and between other disciplines.
- Develop and use strategies, skills, and concepts to solve problems.
- Use appropriate tools, including technology, as vehicles to learn mathematical concepts.

***These are essential learnings that represent bigger ideas/concepts:***

- Students build their spatial sense through geometric experiences.
- Students describe attributes of triangles and rectangles and use the attributes to determine what makes shapes alike and different.
- Students combine compatible polygons to create tessellations.

***These are essential questions that learners ask themselves in order to achieve the essential learnings:***

- How do I describe solid figures according to their attributes?
- How do I recognize right angles in geometric figures and angles that are greater or less than right angles?
- How do I determine if sides of polygons are parallel or perpendicular?
- How do I describe, classify and identify polygons by their attributes?
- What are tessellations, and how do I combine plane figures in patterns to form them?
- What are the ways in which I can classify and name triangles?
- How do I describe and sort quadrilaterals by their attributes?
- *\* How do I know when figures are congruent?*
- *\* How do I explain and show lines of symmetry in a figure?*

***\* Presented in previous grade(s)***

***Resources:*** Van de Walle: Chapter 20 (pp. 363-367 and p. 374)

# UNIT 7: GEOMETRY

## MODULE 4: 18 days of Instruction

### Key Mathematical Concepts:

- Describe characteristics of geometric figures using geometric attributes.
- Recognize, understand and use properties and relationships to classify and describe polygons (including pentagons, hexagons, and octagons).
- Recognize, understand and use properties and relationships of triangles; e.g., two equal sides for isosceles triangles, three equal sides for equilateral triangles, right angle for right triangles to solve problems.
- Recognize, understand and use properties and relationships of quadrilaterals (e.g., parallel sides for parallelograms, right angles for rectangles, equal sides and right angles for squares) to solve problems.
- Recognize, understand and use attributes of right angles in geometric figures/ objects to determine whether other angles are greater/less than a right angle to solve problems.

<p><b>Chapter 21: <u>Solid and Plane Figures</u></b></p> <p>Lesson 1: Solid Figures            Lesson 2: Combine Solid Figures            Lesson 3: Line Segments and Angles            Lesson 4: Types of Lines            Lesson 5: Hands On: Circles            Lesson 6: Problem Solving Strategy:  <i>Break Problems Into Simpler Parts</i></p>	<p><b>Chapter 22: <u>Polygons</u></b></p> <p>Lesson 1: Polygons            Lesson 2: Congruence and Symmetry            Lesson 3: Combine Plane Figures            Lesson 4: Problem Solving Strategy:  <i>Find a Pattern</i></p>
<p><b>Chapter 23: <u>Triangles and Quadrilaterals</u></b></p> <p>Lesson 1: Triangles            Lesson 2: Sort Triangles            Lesson 3: Quadrilaterals            Lesson 4: Sort Quadrilaterals            Lesson 5: Problem Solving Strategy:  <i>Identify Relationships</i></p>	

<b>Day 1</b> <b>CHAPTER 21:</b> <b>Solid and Plane</b> <b>Figures</b>  <b>Lesson 21.1</b> Solid Figures	<b>Day 2</b>  <b>Lesson 21.2</b> Combine Solid Figures	<b>Day 3</b>  <b>Lesson 21.3</b> Line Segments and Angles	<b>Day 4</b>  <b>Lesson 21.4</b> Types of Lines	<b>Day 5</b>  <b>Lesson 21.5</b> Hands On: Circles
<b>Day 6</b>  <b>Lesson 21.6</b> Problem Solving Strategy: Break Problems into Simpler Parts	<b>Day 7</b> <b>CHAPTER 22:</b> <b>Polygons</b>  <b>Lesson 22.1</b> Polygons	<b>Day 8</b>  <b>Lesson 22.2</b> Congruence and Symmetry	<b>Day 9</b>  <b>Lesson 22.2</b> <b>(Day 2)</b> Congruence and Symmetry	<b>Day 10</b>  <b>Lesson 22.3</b> Combine Plane Figures
<b>Day 11</b>  <b>Lesson 22.4:</b> Problem Solving Strategy: Find a Pattern	<b>Day 12:</b> <b>CHAPTER 23:</b> <b>Triangles and</b> <b>Quadrilaterals</b>  <b>Lesson 23.1</b> Triangles	<b>Day 13</b>  <b>Lesson 23.2</b> Sort Triangles	<b>Day 14</b>  <b>Lesson 23.2</b> <b>(Day 2)</b> Sort Triangles	<b>Day 15</b>  <b>Lesson 23.3</b> Quadrilaterals
<b>Day 16</b>  <b>Lesson 23.4</b> Sort Quadrilaterals	<b>Day 17</b>  <b>Lesson 23.4</b> <b>(Day 2)</b> Sort Quadrilaterals	<b>Day 18</b>  <b>Lesson 23.5</b> Problem Solving: Identify Relationships	<b>Day 19</b>  California Connection	<b>Day 20</b>  Assessment



## Unit 7: GEOMETRY

### MODULE 4 NOTES

- Lessons with an overview with an “ \* ” can be optional if additional instructional time is needed for particular unit concepts/topics.

Several of the “lessons” provide important experiences with problem-solving strategies and can be built into other lessons if they are skipped.

- Students may need additional experiences working with large numbers and the operations. This on-going focus can be built into Routines. There are many suggestions for Routines included in this Module. It is not necessary to use all of them. It is important to include the Routines that focus on time and money since these chapters are not included in the year plan.
- It may be possible to teach the lessons designed for 2 days in 1 day.
- The focused “Problem Solving” lessons often provide a strong foundation for the concepts of the chapter and can be taught as the first in the chapter’s sequence.
- This module does not have lesson plans for:
  - Day 19: California Connection
  - Day 20: Assessment

DAY: 1  
 Unit 7: Geometry  
 Chapter 21: SOLID AND PLANE FIGURES  
 LESSON 21.1, Pp. 362-365

<b>MATERIALS:</b>	<ul style="list-style-type: none"> <li>• Demonstration set of geometric solids;</li> <li>• 1 set of paper geometric models for each group of 4-5 (included with module – see pages 15-19);</li> <li>• Tape and scissors for each group;</li> <li>• <b>Routines:</b> <i>Performance Assessment 3.7A</i>, 1 copy for each student.</li> </ul>
<b>LESSON FOCUS:</b>	<b>Solid Figures</b>
<b>CALIFORNIA STANDARDS:</b>	<p><b>Measurement and Geometry:</b></p> <p><b>2.0:</b> Students describe and compare attributes of plane and solid geometric figures and use this understanding to show relationships and solve problems.</p> <p><b>2.5:</b> Identify, describe, and classify common three-dimensional geometric objects.</p> <p><b>Mathematical Reasoning: 1.0, 1.1, 2.0, 2.3, 2.4, 3.0, 3.3</b></p>
<b>PURPOSE OF LESSON:</b>	<ul style="list-style-type: none"> <li>• To recognize and describe properties of solid figures and names the different faces that are a part of the figures;</li> <li>• Understand that solid figures may have all or some of these parts: faces, edges, and vertices.</li> <li>• Understand how to describe a solid figure using the names of plane figures such as: squares, rectangles and triangles.</li> </ul>
<p><b>LAUNCH:</b>                  Introduce students to concepts.</p> <p>Paper copies of geometric figures; tape and scissors</p>	<ul style="list-style-type: none"> <li>• Show the different solids. <b>Ask students</b> which of the shapes on paper do they think match the actual figures? Students explain thinking and reasoning.</li> <li>• Students work in groups to make models of the 5 geometric solids.</li> <li>• Describe and name each. Discuss.</li> </ul> <p><b>Learn, P. 362:</b> Figure It Out. <b>Teach, P. 362,</b> Guided Instruction questions to guide discussion.</p> <ul style="list-style-type: none"> <li>• Name familiar objects that are similar to the 6 solid figures: cube, rectangular prism, sphere, square pyramid, cylinder and cone.</li> </ul> <p><b>Incorporate: P. 363: Reasoning</b> into discussion.</p>

<p><b>EXPLORE:</b> Work with the concept. Focus on students “doing mathematics.”</p>	<p><b>Activity, P. 363:</b> Students work in groups to find the number of faces, edges, and vertices for each solid.</p> <ul style="list-style-type: none"> <li>• Record and discuss each entry in class chart.</li> <li>• Emphasize terms and connect to models of solids.</li> </ul> <p><b>Practice &amp; Problem Solving, P. 364 # 13 – 16.</b> Discuss.</p> <ul style="list-style-type: none"> <li>• Make the chart with class: Label attributes across top of chart (number of faces, edges, faces).</li> <li>• Introduce and discuss terms; e.g., face, vertex, edge. Students investigate shapes and complete the chart.</li> </ul> <p><b>Check, P. 363</b> with students. Note: discuss Math Idea,</p>
<p><b>PRACTICE:</b> Focus on Communication and Representation.</p>	<p><b>Practice &amp; Problem Solving, P. 364 - 365 #17- 21.</b></p> <ul style="list-style-type: none"> <li>• Confer as students work with partners/individually.</li> <li>• Discuss and share solutions.</li> </ul> <p><b>Note:</b> Save paper shapes for Lesson 21.2.</p>
<p><b>SUMMARIZE:</b> Connect purpose to activities.</p>	<p><b>ASSESS, TE P. 365: DISCUSS</b> <b>ASSESS, TE P. 365: WRITE:</b> Have students sketch figures.</p>
<p><b>HOMEWORK:</b></p>	<p><b>Mixed Review, P. 365</b></p>

**ROUTINES:**

**Performance Assessment 3.7A, *Art Class, Performance Assessment* booklet, Pp. PA55-57, PA59-61 (model student papers)**

Read problem with students. Make copies of page if students do not have booklets. Answer any questions.

Be encouraging... motivate, guide...

Be clear... Reword any words or phrases, insert others as needed...

Be supportive... Assist students who need help.

Be fair... Allow students adequate time to do their best work.

Be flexible... All students will not do the task in the same order or way.

Involve students in the evaluating process.

Suggested answers are on P. PA59. Rubrics (3-point) are provided on P. PA56 Papers will be reviewed during the next day’s routine.

DAY: 2  
 Unit 7: Geometry  
 Chapter 21: SOLID AND PLANE FIGURES  
 LESSON 21.2, Pp. 366-367

<b>MATERIALS:</b>	<ul style="list-style-type: none"> <li>• Demonstration set of geometric solids;</li> <li>• Student made paper geometric solids from Lesson 21.1;</li> <li>• *Routines: Transparencies of samples of student work for Performance Assessment 3.7A.</li> <li>• Grid paper</li> </ul>
<b>LESSON FOCUS:</b>	<b>Combine Solid Figures</b>
<b>CALIFORNIA STANDARDS:</b>	<p><b>Measurement and Geometry: 2.0</b>  <b>2.5:</b> Identify, describe, and classify common three-dimensional geometric objects.  <b>2.6:</b> Identify common and solid objects that are the components needed to make a more complex solid object.  <b>Mathematical Reasoning: 2.0, 2.4, 3.0, 3.3</b></p>
<b>PURPOSE OF LESSON:</b>	Understand that some objects are made by combining two or more solid figures.
<p><b>LAUNCH:</b>                  Introduce students to concepts.</p> <p>Student made paper shapes.</p>	<p><b>Quick Review, P. 366</b>  <b>Problem of the Day, TE P. 366A</b></p> <p><b>Learn, P. 366: Put it All Together:</b></p> <ul style="list-style-type: none"> <li>• Sketch the “house” on board/overhead.</li> <li>• Ask students to identify and describe the solid geometric figures they see in the picture</li> </ul> <p><b>Teach, TE P. 366,</b> Guided Instruction questions to guide discussion.</p>
<b>EXPLORE:</b> Work with the concept. Focus on students “doing mathematics.”	<p><b>Alternative Teaching Strategy, TE P. 366B</b></p> <p><b>Check, Pp. 366-367:</b>Do with students. Discuss.</p>
<b>PRACTICE:</b> Focus on Communication and Representation.	<p><b>Practice &amp; Problem Solving, P. 367 #5 – 7</b></p> <ul style="list-style-type: none"> <li>• Whole group discussion. Then, #8 – 14 students work in pairs.</li> <li>• Students name and sketch the missing figure.</li> <li>• Share and discuss. Then #15 together.</li> <li>• Cut paper cube models in half various ways to show the resulting solid figures.</li> <li>• Share and discuss.</li> </ul>

<b>SUMMARIZE:</b> Connect purpose to activities.	<b>ASSESS, TE P. 367: DISCUSS:</b> <i>“Which solid figures could you use.....”</i>
<b>HOMEWORK:</b>	<b>Mixed Review and Test Prep.P. 367</b> <ul style="list-style-type: none"> <li>• Sketch and label the geometric figures: cube, rectangular prism, sphere, cylinder, square pyramid and cone.</li> <li>• See P. 362 for assistance.</li> </ul>

**ROUTINES:**

**Review of Performance Assessment 3.7** *Art Class in Performance Assessment* booklet, Pp. PA55-61.

Involve students in the evaluation of the Performance Assessment, *Art Class* given on the previous day.

Remind students that papers are scored using rubrics.

Share sample rubrics on Pp. PA56.

Ask why students think the 3 is scored the highest.

List the best points. Ask if anything important has been left out. Continue with similar questions.

Share the other two rubrics, one at a time, asking similar questions.

Ask how each could be improved.

Return pages to students. Ask for ways they might improve their work.

Help them edit and/or rewrite, if desired.

DAY: 3  
 Unit 7: Geometry  
 Chapter 21: SOLID AND PLANE FIGURES  
 LESSON 21.3, Pp. 368-371

<b>MATERIALS:</b>	Ruler – 1 per student; <b>Alternative Teaching Strategy, Pg. 370</b> Small amount of clay (or mini-marshmallows or jellied candies) and toothpicks, straws or pipe cleaners for each student; *Routine and lesson: small clock faces
<b>LESSON FOCUS:</b>	<b>Line Segments and Angles</b>
<b>CALIFORNIA STANDARDS:</b>	<b>Measurement and Geometry:</b> 2.2 Students describe and compare attributes of plane and solid geometric figures and use this understanding to show relationships and solve problems. 2.4 Identify right angles in geometric figures or in appropriate objects and determine whether other angles are greater or less than a right angle. <b>Mathematical Reasoning: 1.1, 2.0, 2.3, 2.4, 3.0, 3.3</b>
<b>PURPOSE OF LESSON:</b>	Understand how to classify angles as greater than or less than a right angle. Understand the attributes of lines, line segments, and rays.
<b>LAUNCH:</b> Introduce students to concepts.  Rulers	HW: Students share sketches of 6 figures. Discuss which ones were easy to sketch and which ones were not.  <ul style="list-style-type: none"> <li>• Students use rulers to draw a <b>straight</b> line on their paper. Remind them to put arrowheads at each end of their lines to indicate that it goes on without end.</li> <li>• Ask students to make another straight line, placing points at each end of the segment (endpoints).</li> </ul> <b>Discuss</b> Emphasize that the endpoints indicate that we are looking at only a <u>part</u> of a line. That part is called a <u>line segment</u> .  <ul style="list-style-type: none"> <li>• Draw another line from one endpoint of your segment, forming an angle. Place an arrow on the end of that line, indicating a <b>ray</b>. Discuss.</li> </ul> <b>Learn, P. 368</b> Point to Point: read and discuss. See <b>Teach, P. 368</b> , Guided Instruction questions to guide discussion. Have students draw Victor’s square. Discuss questions and Reasoning at bottom P. SE368. <ul style="list-style-type: none"> <li>• Continue with <b>Identifying Angles, top P. SE369</b>See bullets, top margin, P. TE369</li> </ul>

<p><b>EXPLORE:</b> Work with the concept. Focus on students "doing mathematics."</p>	<p><b>Alternative Teaching Strategy, TE P. 370</b> OR <b>Alternative Teaching Strategy, P. 368B</b></p> <ul style="list-style-type: none"> <li>• Students look for examples of "right angles" in the classroom. Make a list of examples of right angles. Find objects that show an angle of less than 90° and greater than 90°. Add these to the list.</li> <li>• <b>Practice &amp; Problem Solving, P. 370 #6-15:</b> Do with students. Discuss solutions and explain reasoning for answers.</li> </ul>
<p><b>PRACTICE:</b> Focus on Communication and Representation.  Small clocks</p>	<p><b>Practice &amp; Problem Solving, Pp. 370 -371 #16 -22</b> Discuss solutions and explain reasoning for answers.</p> <p><b>Thinker's Corner, Pg. 371</b> Discuss clocks with students. Find times on clock where the hands are: 90°, less than 90° and greater than 90°. (this would make a great routine for review)</p>
<p><b>SUMMARIZE:</b> Connect purpose to activities.</p>	<p><b>Practice &amp; Problem Solving, Pp. 370 - 371 #23 &amp; 24</b> Discuss.</p>
<p><b>HOMEWORK:</b></p>	<p><b>Practice &amp; Problem Solving, P. 371 #25</b> <b>Mixed Review, P. 371 #34-35</b></p>

**ROUTINES:**

**Elapsed Time**

Materials: Demonstration clock face; clock face for each student.

Note: Students show same times as teacher, using their own clocks throughout the routine. Record time on board/overhead as: 2:15 A.M. or 2:15 P.M.

Use demonstration clock to show time, e.g., 2:00. Students do with you. Move minute hand at 15-minute intervals. Ask for the time and how much time has passed as you make each new interval. Continue.

Begin at 2:15. Move the minute hand to 2:45. Ask how much time has passed. Move from 2:45 to 3:15. Ask how much time has passed. Continue with similar times but different hours.

Begin at 2:00 and move hands to show 3:30. Ask how much time has passed. Continue with examples like 2:15 to 3:45, etc. Use times at 5-minute intervals as students progress.

Students work in pairs to show and tell time and elapsed time.

DAY: 4  
 Unit 7: Geometry  
 Module 4: Chapter 21: SOLID AND PLANE FIGURES  
 LESSON 21.4, Pp. 372-373

<b>MATERIALS:</b>	<ul style="list-style-type: none"> <li>• Ruler for each student;</li> <li>• 12" pieces of yarn/strips of paper – 2 per student;</li> <li>• <b>*Routine:</b> demonstration clock face ;</li> <li>• HW: Challenge 21.4;</li> </ul>
<b>LESSON FOCUS:</b>	<b>Types of Lines</b>
<b>CALIFORNIA STANDARDS:</b>	<p><b>Measurement and Geometry:</b></p> <p><b>2.0</b> Students describe and compare attributes of plane and solid geometric figures and use this understanding to show relationships and solve problems.</p> <p><b>2.4</b> Identify right angles in geometric figures or in appropriate objects and determine whether other angles are greater or less than a right angle.</p> <p><b>Mathematical Reasoning: 1.1, 2.0, 2.3, 2.4, 3.0, 3.3</b></p>
<b>PURPOSE OF LESSON:</b>	<ul style="list-style-type: none"> <li>• Understand that intersecting lines cross at a point and form angles and that parallel lines never cross and do not form any angles, because they are the same distance apart at every point.</li> <li>• Recognize that two intersecting lines form <b>four</b> angles and that the opposite angles are equal.</li> <li>• Understand that opposite sides of parallelograms are equal and parallel.</li> </ul>
<p><b>LAUNCH:</b>                  Introduce students to concepts.</p> <p>Rulers or pieces of yarn/strips of paper.</p>	<p>Ask students to draw a line segment, then another segment that crosses it. Ask students what they must do to show that they drew a <b>segment</b> rather than a line. (end points)</p> <p><b>Question:</b>  <i>What do we call the place where two streets cross each other?</i> Possible responses might include corner, stoplight, end of street... Guide students to the term <b>intersection</b> and discuss.</p>
<p><b>EXPLORE:</b>                  Work with the concept. Focus on students "doing mathematics."</p>	<ul style="list-style-type: none"> <li>• Ask students if they can draw two lines that do not cross. Share.</li> <li>• Ask students how/if they know their lines will never cross.</li> <li>• Discuss and define <u>parallel</u> lines. (parallel lines will never intersect because they are the same distance apart at each point.)</li> </ul> <p><b>Learn, P. 372</b> Get in Line: <b>Teach, P. 372</b>, Guided Instruction questions to guide discussion.</p>
<p><b>PRACTICE:</b>                  Focus on Communication and Representation</p>	<p><b>Practice &amp; Problem Solving, P. 373: #5-10</b> Solve and discuss with students, whole group.</p> <p><b>Practice &amp; Problem Solving, P. 373: # 11-14:</b> Confer with students as they work with partners/individually. Discuss and share solutions.</p>

<b>SUMMARIZE:</b> Connect purpose to activities.	<b>Practice &amp; Problem Solving, P. 373: #: 15</b> Review with students. <b>ASSESS, TE P. 373: WRITE</b>
<b>HOMEWORK:</b>	<b>Challenge 21.4</b>

**ROUTINES:****A.M., P.M., Elapsed Time**

Materials: Demonstration clock face.

Show 7:00 on the clock. Ask what time it shows, and if it is in the morning or evening.

Discuss the need for A.M. and P.M. when giving times. Students give examples of what they do at 7:00 a.m. and what they do at 7:00 p.m.

Show 7:00 again. Say, *"If this is morning, it is 7:00 a.m. If it is evening it is 7:00 p.m."* Continue with other times. Explain that the hours between midnight and noon are A.M. hours. The hours between noon and midnight are P.M. hours.

Write midnight to noon: A.M.

Noon to midnight: P.M.

Show and say 11:00 a.m. Students tell time.

Change hands to show 12:00 (noon). Ask how much time has passed. Show and say 11:00 a.m., and then 1:00 p.m. Ask how much time has passed. If students are having trouble with this type of problem, have three students come up with clockfaces and face the class. First student shows 11:00; next shows 12:00; third shows 1:00. Class counts the intervals between 11:00 and 1:00 (2 hours). Continue with similar examples, including half hours; 15- and 5-minute intervals.

