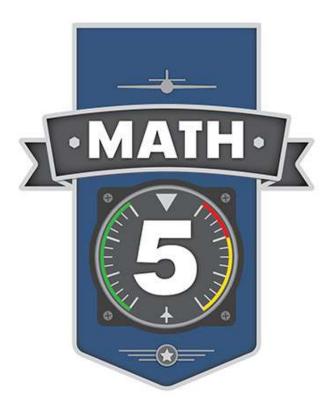
Teacher Edition



Fourth Edition



Part

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Lesson Features

Objectives point out the skills taught in the lesson.

The Lesson Focus prepares the students for what they will learn in the lesson.

A variety of activities allows the students to practice analytical thinking and see math at work in real-life contexts.

The Materials section lists items that are used in the lesson.

Lesson (148) Worktext pages 272, 265

- Objectives

 Edensify the problem that needs to be solved

 Edensify the terms providents and providents device

 Design a LEGO providents

 Use provided materials to build a printhesis

 Test the providents

Teacher Resources
- 14 Engineering Design Process

Other Teaching Aids

- Other Teaching Adds

 For each group

 Several LEGO bricks (L×2, 2×2, 2×4)

 Divinking strave

 Masking tape

 Paper Gibt

 Rubber bunds

String Video of a child with a 3-D printed prosthesis (opti-

Teach for Understanding and Check for Understanding provide background information and questions to effectively engage the students in learning the math concepts for each lesson. Lessons incorporate manipulatives to promote a problem-solving approach that develops critical-thinking skills.

sch for Understanding

Lesson Focus

In this lesson you will use provided materials to design and build a prosthetic index linger.

Identify the problem that needs to be solved; define the terms prosthesis and prosthetic device Display the Engineering Design Process page. Review the process as needed.

Ask

Read Worktext page 272 aloud. Discuss the need for attificial limbs or fingers for those who were born without them or who have had them amputated; Consider showing a video of a child with a 3-D printed proathesis.

printed preathers.
Suppose you have a friend-who has lost the first two segments of his index finger. How could you help hint? I could design secrething to take the place of his missing finger segments.

Write "prosthesis" and "prosthetic device" for display. Explain that

display. Explain that when a person is amoing a body part or has a body part that does not properly function (such as a hand, leg, heart valve, or even a tooth), it can sometimes be replaced with as a stillicial part, which may be called a prouthests or prosthetic device.





Allow students to share examples of prostheses that they are personally

armitar with.

Kly might a prooffness be beligful! It can allow a person who is missing, part of his body to do things he could otherwise not do.

Natal are some golecuital disadvantages of a possiblewid it might not allow a seriou to do all the things he could do if he thad a healthy, hving body part or ode them as well; it might be ancomfortable; it might be expensive; it might east out all one of the part of

Point out that the most effective prostheses function as much like the human body as possible.

- body as possible.

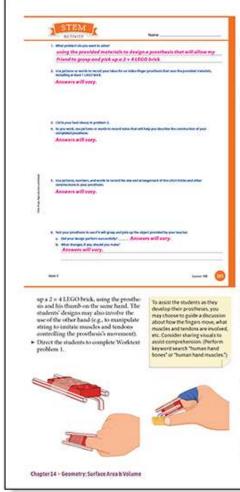
 Remind the students that modeling with math is using numbers and symbols to capitain, describe, or expresent something in the world. Invite them to way, and way that much modeling may be used in constructing a providencia. And a state of the providency of the pro
- Explain that for this chapter's STEM activity, the students will model the pro-cess of building a functional prosthesis from provided materials, including at least 1 LEGO beick. The prosthesis should allow its weaver to grasp and pick



Involving the students in interactive learning through discussion encourages them to construct reasonable proof for their solutions.

Discussion of real-life math problems helps students relate math to biblical worldview truths.

Reduced Worktext and Activities pages provide answers in magenta. Use these pages to evaluate student progress and to determine where more guidance is needed.





Design a LEGO prosthesis

- Design a LEOO prosthesis
 Imagine

 Arrange the attackents in groups, Distribute the listed
 supplies to each group. Encourage the students to
 begin thinking of bow they could use the supplies
 to model a part of a finger.

 Direct the groups to discuss their ideas for a prosthetic device to replace the first two segments of
 their friend's index finger, Remind firm that the
 prosthesis should allow their friend to grasp and
 pick up a 2 × 4 EIGO brick with his thumb and
 the proofficies.

 Bend vue index finger inneard to touch your palm to

the proofhesis. Bendy your index finger inward to touch your pulm to show the students where their proofhesis will attach to the index finger (head of the proximal phalana). What questions do you ments out? Houseld a surver. How long should my proofhesis the How will it attach as my friend's hand? How will it work with his thomb to pick up a 12/GO besid?

➤ Instruct the students to record their ideas for an index finger prosthesis in problem 2 on the Work-fext page.

After the students have recorded their ideas, direct each group to circle their best idea(s) to complete problem 3 on the Worktext page.

Use provided materials to build a prosthesis; test the prosthesis

Create improve

Allow time for the groups to construct a working prosthesis, using their best idea. Emphasize that they may choose to modify their design as they work to improve it.

As they work, direct the students to record in problem 4 any notes that will help them describe the construction of their prosthesis, using pictures or words. or words.

- or words.

 When their prostliesis is complete, instruct each group to eccord in problem 5 the size and arrangement of the LEGO bricks and other constructions in their prosthesis, using potters, numbers, and weeds.

 Direct each group to test their prosthesis to see if it will graup and pick up a 2 × 4 LEGO brick. If time permits, allow groups to demonstrate the operation of their prostheses for the class.
- Direct the groups to complete problem 6 on the Workinst page.
 Cellect the proofbeses to use in Lesson 149.





Group work promotes collaborative learning. Students learn by working together as a class and sometimes by working in smaller groups.

Review Features

Daily Review

Practice and Review Activities

Practice and Review activities are included in every lesson (Teacher Edition) so that the students are continually practicing the essential skills from this grade level and furthering their understanding. These activities may be scheduled for any time during the day.

Daily Reviews

A section of Daily Review exercises is included for each chapter (TeacherToolsOnline.com). These exercises review a concept taught or practiced in an earlier chapter or in fourth grade.

Activities

The Activities workbook provides two pages of optional practice for most lessons. The first page reinforces the Worktext lesson and may be used to assess daily grades. The second page provides a spiral review of concepts as well as standards-based strategies and skills.

Review by Chapter

Chapter Sequence

The chapter sequence helps the students develop a deeper conceptual knowledge of the core topics presented at this grade level. Chapters in fractions and division, for example, are spaced out to allow connections to be made and to enable the students to review and build upon previously taught concepts as they develop new math skills.

Chapter Review

The Chapter Review provides an overview of the main concepts of the chapter. Chapter Review pages can be used as a study guide for the Chapter Test.

Cumulative Review

The Cumulative Review pages are located at the end of each chapter in the Activities book. Use these pages to review math concepts and evaluate which essential skills need reteaching. A Cumulative Review Answer Sheet (Teacher Resources) is available for your students to practice the standardized test format.

Fact Reviews

Fact Reviews (TeacherToolsOnline.com) are provided to help your students work toward fact memorization. Daily fact practice should include a variety of practice methods, such as using flashcards, games, and written practice. Speed drills are available at AfterSchoolHelp.com.

Review in the Classroom

If available, computer-based apps and games may be used for review. Visit TeacherToolsOnline.com for additional review ideas.

New to This Edition

STEM

Most even-numbered chapters feature special lessons that emphasize science, technology, engineering, and math (STEM). Each STEM lesson is intended to pique students' interest as they collaborate to solve a problem through inquiry, active learning, and creativity.

Biblical Worldview Shaping

Biblical worldview themes are specifically highlighted in certain Worktext questions and lesson objectives (indicated by WS).
These sections will help students learn to apply a biblical worldview of mathematics to real-life problems.

Chapter Information

This section at the beginning of each chapter indicates the type of foundational knowledge the chapter builds upon and provides helpful information pertaining to the chapter.

Lesson Focus

For every lesson, this book offers a Lesson Focus, which is to be conveyed to your students before the lesson begins. Students should discuss what they have learned before they begin their practice on the Worktext pages.

Problem-Solving Emphasis
Processing word problems successfully will help your students become lifelong problem solvers. Ask the students to listen for what action is taking place and whom the problem is about as you read each word problem the first time. As you reread the word problem one sentence at a time, encourage your students to picture the problem, write an equation, solve the problem, and then explain how their answer makes sense. Finally, help the students craft a summary sentence to explain the solution.

Reasoning and Critical Thinking

The lessons establish a pattern of asking students to explain their answers or reasoning. It is expected that students will give their reasoning for all answers where appropriate. A gear icon (%) identifies higher-order thinking questions. Supply any prompts or background needed to guide the student to the answer.

Collaborative Learning

Students sometimes work in pairs or groups, allowing collaboration and interaction among peers. For optimal learning for all students, each group should include students with varying strengths and abilities.