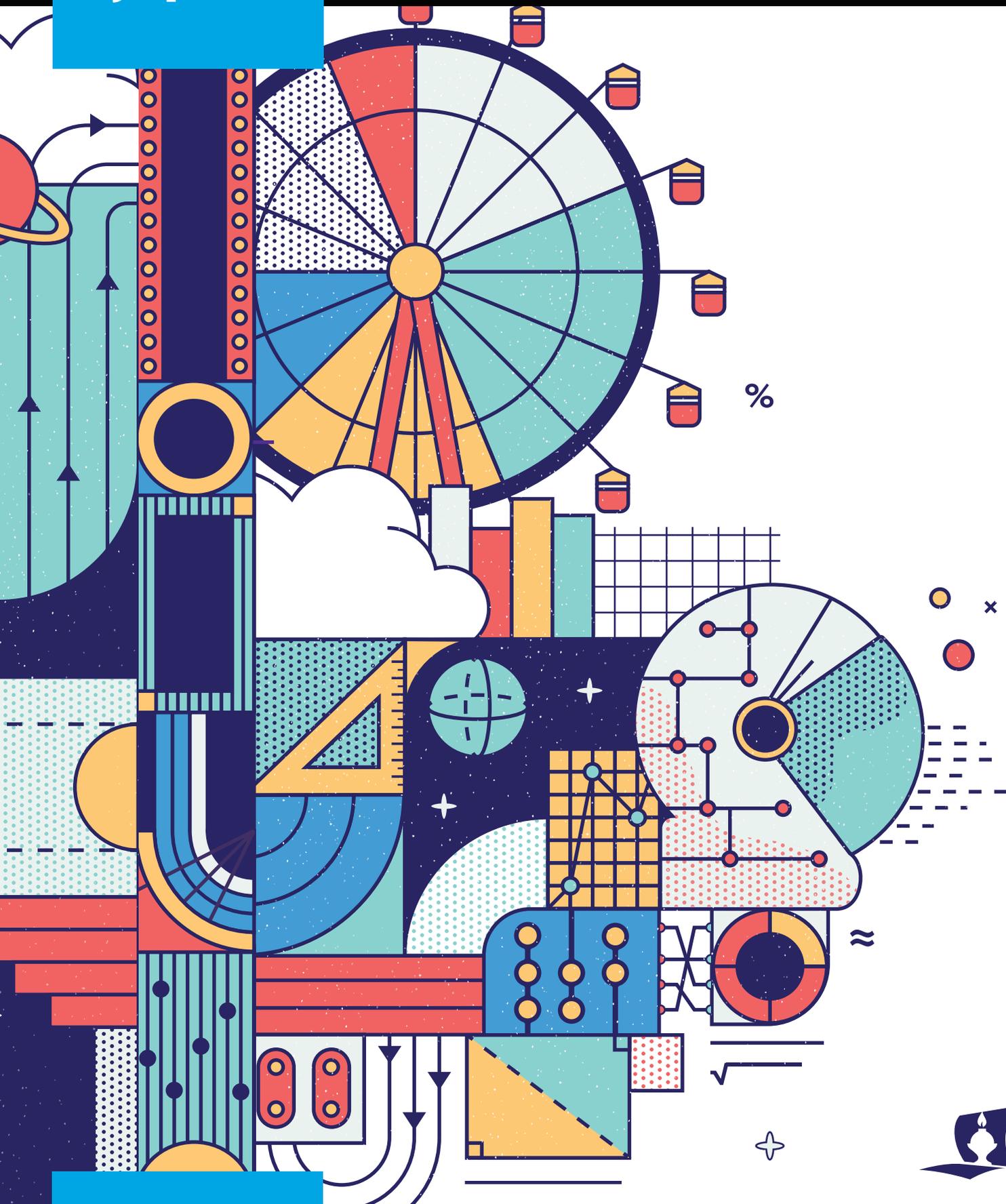


Math



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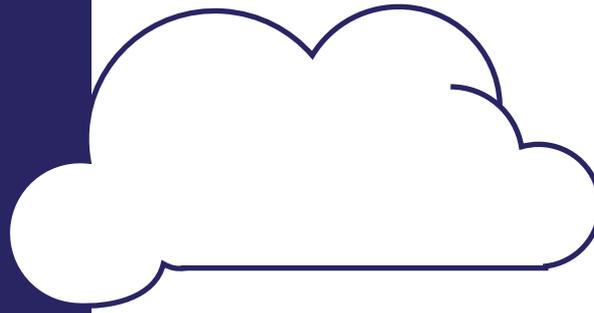
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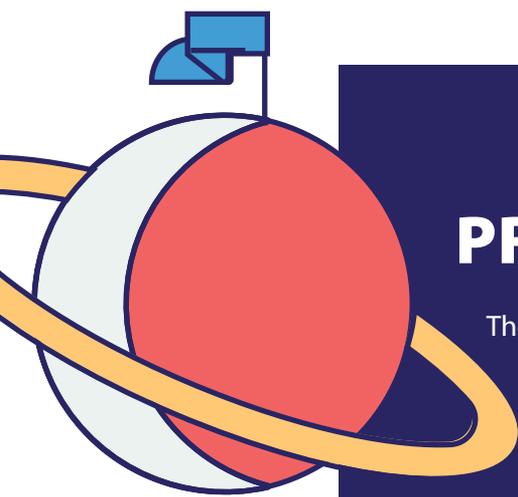


OUR VISION

To equip students with advanced mathematical skills and strategies for analyzing and solving real-world problems through the application of abstract reasoning within the context of a biblical worldview.

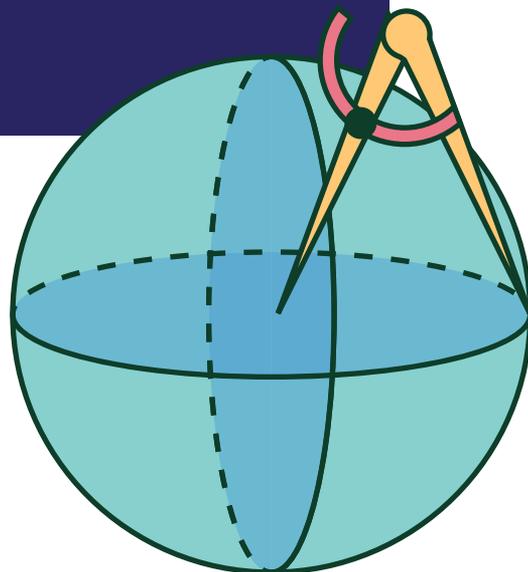
GOALS

- To ensure mastery of foundational mathematical concepts including number systems, operations, algebra, functions, geometry, probability, and statistics
- To support procedural fluency for college and career readiness through consistent, strategic practice and review
- To develop analytical thinking, reasoning skills, and perseverance in real-world problem solving through the creation and use of models
- To encourage the use of technology to enhance learning, to incorporate multiple representations of concepts, and to remove computational constraints
- To equip students to formulate a biblical view of mathematics



PROGRAM APPROACH

The BJU Press middle and high school math program enables students to use mathematics to better fulfill the dominion mandate. The math courses examine many mathematical concepts to ensure mastery, foster readiness, and encourage careful thinking. The program also incorporates various technology tools to enhance student learning and empower students to take their computational skills to the next level. All mathematical concepts are examined through the lens of a biblical worldview to lead students to formulate their own positions based on the truth of God's Word. In short, the program serves to equip students with advanced mathematical skills to solve real-world problems within the context of a biblical worldview.

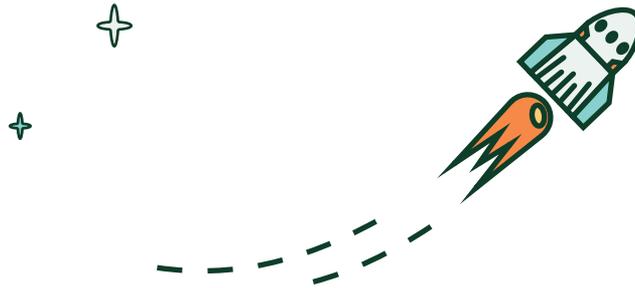
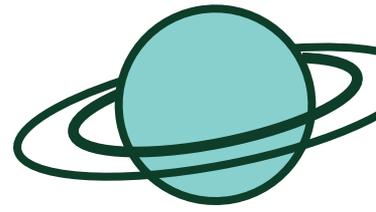




How We Ensure Conceptual Mastery

The BJU Press middle and high school math courses ensure conceptual mastery using a variety of teaching techniques. Teachers use essential questions to flesh out the significant concepts in each lesson. They will also help students recognize and correct ineffective solutions to problems. Modeling helps students progress from simply viewing numerical equations on a page to recognizing and understanding mathematical problems in everyday life. Teachers also facilitate abstract reasoning and foster collaborative learning and classroom discussion. Students are encouraged to assert their own positions and examine the reasons behind those positions. Each course includes exercises that use a spiral review to develop understanding of the newest concept and to review previous concepts. Our Pre-Algebra course also provides QR codes that link students to additional instruction and practice.





How We Support Procedural Fluency

The middle and high school math courses also foster procedural fluency in students. Students are able to select and execute mathematical procedures relevant to individual problems. The courses use mathematical models to teach students the relationships between quantities and structure within the numerical system. By using modeling, students learn how to lay out mathematical equations, analyze them, and predict an outcome based on previous experience so they can come to a reasonable conclusion and contribute to solving real-world problems. Working through problems and equations in this way helps them to understand the procedures necessary for using mathematical practices effectively. The spiral review exercises not only contribute to conceptual mastery but also enhance fluency by helping students develop more understanding and refresh prior knowledge. The courses enable students to use abstract reasoning and analyze incorrect solutions to problems. Teaching material includes discussion prompts and reminders to direct students' attention to key ideas and step-by-step reasoning to ensure they understand concepts beyond simple rote memory.



How We Develop Real-World Problem Solving

The middle and high school math courses encourage real-world problem solving through STEM activities. These projects promote greater understanding and appreciation for the role math plays in science, engineering, and design. STEM projects use a variety of disciplines to nurture holistic problem solving and student collaboration. For example, *Fundamentals of Math* includes a project requiring students to create five common weather observation instruments. Students will use the constructed instruments to record weather observations for several consecutive days. Course teaching material provides suggested questions that encourage students to think about their processes, how they can improve their instruments, and how they might use their instruments best. Once each STEM project is complete, students will report their results to show what they've learned and what they can accomplish by using STEM processes. These STEM projects present multifaceted problems and guide students through crafting optimal solutions for the best results. Multiple courses also feature a "then and now" series that demonstrates how problems have previously been solved using mathematical skills. Students also engage in strategic questioning to focus on key concepts and apply those concepts to real-world problems.





How We Use Technology

The BJU Press middle and high school math courses introduce students to multiple technological resources to make resolving math problems simpler and more accessible. Students are taught to handle advanced calculators, and they also have access to After School Help with additional math problems and videos explaining challenging mathematical concepts.



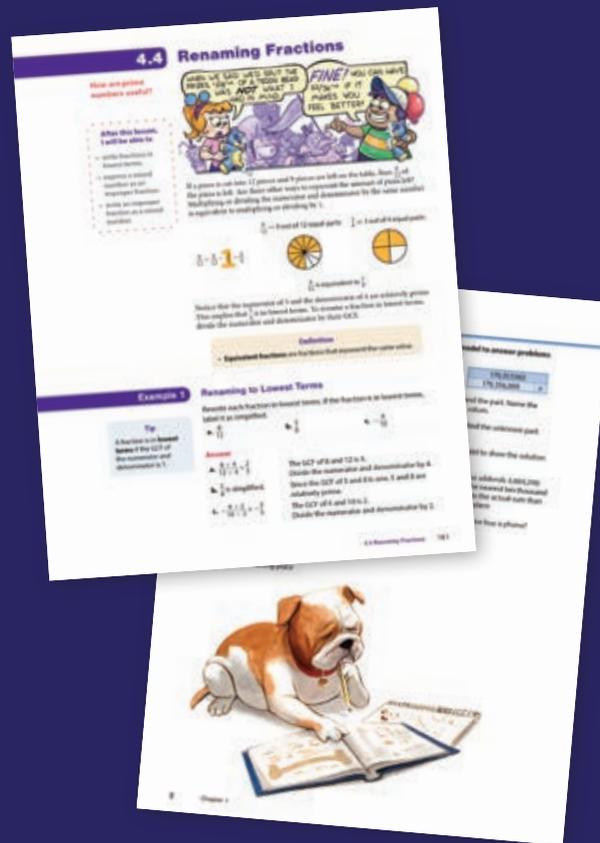
How We Nurture a Biblical Worldview

In a world of complicated and involved issues, students can learn to use mathematics to simplify or solve problems. Throughout BJU Press math courses, we direct students to determine the root issues of real-world problems according to a biblical worldview and solve them using mathematical processes. As students break down and define problems and make assumptions about the causes and contributions to those problems, they do so with an understanding of what the Bible says and expects. Ultimately, we encourage students to develop solutions that are appropriate and ethical. Additional features prompt worldview development as well. *Fundamentals of Math* uses engaging cartoons to discuss biblical worldview shaping objectives. *Pre-Algebra* also provides thorough explanations of why mathematical principles consistently work effectively. Students will verify that mathematical principles based on the timeless truths in God's Word provide effective solutions for problems in our world.

MATERIALS

Student Edition (eTextbook available)

Our math textbooks have clear presentations of concepts with practice exercises that promote student success and prepare students for standardized testing and college-level math courses.



Teacher Edition

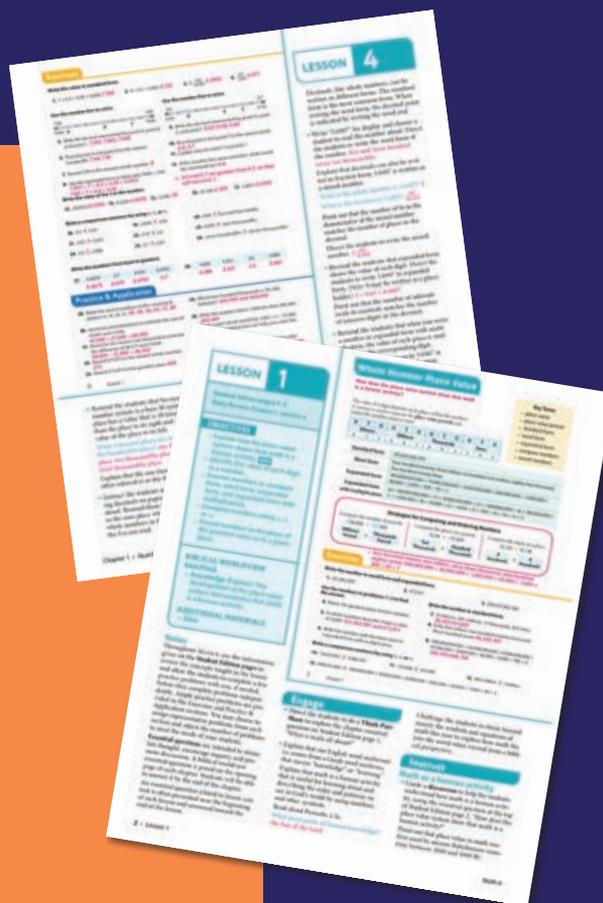
The teacher editions contain presentation suggestions, motivational ideas, and tips to address common student errors. The teacher editions also suggest easy adaptations for scheduling and assignments for minimum, standard, and extended tracks.

Student Activities (eActivities Available)

The activity manuals (available for Grades 7–9) provide resources for extra practice, remediation and enrichment activities, calculator skills, exercises, and chapter and cumulative reviews.

Assessments & Assessments Answer Keys

Assessments packets include section quizzes and one age-appropriate test per chapter. Alternative assessments are also provided via ExamView.



THE FEATURES *Page Examples*

LESSON 4

Student Edition pages 9–11
Daily Review Chapter 1, section d

OBJECTIVES

- Read and write decimals to the ten thousandths place.
- Express decimals in multiple forms.
- Compare decimals.
- Identify why decimals can be ordered. **RWS**
- Round decimals to the place of greatest value or to a given place.

BIBLICAL WORLDVIEW SHAPING

- **Knowledge** (Recall): Decimals can be ordered because God made an orderly world.

TEACHER RESOURCES

- 1 *Decimal Number Lines*

ADDITIONAL MATERIALS

- Bible

Teacher Resources are available in two formats: as printed pages in the back of this Teacher Edition and on TeacherToolsOnline.com.

Engage

- Direct the students to do a **Think-Pair-Share** to explore the essential question at the top of Student Edition page 9, “Why can I order numbers?” You may discuss the following ideas with the students:
Decimals help us to work with more exact measurements. We can tell whether 12 oz of our favorite drink is more than 10.25 oz. We can compare, order, and round decimals. But in this lesson we will explore the “why” behind some of these helpful skills.

Decimal Place Value

Why can I order numbers?

A decimal is a number that is to the right of the ones place. The decimal point separates the whole number from the decimal part. In a base ten system, the place value chart of the ones place to show decimal places. The value of each place decreases in value as you move to the right of the ones place.

Hundreds	Tens	Ones	Tenths	Hundredths	One Thousandths	Ten Thousandths
		4	.	3	5	8

Standard form	4.3586
Fraction form	$4 \frac{3,586}{10,000}$
Word form	four and three thousand, five hundred eighty-six ten thousandths
Expanded form	$4 + 0.3 + 0.05 + 0.008 + 0.0006$
Expanded form with multiplication	$(4 \times 1) + (3 \times 0.1) + (5 \times 0.01) + (8 \times 0.001) + (6 \times 0.0001)$

Zeros can be annexed to help you compare decimals when the number of decimal places varies. The 0s make an **equivalent decimal**, but the value of the

Decimals can be **rounded** to different places. Thinking of the location of a decimal on a

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

$\frac{0.3}{\text{least}}$ $\frac{3.01}{\text{least}}$ $\frac{3.15}{\text{least}}$ $\frac{3.5}{\text{greatest}}$

Lesson 4 9

Instruct

Reading & writing decimals

- **Model** decimals with a place-value frame to help students build number sense.
- Explain that the ones place is the center of our number system. The decimal point marks the ones place; it separates the whole numbers from the decimal fractions. Our number system has an infinite number of places on each side of the ones place.
Write “2.48” for display in a place-value frame; label the ones, tenths, and hundredths places. Remind the students that

the decimal point is read as *and*. Choose a student to read the number aloud. **two and forty-eight hundredths**

What number is 1 tenth more than 2.48? **2.58**

Invite a student to write each of the following numbers as it is discussed.

What number is 1 hundredth more than 2.58? **2.59**

What number is 1 hundredth more than 2.59? **2.60, or 2.6**

Review renaming if needed.

- Follow a similar procedure for several other numbers.

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

STEM

UV and Me

Why should I be concerned about solving health and safety problems?



Ask a question to identify the problem.

1. What problem do I want to solve? *how to protect my skin from too much UV exposure*
Imagine possible solutions.

Four STEM projects throughout the course emphasize science, technology, engineering, and math.

3. UPF 25 $\frac{3}{25} = 1 \div 25 = 0.04 = \frac{4}{100} = 4\%$
or $\frac{1}{25} \times \frac{4}{4} = \frac{4}{100} = 4\%$ of the rays
4. UPF 50 $\frac{4}{50} = 1 \div 50 = 0.02 = \frac{2}{100} = 2\%$
or $\frac{1}{50} \times \frac{2}{2} = \frac{2}{100} = 2\%$ of the rays
5. UPF 35 $\frac{2}{35} = 1 \div 35 = 0.028 \approx 0.03 = \frac{3}{100} = 3\%$ of the rays

Answer the question.

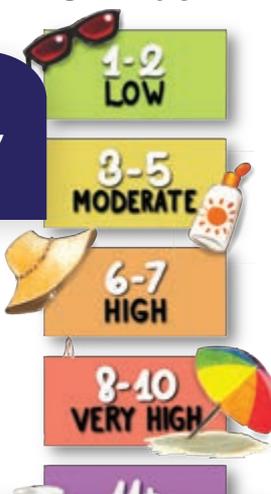
6. If an SPF 50 sunscreen blocks 98% of UVB rays, what percentage of those rays would it allow?
 $100\% - 98\% = 2\%$ of UVB rays
7. Which UPF rating of a UPF-rated garment would allow the same percentage of UV rays reach the skin as an SPF 50 sunscreen? *UPF 50 allows 2% of the rays. (See problem 4.)*
8. If an SPF sunscreen and a UPF-rated garment allow the same amount of UVB rays to reach the skin, do they provide the same protection? Why or why not?

Plan to solve the problem.

9. Predict: Name the pieces in order.
10. Record the results.
11. How accurate are your predictions?
Answers will vary.
12. Besides being made from a protective fabric, what else would make a shirt ideally UV protective?

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

UV Index



$$5. \frac{1}{35} = 1 \div 35 = 0.028 \approx 0.03 = \frac{3}{100} = 3\% \text{ of the rays}$$

Lessons 49–51 109

LESSON

49

Student Edition pages 91, 109–10

STEM

OBJECTIVES

- Define the problem of UV rays and exposure.
- Create a model for detecting UV rays using UV-sensitive beads.
- Calculate the amount of UV rays that reach skin based on UPF.

TEACHER RESOURCES

- 22 *UV Skin Damage*
- 23 *Electromagnetic Spectrum, UV Rays & SPF* (for each student)
- 24 *UV and Me Basics*, page 1 (for each student); page 2 (for each group)
- 25 *Engineering Design Process*

ADDITIONAL MATERIALS

- UV sunburn and skin damage video (optional)
- small resealable plastic bag with 5–10 UV-sensitive beads and a length of cord, string, or elastic thread (for each student)
- broad spectrum sunscreen SPF 30 or greater (optional)
- 2 T measure ($\frac{1}{8}$ c)

Ask

Reasons for concern

- Guide a **visual analysis** of the *UV Skin Damage* page to help students understand the damage to the skin from the sun.

Visit TeacherToolsOnline.com for resources that demonstrate the effect of UV rays on skin.

- Display the top of the *UV Skin Damage* page showing a photograph of two sides of the same face, one side photographed in natural light and the other using ultraviolet (UV) photography.

What do you think makes this person's skin look different on the UV photography side? *Accept any reasonable answers.*

Explain that one side was photographed in natural light and looks normal but that the other side was photographed with a special camera or lens which shows UV damage to skin that is not apparent in natural light.

- Display the bottom half of the *UV Skin Damage* page showing a wrinkled face.

How do you think his skin is so wrinkled? *Accept any reasonable answers.*

Point out that frequent direct exposure to UV rays from the sun can cause deep wrinkles in the skin.

- Show a video explaining how UV rays affect skin, if available.
- Read aloud the essential question at the top of Student Edition page 109, "Why should I be concerned about solving health and safety problems?" Allow students to share their answers. Explain

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

Instructional strategies provide the means for presenting educational content.

Lesson 49 • 109

Math 6

4.4 Renaming Fractions

How are prime numbers useful?

After this lesson, I will be able to

- write fractions in lowest terms.
- express a mixed number as an improper fraction.
- write an improper fraction as a mixed number.



If a pizza is cut into 12 pieces and 9 pieces are left on the table, then $\frac{9}{12}$ of the pizza is left. Are there other ways to represent the amount of pizza left? Multiply $\frac{9}{12}$ by $\frac{1}{3}$.

Start each section with a question about the key idea and a list of the skills you are expected to learn.

$$\frac{9}{12} = \frac{9}{12} + \frac{1}{3} = \frac{3}{4}$$



$\frac{9}{12}$ is equivalent to $\frac{3}{4}$.

Notice that the numerator of 3 and the denominator of 4 are relatively prime. This implies that $\frac{3}{4}$ is in lowest terms. To rename a fraction in lowest terms, divide the numerator and denominator by their GCF.

Definition

- **Equivalent fractions** are fractions that represent the same value.

Example 1

Renaming to Lowest Terms

Rewrite each fraction in lowest label it as simplified.

a. $\frac{8}{12}$

b. $\frac{5}{8}$

Answer

a. $\frac{8 \div 4}{12 \div 4} = \frac{2}{3}$

b. $\frac{5}{8}$ is simplified.

c. $\frac{-4 \div 2}{10 \div 2} = -\frac{2}{5}$

The GCF of 8 and 12 is 4.

Divide the numerator and denominator by 4.

Since the GCF of 5 and 8 is one, 5 and 8 are relatively prime.

The GCF of 4 and 10 is 2.

Divide the numerator and denominator by 2.

Tip

A fraction is in **lowest terms** if the GCF of the numerator and denominator is 1.

Locate definitions, key concepts, and step-by-step guidelines within highlighted colored boxes.

Study the step-by-step reasoning to solve example problems, and then check your understanding by completing the Skill Check exercises.

Example 3 Subtracting Decimals

Find the difference and check the solution by estimation. Annex zeros where necessary.

a. $32 - 16.485$

b. $7.481 - 0.69$

Answers

a. Actual	Check	b. Actual	Check
32.000	32	7.481	7.5
$\underline{-16.485}$	$\underline{-16}$	$\underline{-0.690}$	$\underline{-0.7}$
15.515	16	6.791	6.8

Notice on part *a* the values are rounded to the nearest whole number, while on part *b* they are rounded to the greatest place value of the smaller number. You may be asked to explain why you chose a particular rounding method for your estimation.

Skill Check B

Solve. Estimate to check the reasonableness of your answers.

- | | | |
|-----------------------|-----------------------|-----------------------------|
| 1. 11.53 | 2. 17.65 | 3. $26.4 - 8.3596$ |
| 17.56 | $\underline{- 8.701}$ | 4. $79.8462 - 8.9$ |
| 23.69 | | 5. $308.231 + 42.07 + 12.6$ |
| 12.6 | | 6. $\$65 - \8.97 |
| $\underline{+ 61.87}$ | | |

A. Exercises

Estimate each sum or difference by rounding each number to its highest place value.

2. $316 + 498 + 225$ 3. $1387 + 2635$ 4. $738 - 285$

5. $738 - 285$

- | | | | |
|---------------------|--------------------|---------------------|----------------------|
| 6. 728 | 7. 84 | 8. 947 | 9. 2107 |
| $\underline{+ 463}$ | $\underline{- 39}$ | $\underline{- 685}$ | $\underline{+ 7329}$ |

- | | | | | |
|----------------------|----------------------|------------------------|------------------------|-------------------------|
| 10. 7308 | 11. 4325 | 12. $10,743$ | 13. $35,000$ | 14. $738,221$ |
| $\underline{- 2519}$ | 9284 | $15,482$ | $\underline{- 12,627}$ | $\underline{- 419,325}$ |
| | $\underline{+ 2976}$ | $\underline{+ 16,915}$ | | |

- | | | | | |
|----------------------|----------------------|-----------------------|-----------------------|-------------------------|
| 15. 6.94 | 16. $\$57.49$ | 17. $\$215.93$ | 18. 0.572 | 19. $\$2041.29$ |
| $\underline{+ 5.97}$ | $\underline{+ 8.53}$ | $\underline{+ 17.85}$ | $\underline{- 0.286}$ | $\underline{- 1759.65}$ |

20. Essential Question: Explain how to perform an exact check of the answers for exercises 5 and 7. What principle does this illustrate?

Observe how the essential question is assessed in the exercise set.

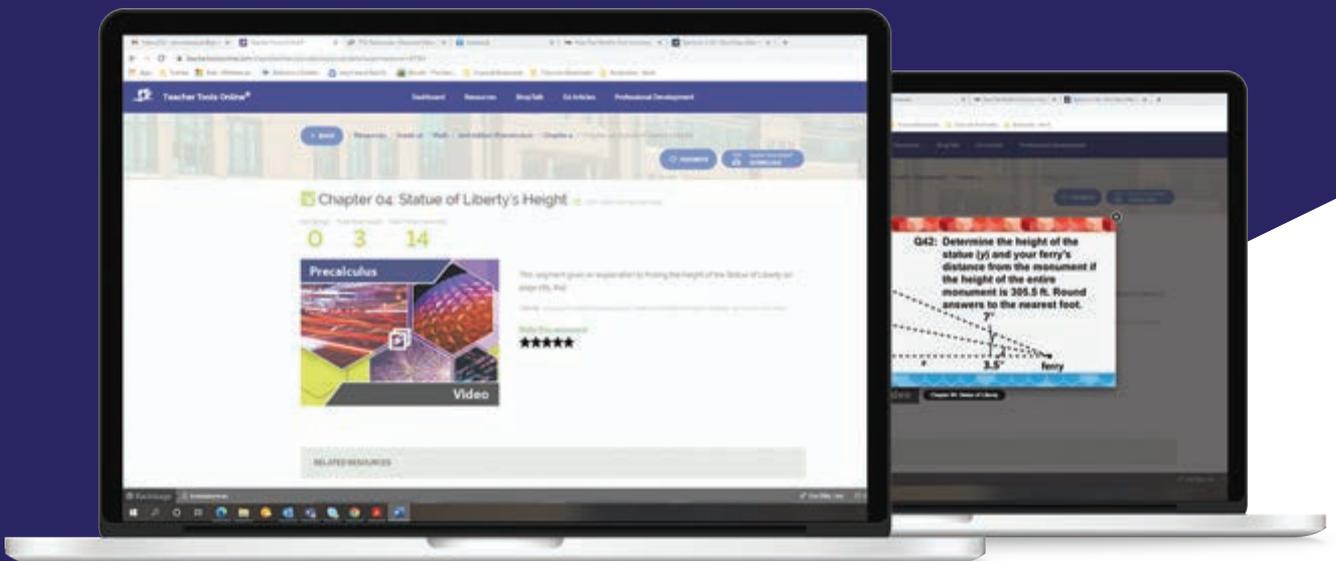
Technology Resources

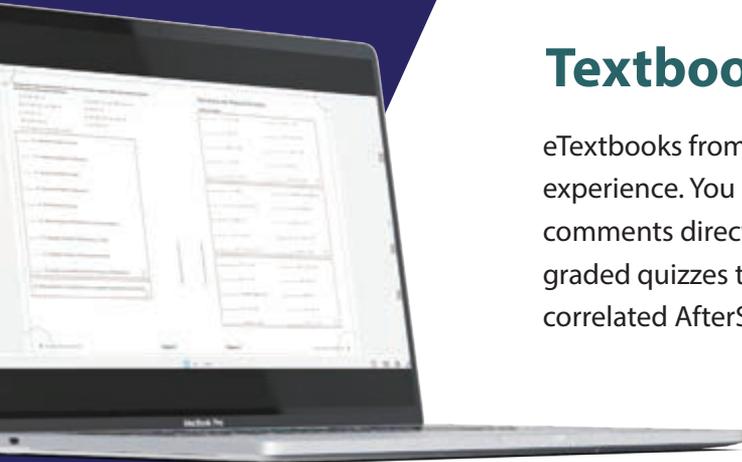
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- Editable PowerPoint slides work through example problems and give opportunities for practice and review as a class.
- Searchable, projectable copies of the student and teacher editions, allow you to project daily activities and work through them as a class.
- **ExamView** allows you to create customized quizzes and tests using a bank of questions that correlate with each chapter. You can edit questions and answers and instantly add multiple versions of tests to prevent cheating.





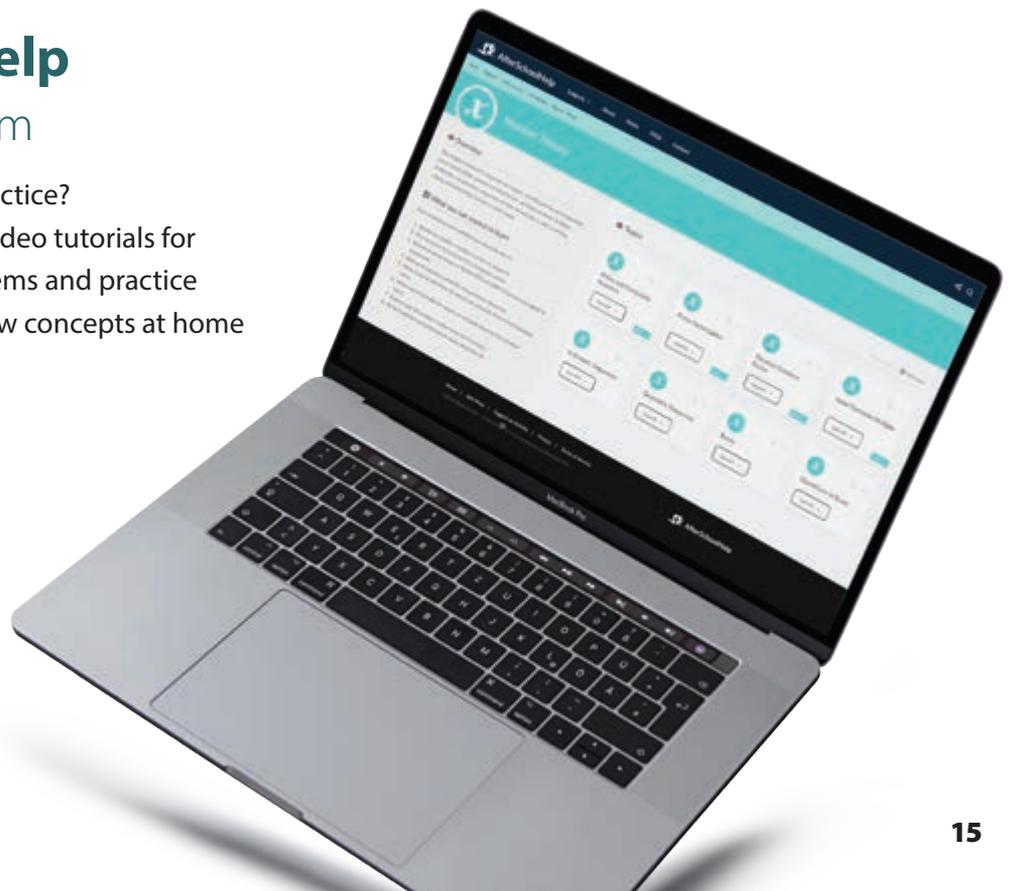
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After School Help

AfterSchoolHelp.com

Students need extra math practice? AfterSchoolHelp.com offers video tutorials for working through math problems and practice activities for students to review concepts at home or at school.





Middle and high school math materials are available for Grades 6–12. For a list of all grades, contact your Precept Sales Representative at **800.511.2771** or visit **bjupress.com** today.

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