

CHRISTIAN WORLDVIEW SHAPING

From the perspective of a Christian worldview, math is a powerful tool for biblical dominion—for managing resources and producing things that help others and that declare the glory of God (Genesis 1:28). For this reason, we have included on this CD a series of exercises titled “Christian Worldview Shaping.” These contain real-life problems related to the theme of the chapter. They are designed to show the students that math really is useful for the work of dominion.

Many students, however, will have difficulty seeing these problems as somehow shaping their worldview. They will tend to view them as nothing more than interesting story problems instead of demonstrations that math can be a tool for biblical dominion. A Dominion Discussion section is included with each activity to help you as you teach the students how this real-life problem relates to maximizing the usefulness of God’s world (Genesis 1:28) and how it also relates to loving others as much as we love ourselves (Mark 12:30–31).

One of the most important goals of teaching math from a Christian worldview is demonstrating over and over that math helps us obey the first command God gave to the human race. Math is important to the Christian because responsible dominion is important to God. May God richly bless you this year as you teach students to see math from the perspective of Scripture.

LESSON 6

Activity: Perform mental math calculations

Materials

- Ladder Access page for display (page 2 in this section of the CD)
- Ladder Access page for each student
- Books or a multi-media presentation about the firefighting profession (optional)

Procedure

1. Allow the students to read the literature about firefighting during free time prior to this lesson or show the presentation to the entire class.
2. Explain that firefighters are organized into groups that perform specific tasks. Each group is referred to as a *company*.
engine company: sets up hoses which provide the water necessary to attack the fire
truck (or ladder) company: performs forcible entries, carries out search and rescue operations, provides access to the upper levels of a building through the use of ladders, ventilates the burning buildings, helps to salvage possessions, helps investigate the origin of the fire
rescue company: rescues the victims at the site of the fire
brush company: extinguishes wildfires and protects buildings that are close to the site of a fire
hazardous materials company: handles hazardous materials situations
emergency medical company: gives emergency medical care to the injured
3. Guide a discussion about 2 or 3 types of firefighter companies using questions similar to the ones below.
 - **What kind of skills do you think a firefighter in the engine company uses as a regular part of his job? Accept all reasonable answers.**
 - **What kind of knowledge do you think a firefighter in the engine company needs? Accept all reasonable answers.**
 - **How do you think mathematics may be helpful to a firefighter in the engine company? Accept all reasonable answers.**
4. Explain that, as in any profession, a firefighter has to learn some basic information in order to do his job well. Estimating and mental math operations are math skills that a firefighter relies on to make instant decisions.
5. Display and distribute the Ladder Access page. Explain to the students that this page provides them with practice for a ladder company drill. Choose students to read the directions and the given information on the page. Guide the students in determining if the given structure is residential or commercial. Direct them to use mental math, if possible, to calculate the given information and then choose the ladder that will help them successfully accomplish the job.
6. For each structure, choose more than one student to explain how he came to choose the correct ladder. Processes will vary; accept all correct methods.

7. Explain that with experience and practice, a firefighter in the ladder company will automatically know a 16-foot ladder is needed to reach a second-floor residential windowsill. When encountering new and challenging situations, firefighters apply the information they learned in basic training to help save lives and minimize structural damage.

DOMINION DISCUSSION

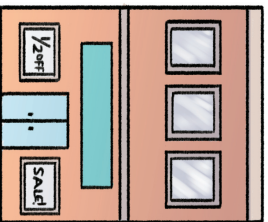
1. Explain that firefighters are willing to endanger their own lives for the safety of others because they believe that each person's life is important.
2. Read John 15:13 aloud. Explain that Jesus taught that those who are willing to lay down their lives for others demonstrate the greatest love. Encourage students to make a habit of praying for firefighters, other rescue workers, and victims when they hear a siren or see a rescue vehicle rushing to the scene of an accident.
 - **What other professions exist to protect people's lives? Possible answers: policemen, military personnel, search and rescue workers, lifeguards, medical personnel**
3. Read Genesis 1:26–27 aloud. Explain that God made people in His image; they are to reflect and show forth God's character in their lives on earth. It is important to preserve and cherish the lives of other people because they are God's special creation intended to show forth His glory. However, when Adam and Eve sinned (Genesis 3), it resulted in men and women no longer being able to reflect God's glory.
4. Read Romans 3:23 aloud. Explain that the apostle Paul describes the fall of man in chapters 1–3 of his letter to the Romans. All people fall short of being able to reflect God's glory. Mankind's sinfulness has put all people under God's judgment.
5. Read Romans 5:6–9 aloud. Explain that Paul wrote that God has provided a remedy for our sinfulness. God made His own Son, Jesus Christ, to be sin for us that we might be restored to a righteous or sinless state before Him. Jesus, who was the sinless Son of God, suffered for our sins.
6. Read John 3:16–18 aloud. Challenge the students to think about whether they have trusted in Jesus' work on the cross to rescue them from their sinfulness before God. It is only through having our relationship with God restored through Christ that we can be forgiven of our sins and have the ability to reflect God's image in a way that pleases Him.

Ladder Access

Choose the best ladder length for the job: 16 foot, 24 foot, or 35 foot.

- Height of the first floor of a residential building: 8–10 feet; distance from the floor to the windowsill: approximately 3 feet
- Height of the first floor of a commercial building: 12 feet; distance from the floor to the windowsill: approximately 4 feet
- The reach of a ladder is approximately 1 foot less than its length.
- Three feet of ladder must extend beyond the rooftop or the windowsill.

1.



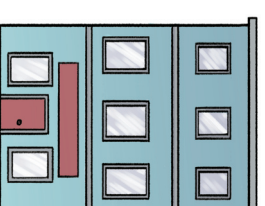
access: rooftop

2.



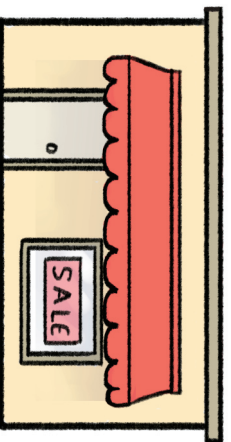
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3.



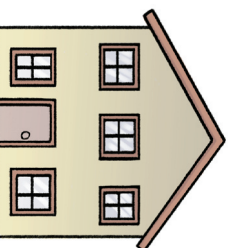
access: third-floor window

4.



access: rooftop

5.



access: second-floor window

6.



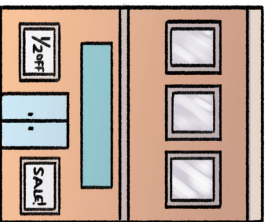
access: rooftop

Ladder Access

Choose the best ladder length for the job: 16 foot, 24 foot, or 35 foot.

- Height of the first floor of a residential building: 8–10 feet; distance from the floor to the windowsill: approximately 3 feet
- Height of the first floor of a commercial building: 12 feet; distance from the floor to the windowsill: approximately 4 feet
- The reach of a ladder is approximately 1 foot less than its length.
- Three feet of ladder must extend beyond the rooftop or the windowsill.

1.



access: rooftop

$$12 + 12 + 3 = 27 \text{ ft or } (2 \times 12) + 3 = 27 \text{ ft; 35-foot ladder}$$

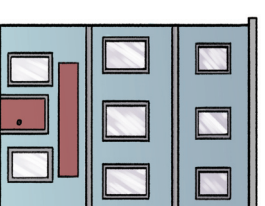
2.



access: rooftop

$$10 + 10 + 3 = 23 \text{ ft or } (2 \times 10) + 3 = 23 \text{ ft; 24-foot ladder}$$

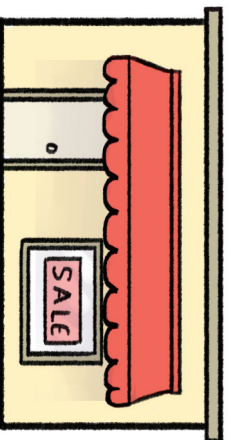
3.



access: third-floor window

$$12 + 12 + 4 + 3 = 31 \text{ ft or } (2 \times 12) + 4 + 3 = 31 \text{ ft; 35-foot ladder}$$

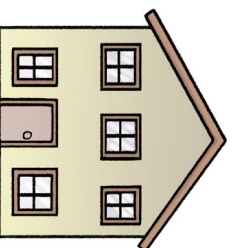
4.



access: rooftop

$$12 + 3 = 15 \text{ ft or } (1 \times 12) + 3 = 15 \text{ ft; 16-foot ladder}$$

5.



access: second-floor window

$$10 + 3 + 3 = 16 \text{ ft; or } (1 \times 10) + 3 + 3 = 16 \text{ ft; 24-foot ladder or a 16-foot ladder for a first floor height of 8 or 9 feet}$$

6.



access: rooftop

$$10 + 10 + 10 + 3 = 33 \text{ ft or } (3 \times 10) + 3 = 33 \text{ ft; 35-foot ladder}$$

LESSON 17

Activity: Calculate the wattage of an appliance

Materials

- How Many Watts? page for display (page 5 in this section of the CD)
- A calculator for each student (optional)

Procedure

1. Direct attention to Student Text pages 28–29. Point out that dams are built for different purposes. Remind the students that the South Creek Fork Dam in Pennsylvania was first made to supply water for a canal. The Hoover Dam, pictured on page 29, was built to end the flooding in many areas along the Colorado River and to provide electricity to areas in the Southwest United States.

2. Explain that the electricity that is made through the power of moving water is called *hydroelectric energy*. The Hoover Dam is a hydroelectric dam.

Point out that by the time the Hoover Dam was finished in 1935 many cities in the United States used electricity. Electric lights were used along streets, storefronts were lit up, and homes were built with indoor lighting. The power supply potential caused great population growth in the surrounding areas. Today, the electricity created by the Hoover Dam supplies power to parts of California, Arizona, and Nevada.

- **What items do you use that require electricity? Accept all correct answers.**
 - **How are these items helpful to people? Accept all reasonable answers.**
3. Explain that the power needed to run the electrical devices that we use every day is measured in a unit called a *watt*. The wattage of a device is often indicated somewhere on the object.
 4. Display the How Many Watts? page. Read the formula and the explanations of the terms. (*Note:* If the students do not understand what a circuit is, explain that it is a continuous path for electricity to travel through. You can refer to the chapter on “Electricity” in *Science 6*, BJU Press.)

Explain that by using the formula $\text{volts} \times \text{amps} = \text{watts}$, you can find the wattage of a toaster, a lamp, or another electrical device without a motor.
 5. Direct attention to the first problem on the page.
 - **What numbers could be substituted for the words in $\text{volts} \times \text{amps} = \text{watts}$ to find the number of watts needed to power appliance 1? Elicit that you can substitute 120 for the volts and 11.5 for the amps. The product of the two factors is the number of watts.**
 - **How many watts does appliance 1 use? 1,380 watts**
 6. Instruct the students to calculate the watts needed to power appliances 2–4. You may choose to allow them to use a calculator. Choose students to tell and explain their answers.
 - **How can you use $\text{volts} \times \text{amps} = \text{watts}$ to find the amps for number 5? Elicit that you can use a related division equation: if $\text{volts} \times \text{amps} = \text{watts}$, then $\text{watts} \div \text{volts} = \text{amps}$.**
 - **What is the amps measurement for appliance 5? 13 amps**

7. Direct the students to find the amps for appliance 6. Choose a student to tell the answer and explain his solution.

DOMINION DISCUSSION

- **How are everyday electrical devices helpful to people? Accept all answers, but point out that most appliances are made so that chores are easier and takes less time.**
1. Remind the students that prior to modern inventions, people washed their clothes by hand. There were no water heaters, so baths were often taken in cool water. Prior to indoor lighting, homes were dimly lit in the evenings by the light of candles or oil lamps. Allow the students to share other thoughts about how everyday life may have been different before electricity was widely available.
 2. Remind the students that God commands people to have dominion over the earth (Genesis 1:28). This means that they should manage and use the resources on the earth for the good of mankind. Explain that using electricity to power devices to save us time and energy is one way that people are fulfilling this command.
 3. Read Matthew 22:37–40 aloud. Explain that Jesus teaches that you must first love the true and living God and also love others.

Explain that the Bible says that a person who has not been redeemed by God through Jesus Christ walks according to his sinful desires. Point out that the person who follows the way of the world is one who does whatever brings him pleasure, while ignoring God and others (Ephesians 2:3). However, the true follower of Jesus strives to love God and to love others, following the example of his Savior (Philippians 2:3–8).
 4. Challenge the students to think about how they spend their free time—free time that often comes from the many conveniences of modern-day life.
 - **Do you spend your time and energy for your own happiness only? Do you find ways to serve God and others?**
 - **What activities could you do in your spare time to show your love to God and others? Accept all reasonable answers; possible answers are sharing the gospel with others, serving in a church ministry, spending extra time reading the Word of God, helping a friend with homework, taking time to play with a sibling or friend instead of using the time for yourself, or doing extra chores to help around the house.**
 5. Explain to the students that it is only through the power of the Holy Spirit that a Christian is able to love God and love others more than himself (Romans 8:5).

How Many Watts?

$$\text{volts} \times \text{amps} = \text{watts}$$

watt: the unit of measurement for electrical power

volt: the unit of measurement for the amount of the electrical push or force in a circuit

ampere (amp): the unit that is used to measure the amount of current flowing through a point of a circuit in one second

Use the formula to find the missing measurement (watts or amps).

1. volts: 120
amps: 11.5

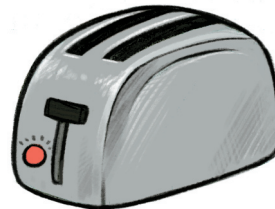
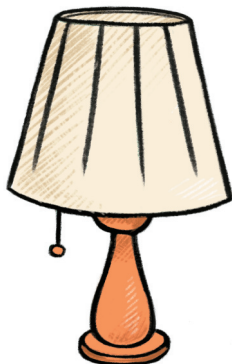
2. volts: 116
amps: 9

3. volts: 120
amps: 0.7

4. volts: 118
amps: 7.5

5. watts: 1,495
volts: 115

6. watts: 2,558.5
volts: 119



How Many Watts?

$$\text{volts} \times \text{amps} = \text{watts}$$

watt: the unit of measurement for electrical power

volt: the unit of measurement for the amount of the electrical push or force in a circuit

ampere (amp): the unit that is used to measure the amount of current flowing through a point of a circuit in one second

Use the formula to find the missing measurement (watts or amps).

1. volts: 120

amps: 11.5

$$120 \times 11.5 = 1,380 \text{ watts}$$

2. volts: 116

amps: 9

$$116 \times 9 = 1,044 \text{ watts}$$

3. volts: 120

amps: 0.7

$$120 \times 0.7 = 84 \text{ watts}$$

4. volts: 118

amps: 7.5

$$118 \times 7.5 = 885 \text{ watts}$$

5. watts: 1,495

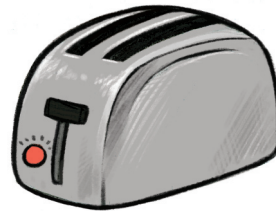
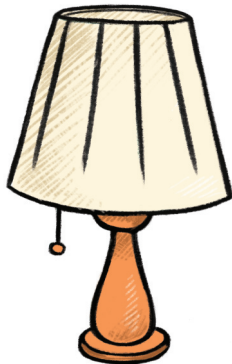
volts: 115

$$1,495 \div 115 = 13 \text{ amps}$$

6. watts: 2,558.5

volts: 119

$$2,558.5 \div 119 = 21.5 \text{ amps}$$



LESSON 25

Activity: Find the average

Materials

- Daily Ocean Temperatures page for display (page 8 in this section of the CD)
- Daily Ocean Temperatures page for each student
- A calculator for each student

Procedure

1. Explain that gaining an understanding of God's Creation can be fascinating and be a blessing to others. Scientists are able to study many aspects of God's creation. One particular scientific field is *meteorology*, the study of the atmosphere and weather/climate patterns. A *meteorologist* is a person who studies weather patterns and reports weather forecasts. Point out that the students are probably most familiar with local meteorologists; however, many companies and agencies also hire meteorologists.

One organization that employs meteorologists is the National Oceanic and Atmospheric Administration NOAA (often pronounced no'• ah). It is a scientific division of the United States government that studies the ocean and the atmosphere. This organization provides information that is necessary for good stewardship of the earth and for the safety of lives and property in the event of severe weather conditions.

2. Point out that the students may have heard a meteorologist mention the terms *El Niño* or *La Niña*.

El Niño refers to times when the temperatures of the water in the Pacific Ocean near the equator are warmer than normal. *La Niña* refers to times when these temperatures are cooler than normal. The term *El Niño* is Spanish for "the boy child," and the term *La Niña* means "the girl child." These terms were first used by fishermen in South America who noticed the changes in the Pacific Ocean temperatures.

The NOAA places buoys in the oceans along the equator with devices that measure water temperature, currents, and winds. In addition to the buoys, the NOAA collects information using satellites and radiosondes (instruments for measuring different aspects of the atmosphere that are carried into the skies by weather balloons).

The information provided by the NOAA is available to scientists around the world for study. Through studying the NOAA data and other sources, some meteorologists have concluded that during *El Niño* years, fewer than normal tropical storms and hurricanes form in the Atlantic Ocean, but more storms form in the Pacific Ocean. They also noted that during *La Niña* years, the opposite occurs: more than normal tropical storms and hurricanes form in the Atlantic Ocean, and fewer storms form in the Pacific Ocean. These events occur because the ocean temperatures have a variety of direct effects on our atmosphere.

3. Explain that the continued study of the *El Niño* and *La Niña* patterns may help meteorologists to make more accurate predictions of severe weather conditions.
4. Display and distribute the Daily Ocean Temperatures page. Explain to the students that they will perform some weather-related data analyses. Remind them that a regular part of a meteorologist's work is looking at a variety of weather-related information and drawing conclusions from that information.
5. Guide the students in finding the average ocean temperatures for December and January. Allow them to use a calculator.

➤ **How can you group some of these temperatures to make your calculating simpler? Answers will vary. One example in the month of December is the following: the 4 temperatures of 21.9°C can be grouped by entering 4×21.9 into the calculator, rather than $21.9 + 21.9 + 21.9 + 21.9$.**

Encourage the students to mark the temperatures they have calculated as they solve the problems. Give guidance as necessary.

DOMINION DISCUSSION

1. Remind the students that people use weather information given to the public allows them to make informed decisions about upcoming activities; also mention how severe weather alerts and notification systems save many lives by giving communities and individuals time to plan and find shelter when necessary.
➤ **How has information reported by a meteorologist affected you at home or on a vacation? Do you know a relative, friend, or missionary in another region that has been affected by weather-related storms? Answers will vary.**
2. Read Genesis 1:28 aloud. Explain that when God created man, He commanded man to have dominion over the earth. *Dominion* means that God wanted people to take care of the earth and manage its resources for the use of mankind. But the earth we seek to manage today is different from the one God made. Because we have sinned, God has cursed our world. The curse affects the atmosphere and weather. So whenever we study tornadoes, thunderstorms, or hurricanes, we should remember that these storms are God's ways of speaking to us about our sin.

Remind the students that all people are made in God's image, and that we all, in some way or another, fulfill the command of Genesis 1:28. Even meteorologists that do not know the true, living God through Jesus Christ are exercising dominion over the earth. All people who use weather-related information to make decisions for their good and the good of others are doing the same. Those who know the true and living God can obey from the heart the dominion command as well as God's other commands (Ephesians 6:6). They can obey the dominion command with love and compassion, knowing that God often uses the curse on the earth to draw people to experience His salvation. Men, women, boys, and girls can have great joy in their obedience because they are giving glory to the one true and living God.

Daily Ocean Temperatures

Find the average temperature for each month.

December	January
22.6° Celsius	21.7° Celsius
23.4° Celsius	21.9° Celsius
21.5° Celsius	22.6° Celsius
24.8° Celsius	23.0° Celsius
22.6° Celsius	23.5° Celsius
21.9° Celsius	23.5° Celsius
23.4° Celsius	23.7° Celsius
21.5° Celsius	23.9° Celsius
21.9° Celsius	23.9° Celsius
23.6° Celsius	24.2° Celsius
24.2° Celsius	24.1° Celsius
22.0° Celsius	24.0° Celsius
21.5° Celsius	24.2° Celsius
20.9° Celsius	24.6° Celsius
21.3° Celsius	24.1° Celsius
22.7° Celsius	25.3° Celsius
22.9° Celsius	25.7° Celsius
23.6° Celsius	25.6° Celsius
22.8° Celsius	25.2° Celsius
20.7° Celsius	25.4° Celsius
20.7° Celsius	25.9° Celsius
21.9° Celsius	25.2° Celsius
21.9° Celsius	26.2° Celsius
21.3° Celsius	26.5° Celsius
21.6° Celsius	26.8° Celsius
21.4° Celsius	26.8° Celsius
21.1° Celsius	27.1° Celsius
20.5° Celsius	27.0° Celsius
19.0° Celsius	27.3° Celsius
19.7° Celsius	26.9° Celsius
20.8° Celsius	26.4° Celsius
Average monthly temperature:	Average monthly temperature:

Daily Ocean Temperatures

Find the average temperature for each month.

December	January
22.6° Celsius	21.7° Celsius
23.4° Celsius	21.9° Celsius
21.5° Celsius	22.6° Celsius
24.8° Celsius	23.0° Celsius
22.6° Celsius	23.5° Celsius
21.9° Celsius	23.5° Celsius
23.4° Celsius	23.7° Celsius
21.5° Celsius	23.9° Celsius
21.9° Celsius	23.9° Celsius
23.6° Celsius	24.2° Celsius
24.2° Celsius	24.1° Celsius
22.0° Celsius	24.0° Celsius
21.5° Celsius	24.2° Celsius
20.9° Celsius	24.6° Celsius
21.3° Celsius	24.1° Celsius
22.7° Celsius	25.3° Celsius
22.9° Celsius	25.7° Celsius
23.6° Celsius	25.6° Celsius
22.8° Celsius	25.2° Celsius
20.7° Celsius	25.4° Celsius
20.7° Celsius	25.9° Celsius
21.9° Celsius	25.2° Celsius
21.9° Celsius	26.2° Celsius
21.3° Celsius	26.5° Celsius
21.6° Celsius	26.8° Celsius
21.4° Celsius	26.8° Celsius
21.1° Celsius	27.1° Celsius
20.5° Celsius	27.0° Celsius
19.0° Celsius	27.3° Celsius
19.7° Celsius	26.9° Celsius
20.8° Celsius	26.4° Celsius
Average monthly temperature: 21.9° Celsius	Average monthly temperature: 24.9° Celsius

LESSON 38

Activity: Make a circle graph to show the percent

Materials

- Circle Graph A page for display (page 11 in this section of the CD)
- Circle Graph B page for display (page 13 in this section of the CD)
- Circle Graph A page for each student
- Circle Graph B page for each student
- Markers for the teacher: red, green, and blue
- Colored pencils for each student: red, green, and blue
- A variety of circle graphs

Note

You may choose to guide the students in making these graphs using a computer program. However, this hands-on activity will help them to develop an understanding of how fractions are equivalent to decimals.

Procedure

1. Explain that being able to analyze information and communicate it clearly are both important skills.
Organizing information in a graph or a chart can help us to evaluate goals and make decisions for the future.
2. Display and distribute the Circle Graph A page.
 - What kind of information is on this graph? *attendance for vacation Bible school in 2011*
 - What is the total attendance shown on Circle Graph A? *200*
 - What does the total attendance include? *visitors, church children, and workers*

Explain that the vacation Bible school director wants to use some graphs to show the percentage of groups attending VBS for the past two years.
3. Guide the students in writing in the table the attendance for each group in fraction form. Explain that to find the percentage of each section, the fractions can be renamed as a fraction with 100 as the denominator.
 - How can each of these fractions be renamed as a fraction with a denominator of 100 to find the percent? *Divide each fraction by $\frac{2}{2}$.* Guide the students in finding the percent.
4. Direct the students to color the squares in the key: *red* for visitors, *blue* for church children, *green* for workers.
5. Explain that the entire circle graph represents 100% of the attendance; each section represents 10%. Elicit the number of sections that should be colored *red* to show that 20% of those in attendance were visitors, *2*, the number of sections that should be colored *blue* to show that 60% of the attendees were church children, *6*, and the number of sections that should be colored *green* to show that 20% of those who attended were workers, *2*. Direct them to color the graph accordingly during the discussion.
6. Display and distribute the Circle Graph B page. Guide the students in writing the attendance of each group in fraction form.
 - Can these fractions be renamed as a fraction with a denominator of 100? *No*
 - What do you notice when these fractions are renamed to lowest terms? *Elicit that the denominator of the lowest terms can be renamed to a denominator of 100 using multiplication.*

7. Guide the students in renaming each fraction to lowest terms by dividing. Then use multiplication to rename the fraction with 100 as the denominator.
8. Direct the students to color the squares in the key: *red* for visitors, *blue* for church children, *green* for workers. Elicit from the students the number of sections that should be colored *red* in the graph to show that 50% of those in attendance were visitors, *5*, the number of sections that should be *blue* to show that 25% of the attendees were church children, *2 $\frac{1}{2}$* , and the number of sections that should be colored *green* to show that 25% of those who attended were workers, *2 $\frac{1}{2}$* . Direct them to color the graph accordingly during the discussion.

DOMINION DISCUSSION

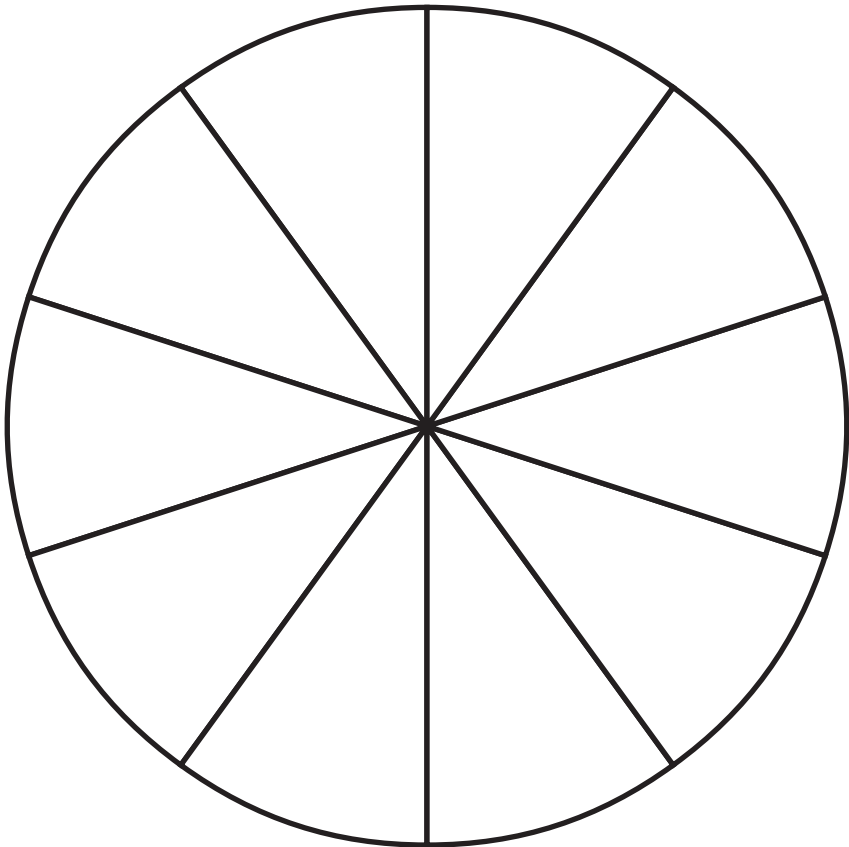
1. Direct the students to examine both graphs. Explain that the VBS director will use these graphs to report the VBS attendance for the past two years to the church members.
2. Point out that when the VBS leader presents this information, he plans to use Circle Graph B to show that there was a decrease in the number of church children that attended Bible school. The attendance decreased because a significant number of children were promoted to the youth group. Many of the children who were promoted also volunteered to be workers.
 - How do you think graphs like these may be valuable to the VBS leader and to the congregation when thinking about future years of VBS ministry? *Accept any reasonable answers, but elicit that as more people volunteer as workers, they are able to have more children attend, especially more visitors.*
 - What kinds of decisions could be influenced by the information on the graphs? *Accept all correct answers.*
 - Compare Circle Graph A to Circle Graph B. Did the church meet its goal to have at least 60% of the attendees be visitors in 2012? *Elicit that they did not meet that goal, but that the percentage of visitors did increase.*
 - What might the VBS leader do to help reach the goal of 60% visitors? *He may encourage more people to volunteer to hand out fliers for the next year.*
3. Read Hebrews 10:23–25 aloud. Explain that the writer of Hebrews reminded Christians that they are able to have a bold confidence in the Lord because Jesus is their High Priest. With this boldness, they are commanded to encourage one another to love each other and to do good works. In a similar manner, the graphs shown by the VBS leader can encourage church members to evangelize and serve.
 - What other ways might you or others in your church use mathematics to encourage other Christians to love one another and to do good works that glorify God? *Accept all reasonable answers.*
4. Remind the students that when a person trusts in Christ as his Savior from sin, Christ saves him to do good works (Ephesians 2:10). Learning good math skills and being ready to apply them when there is a need is one way that you can do good works for the glory of God. The good works God has called us to are related to the dominion command. We are to care for our resources in such a way that God is glorified and other people are helped. This command applies even to the way that we plan our church's VBS outreach.

Circle Graph A

	Fraction form	Percent
Total Attendance: 200		
Visitors: 40		
Church Children: 120		
Workers: 40		

Key	RED—Visitors	BLUE—Church Children	GREEN—Workers
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Percentage of Attendees at VBS in 2011



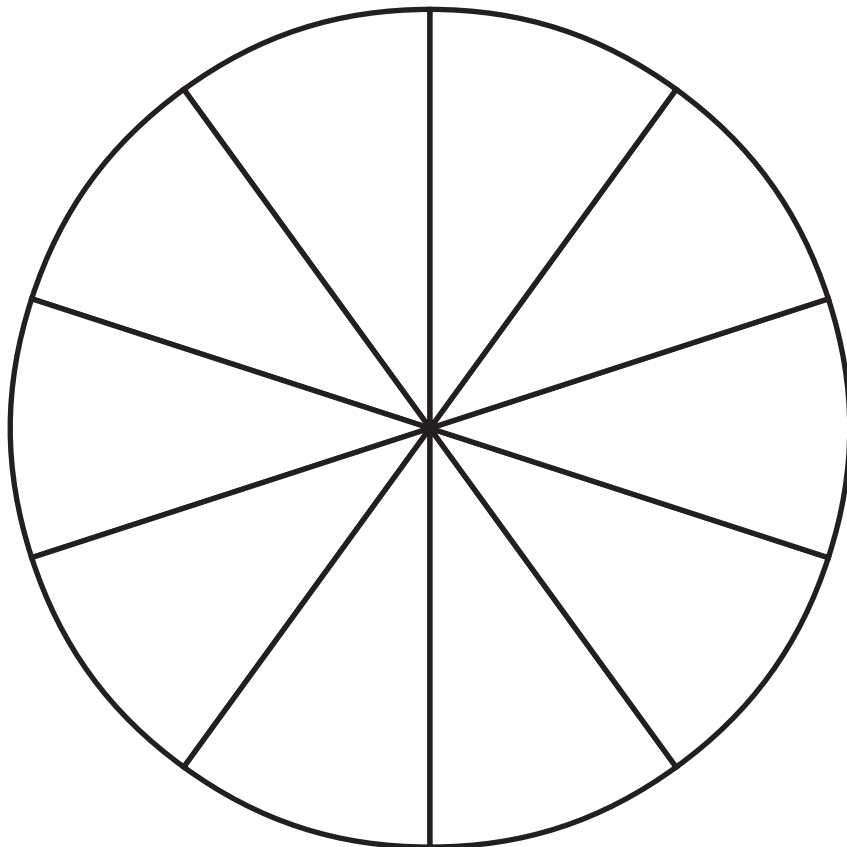
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Circle Graph A

	Fraction form	Percent
Total Attendance: 200	$\frac{200}{200}$	$\frac{200}{200} \div \frac{2}{2} = \frac{100}{100} = 100\%$
Visitors: 40	$\frac{40}{200}$	$\frac{40}{200} \div \frac{2}{2} = \frac{20}{100} = 20\%$
Church Children: 120	$\frac{120}{200}$	$\frac{120}{200} \div \frac{2}{2} = \frac{60}{100} = 60\%$
Workers: 40	$\frac{40}{200}$	$\frac{40}{200} \div \frac{2}{2} = \frac{20}{100} = 20\%$

Key	RED—Visitors	BLUE—Church Children	GREEN—Workers
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Percentage of Attendees at VBS in 2011

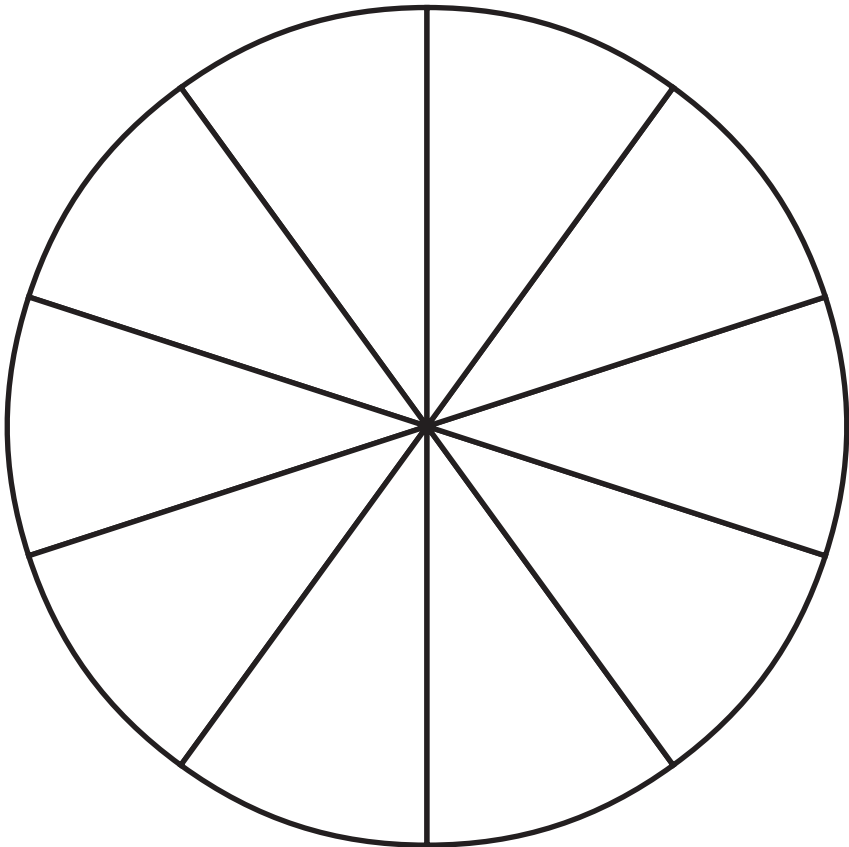


Circle Graph B

	Fraction form	Percent
Total Attendance: 360		
Visitors: 180		
Church Children: 90		
Workers: 90		

Key	RED—Visitors	BLUE—Church Children	GREEN—Workers
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Percentage of Attendees at VBS in 2012



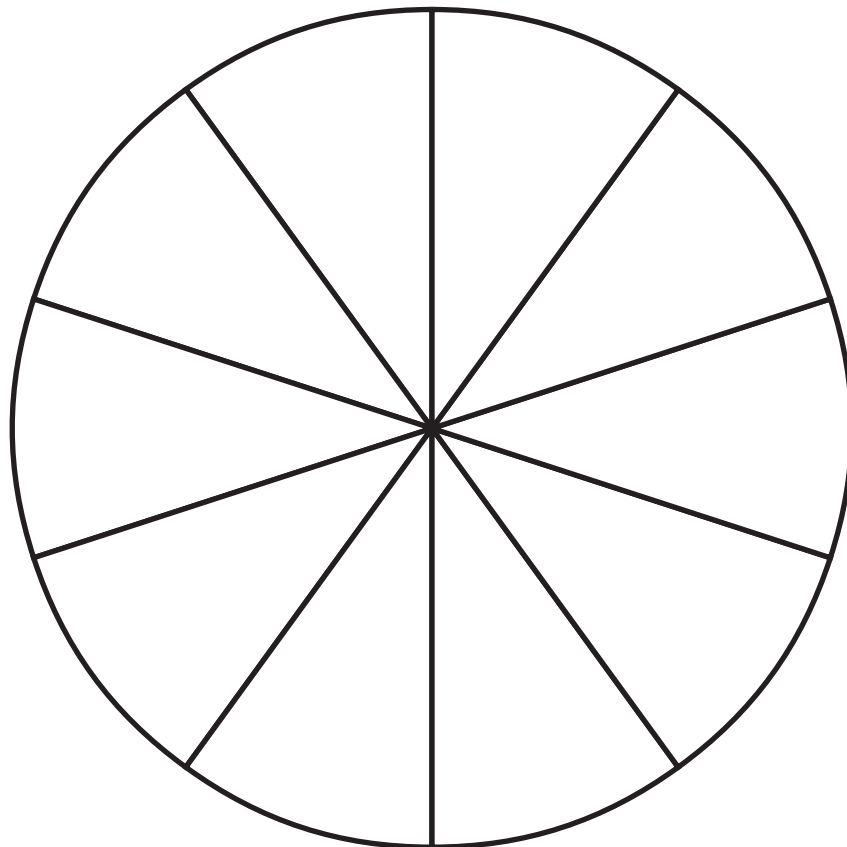
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Circle Graph B

	Fraction form	Percent
Total Attendance: 360	$\frac{360}{360}$	100%
Visitors: 180	$\frac{180}{360}$	$\frac{180}{360} \div \frac{180}{180} = \frac{1}{2}$ $\frac{1}{2} \times \frac{50}{50} = \frac{50}{100} = 50\%$
Church Children: 90	$\frac{90}{360}$	$\frac{90}{360} \div \frac{90}{90} = \frac{1}{4}$ $\frac{1}{4} \times \frac{25}{25} = \frac{25}{100} = 25\%$
Workers: 90	$\frac{90}{360}$	$\frac{90}{360} \div \frac{90}{90} = \frac{1}{4}$ $\frac{1}{4} \times \frac{25}{25} = \frac{25}{100} = 25\%$

Key	RED—Visitors	BLUE—Church Children	GREEN—Workers
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Percentage of Attendees at VBS in 2012



Activity: Determine the type and amount of lumber needed to build a bookcase

Materials

- Lumber Choices page for display (page 16 in this section of the CD)
- Lumber Choices page for each student

Note

Allow students to examine a bookcase in your classroom as a visual aid. Although the dimensions among bookcases will vary, students will be able to see an object with sides, top, bottom, shelves, height, width, and depth.

Procedure

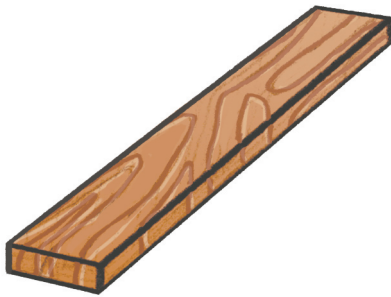
1. Explain that fractions are often used in constructing objects large or small. The ability to work with fractional amounts is important to professional and amateur carpenters.
2. Display the Lumber Choices page. Choose a student to read the information aloud. Explain that there are many board sizes available for purchase from a lumber supplier.
 - **Why is it important to determine the size of the boards and the number of boards needed for the job? Elicit that if you buy the incorrect materials, you will waste money, materials, and time.**
3. Direct the groups to discuss and decide which piece of lumber they should use to build the bookcase.
 - **From the choices given, which piece of lumber should be used to build the bookcase? Explain your answer. 2 inches × 10 inches × 16 feet; it is the only piece that has a depth of 10 inches for each part of the bookcase.**
4. Direct the groups to decide how many 2-inch × 10-inch × 16-foot boards are needed to make the bookcase. Encourage them to choose a problem-solving strategy, such as drawing a picture, making a list, and/or writing equations to help them solve the problem. Give guidance as needed.
 - **How many boards are needed to complete the bookcase? 3**
5. Choose students to share how their group solved the problem. **Accept all reasonable processes.**

1. Explain that in the book of Exodus, God tells Moses how the tabernacle (the place of worship) is to be built. God gives very specific instructions for how it is to be built, such as measurements for the boards, colors for the curtains, and the types of materials to be used.
2. Read Exodus 31:1–6 aloud. Point out that God names two men that he has specially gifted to build the tabernacle: Bezaleel, the son of Uri, of the tribe of Judah, and Aholiab, the son of Ahisamach, of the tribe of Dan. God had given these two men the opportunity to develop skills and to gain mathematical wisdom so that they were ready to build His tabernacle and its furnishings according to His commands.
3. Challenge the students to think of their educational exercises as opportunities to develop skills that they can use in service to the Lord. They may not think that they are particularly talented in math, but God is giving them an opportunity to learn a variety of mathematical skills this year. In the future, they may use these math skills to be a blessing to others and to bring God glory.
 - **Name some ways that you, as a sixth grader, may use your knowledge of fractions to bring God glory now. Accept any reasonable answers. Possible ideas: cooking meals to help Mom, giving a tithe or $\frac{1}{10}$ of your allowance to the Lord, dividing snacks or toys fairly among your friends and siblings**

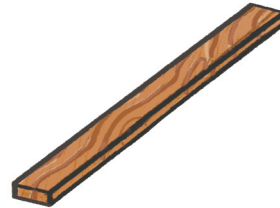
Lumber Choices

The pastor needs a new bookcase for his study. The boys' Sunday school class wants to build the bookcase for him. The dimensions for the bookcase are the following: $7\frac{3}{4}$ feet tall and $2\frac{1}{2}$ feet wide. There will be 5 shelves inside the bookcase, in addition to the top and bottom. All the shelves should have a depth of 10 inches. In the shed, there is a 4-foot \times 8-foot piece of plywood that can be used for the back of the bookcase. The boys will cut it to measure $2\frac{1}{2}$ feet \times $7\frac{3}{4}$ feet. However, they will need to purchase boards to build the sides and the shelves.

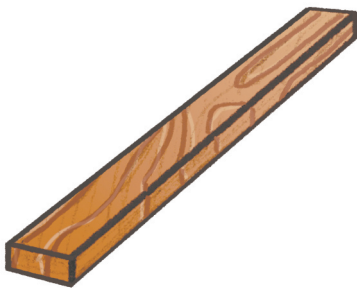
Use the information above to choose the size and the number of boards needed to complete the bookcase.



2 in. \times 12 in. \times 16 ft



1 in. \times 6 in. \times 12 ft



2 in. \times 10 in. \times 16 ft

board for sides and shelves: _____

number of boards needed: _____

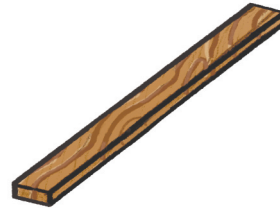
Lumber Choices

The pastor needs a new bookcase for his study. The boys' Sunday school class wants to build the bookcase for him. The dimensions for the bookcase are the following: $7\frac{3}{4}$ feet tall and $2\frac{1}{2}$ feet wide. There will be 5 shelves inside the bookcase, in addition to the top and bottom. All the shelves should have a depth of 10 inches. In the shed, there is a 4-foot \times 8-foot piece of plywood that can be used for the back of the bookcase. The boys will cut it to measure $2\frac{1}{2}$ feet \times $7\frac{3}{4}$ feet. However, they will need to purchase boards to build the sides and the shelves.

Use the information above to choose the size and the number of boards needed to complete the bookcase.



2 in. \times 12 in. \times 16 ft



1 in. \times 6 in. \times 12 ft



2 in. \times 10 in. \times 16 ft

board for sides and shelves: 2 in. \times 10 in. \times 16 ft

number of boards needed: 2

LESSON 60

Activity: Use plane figures to make miniature parachutes

Materials

- Parachute Designs page for display (page 19 in this section of the CD)
- A plastic grocery bag for each student
- A toy soldier figurine or a penny for each student
- Transparent tape for each student
- Six 15-inch lengths of lightweight string or thread for each student

Procedure

1. Remind the students of the parachute rescue on Student Text page 118. Explain that parachutes are used for the sport of skydiving and for other purposes.
 - **Where have you seen parachutes used? Possible answers: in the military, on spacecraft and rockets, for sports such as skydiving, drag racing, and parasailing**
2. Explain that most parachutes are used to slow down the pull of gravity on an object. The fabric of a parachute catches the air as an object or a person falls. The friction of the air meeting the parachute slows down the descent, allowing a gentler and safer landing.
3. Tell the students a brief history of parachutes.

Leonardo da Vinci, the famous artist, drew sketches of a parachute in the late 1400s. His design was constructed of fabric stretched over a pyramid-shaped frame. There is no record that he ever had the opportunity to build and test his model.

In the two centuries after Leonardo da Vinci first sketched his design, there were many similar framed parachutes experimented with. Some parachutes were used by men jumping from buildings; some were used to lower animals and men from hot-air balloons.

In 1797 Andrew Garnerin jumped from a hot-air balloon using a parachute with a canopy that was made only out of fabric without a frame—similar to the parachutes used today. About 100 years later, the harness with the backpack design was developed.

4. Display the Parachute Designs page. Explain that there are a variety of parachute designs used today.
 - **What plane figures are seen in the fabric of the round parachute? Elicit that it is made up of triangle-shaped pieces.**
 - **How would you describe the overall shape of the parachute when it is full of air? Elicit that it is dome-shaped.**
5. Direct attention to the cruciform/square parachute. Explain that *cruciform* comes from the word *crucifix*, meaning “cross.”
 - **Why do you think the cruciform can also be called a square parachute? Elicit that it is easy to see a square in the center and the four sides that extend downward.**
 - **What plane figures form a cross in this parachute? two rectangles**
 - **How do the two rectangles form a cross? The two rectangles cross over each other to form the perpendicular lines that make up a cross-shape.**

6. Direct attention to the parafoil. Explain that a parafoil canopy allows for air flow through the many cells giving this parachute the ability to glide through the air as well as descend. This parachute is used by many skydivers.
 - **What plane figures form a parafoil parachute? Elicit that it appears to be made up of many rectangles.**
7. Distribute the bags, string, soldiers or pennies, and tape. Instruct the students to make a simple, small parachute using a circle, rectangle, or square. Give the students these steps to follow. (**Note:** You may wish to make each parachute step by step as the students make theirs.)
 - Draw the shape on the bag and then cut it out to make the canopy.
 - Cut parachute lines from the string. For each parachute, make the line lengths equal and at least 12 inches long.
 - For a circular parachute, cut 6 lines. Tape one end of each string around the edge of the canopy, trying to make the spaces between the lines approximately equal in distance.
 - For square or rectangular parachutes, cut 4 lines. Tape one end of each string to each corner of the figure.
 - Bundle the other ends of the lines together and tape them together.
 - Tape the penny or toy soldier to the place where the lines are bundled.
8. Allow the class to observe as each student tests his parachute by dropping it at least 2 times from a safe location. Remind the students that the slower and gentler the descent, the better the performance.
9. Guide a class discussion on which parachutes seemed to work better and why. Direct each student to write a brief description of how his parachute performed.

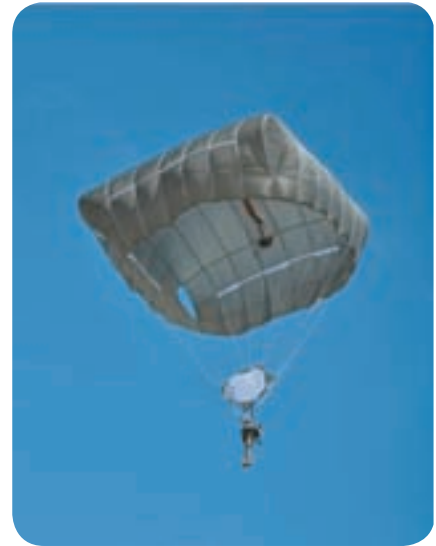
DOMINION DISCUSSION

1. Explain that the Pararescue Jumpers, or PJs, is a special operations group in the United States Air Force. Their motto is “That others may live.” In order to become a PJ, a candidate must have about 2 years of intensive training. One of the tasks that a PJ must learn to do well is parachute into a battlezone in order to provide medical assistance to injured service members.
 - **How do you think reliable parachutes make a difference for Pararescue Jumpers? Elicit that jumping from a plane is dangerous. Having a reliable parachute allows a PJ to land safely in order to accomplish his mission.**
 - **How does the reliable parachute make a difference for the serviceman who is being helped by a PJ? Elicit that when the PJ lands safely, the injured person receives the immediate medical care that is sometimes the difference between life and death.**
2. Remind the students that in Genesis 1, God commands people to manage and use the resources on the earth for the good of mankind. Point out that over the centuries, God has allowed man to learn more about the resources available to him and how different materials interact with each other. Who would have thought that air could be utilized to help us fly and that PJs would use parachutes to save lives? God’s world is amazing.

Parachute Designs



Round Parachute



Cruciform or Square Parachute



Parafoil

LESSON 66

Activity: Use fractions to check calculations

Materials

- Shipping Invoice page for display (page 21 in this section of the CD)
- A calculator for each student

Procedure

- On page 148 of the student text, what kind of transportation was used to deliver the serum from the end of the railroad tracks at Nenana to Nome, Alaska? *teams of dogsleds*

1. Explain that transporting goods such as medicines, food, and clothing to the stores where we shop has become an important business in the United States and in many other countries. Some businesses have their own transportation systems, but others hire transportation companies to bring in their goods.

- What modes of transport are used to deliver products to stores? *Elicit that products made in other countries arrive by ship or airplane. Products made within a country are moved by airplanes, trains, and tractor trailers. Products are usually delivered to stores by truck.*

2. When thinking of the trucking industry, truck drivers often come to mind. Truck operators are the people who pick up and deliver the goods. However, a variety of skilled office personnel are also needed to run a successful transportation business; these include managers, dispatchers, salespersons, and bookkeepers.

Explain that it is crucial for a trucking company to hire a bookkeeper with integrity to manage the company's financial transactions. A computer program keeps track of the amount of money that customers owe for having their products shipped.

When an invoice (bill) is generated for a customer, the bookkeeper is responsible to check the calculated amount for accuracy before it is sent to the customer. A bookkeeper may check the total by estimating or by solving the actual amounts.

3. Display and distribute the Shipping Invoice page. Choose a student to read aloud the information at the top of the page. Explain that this information is what the bookkeeper uses to check the accuracy of each charge.

- Is the amount shipped for Glass Superstore on August 4 a full shipment? *No; the shipment did not weigh 43,000 pounds.*

- What fraction can be written to show what part of a full shipment was shipped? *$\frac{15,176}{43,000}$ lb*

4. Guide the students in determining compatible numbers for the numerator and denominator in order to rename the estimated fraction to lowest terms. *$\frac{15,000}{45,000} = \frac{1}{3}$*

Remind the students that customers are charged for the weight of the items being shipped. Elicit that since the weight of the materials shipped on August 4 is approximately $\frac{1}{3}$ of the total weight that can be carried in one tractor-trailer, the charge for the materials shipped on August 4 should be approximately $\frac{1}{3}$ of the charge for the entire shipment.

5. Guide the students in rounding the charge for an entire shipment (\$23,220) to a number that is compatible with $\frac{1}{3}$. It may be necessary to remind the students that

the rounded number needs to be compatible with the denominator, 3. *\$24,000*

- What is $\frac{1}{3}$ of \$24,000 equal to? *\$8,000*
- Is the charge for August 4 approximately $\frac{1}{3}$ of the charge for an entire shipment? *yes*

Explain that this is one way to check that the charges listed on an invoice are reasonable.

- How could you estimate the charge for the August 4 shipment? *Elicit that you can multiply 15,000 (the estimated weight of the shipment) by \$0.50 (the estimated cost per pound); $0.50 \times 15,000 = \$7,500$.*

6. Elicit that the answer is an underestimate because both factors were rounded down before they were multiplied. The underestimate of \$7,500 is still close to the actual amount of \$8,195.04; therefore, \$8,195.04 can be considered a reasonable charge.

7. Follow a similar procedure for checking the remainder of the charges.

(Note: For the materials shipped on August 25, you may choose to have the students multiply $0.25 \times \$24,000$ to estimate $\frac{1}{4}$ of the charge for the entire shipment.)

The students will find that there is an error in the amount that Glass Superstore was charged on August 25. *$\frac{11,000}{44,000} = \frac{1}{4}$ of a load and $\frac{1}{4} \times \$24,000 = \$6,000$; $0.50 \times 11,000 = \$5,500$* These estimates would make the charge of \$2,096.06 off by approximately \$3,000 to \$4,000. This discrepancy would cause a bookkeeper to recheck the entered data to look for an error.

8. Explain that checking these figures may seem difficult to the students because the process is new to them. However, a bookkeeper who works with rates such as these on a daily basis can check the reasonableness of charges rather quickly.
9. Direct the students to use their calculators and the actual amounts to check the charges for each date. Direct them to write any corrections beside the incorrect information.

DOMINION DISCUSSION

1. Read Proverbs 11:1 and Matthew 7:12 aloud.
 - How does a bookkeeper's ability to check the invoices fulfill these scriptures? *Elicit that if the bookkeeper were the customer, he would want the calculations to be checked for any errors so that he would not be overcharged.*
2. Point out that when a Christian bookkeeper uses his mathematical skills to keep an accurate record for a customer, he is a blessing to his employer by dealing honestly and fairly with the customers. His faithful mathematical work brings glory to God.

Shipping Invoice

Customers are charged by the weight of their materials. The charge per pound of freight is 54 cents.

The total amount of freight that can be carried in one of the tractor-trailers is 43,000 pounds.

The total charge for an entire shipment is \$23,220.00.

Use the information above to estimate whether these charges are reasonable.

Glass Superstore		
Date	Weight	Charge
8/4	15,176 lb	\$8,195.04
8/11	8,727 lb	\$4,712.58
8/18	4,365 lb	\$2,357.10
8/25	11,289 lb	\$2,096.06
Total due:		\$17,360.78

LESSON 71

Activity: Record encounters with fractions

Procedure

1. Explain to the students that, at the end of Chapter 8, they will need to record some real-life situations in which either they or a family member used fractions. Suggest that the students make notes about the situations as they notice them, including the specific numbers that were used.
2. On the day of the Chapter 8 Review or the Chapter 8 Test, direct each student to record at least two of the situations in the Journal section of his Math notebook. Explain that each situation should be explained using at least 4 well-written sentences and should include the specific numbers that were used. Allow the students to refer to the notes they took.
3. Shortly after the Chapter 8 Test, provide time for the students to share with the class their real-life experiences using fractions.

DOMINION DISCUSSION

1. As students share their experiences using fractions, ask them to tell whether the situation is an example of exercising dominion over the earth and its resources. If the situation is an example, ask the student to explain how the situation relates to man exercising dominion over the earth and its resources.
Also, ask the students to tell whether the situation shows the love of God to others and whether the use of fractions in the situation helped other people.
2. Remind the students that a person is not saved by doing good works; instead, a person is saved when he turns from his sin and places his trust in Christ. After a person trusts Christ as his Savior from sin, Christ enables him to do good works (Ephesians 2:8–10). Using fraction skills for the benefit of others and for God's glory is a good work that is pleasing to the Lord and is one of the good works that God has saved us to do.

LESSON 84

Activity: Calculate regular pay, overtime pay, and the number of hours worked based on pay

Materials

- Pay Stub page for display (page 24 in this section of the CD)

Procedure

- Lead a discussion about working hours and wages beginning with the following or similar questions.

➤ **What time does your parent arrive at work? Answers will vary. depart from work? Answers will vary.**

➤ **How many hours does your parent work per day? Answers will vary. per week? Answers will vary.**

Explain that in the United States employees who work at least 40 hours per week are considered full-time employees and those who work less than 40 hours are usually considered part-time employees.

Some full-time employees are *salaried employees*; they earn a salary or set amount of pay for each pay period.

Other full-time employees are *hourly employees*; they are paid a set amount of money for each hour they work. When an hourly employee is asked or required to work more than 40 hours, the number of hours beyond 40 hours is called *overtime*.

➤ **Is your parent a full-time or part-time employee at his job? Answers will vary.**

➤ **Does your parent ever work overtime? Answers will vary.**

- Explain that most employers are required to pay full-time hourly employees a pay rate that is at least one and a half times the employee's normal pay per hour whenever they work beyond 40 hours.

During the previous two-week pay period, Michael worked 40 hours one week and 52 hours the next week. He earns \$8.50 per hour. How much gross pay should he expect in his paycheck for those two weeks?

- Explain that *gross pay* is the total amount of money earned before any deductions or taxes are taken out.

➤ **What is the total number of hours Michael worked during the two-week pay period? $40 + 52 = 92$ hours**

➤ **How many of the 92 hours are overtime hours? Elicit that 12 hours are overtime because $92 - (40 + 40) = 12$.**

➤ **How could you find the rate of pay for the overtime hours? Elicit that you could multiply his regular pay of \$8.50 by 1.5: $1.5 \times \$8.50 = \12.75 per hour.**

- Instruct the students to write one equation to find Michael's pay for this pay period. **Possible equation: $(80 \times \$8.50) + (12 \times \$12.75) = \$680 + \$153 = \$833$.**

When Andrea finished working on Friday, she checked her time sheet and saw that she worked 42.75 hours for the week. If she earns \$9.25 per hour, how much gross pay did she earn this week?

- Use a similar process to find the number of overtime hours for Andrea **$42.75 - 40 = 2.75$** and her pay per hour for overtime. **$1.5 \times \$9.25 = \13.875 ; \$13.88 per hour** Elicit that the amount needs to be rounded to the nearest cent.

- Instruct the students to write one equation to find the amount Andrea earned. **Possible equation: $(40 \times \$9.25) + (2.75 \times \$13.88) = \$370 + \$38.17 = \$408.17$**

Michael checked his time sheet and saw that he worked 2.5 hours of overtime during the first week of the pay period and 10 hours of overtime during the second week. His gross income for the pay period was \$979.63. Is this amount of pay correct for the hours he worked?

➤ **Use Michael's regular pay rate of \$8.50 per hour to find whether the amount of Michael's gross pay is correct. Methods will vary; possible solution: $\$979.63 - \$680 = \$299.63$ (gross pay – regular pay for 2 weeks = overtime pay); $\$299.63 \div \$12.75 = 23.5$ hours (overtime pay ÷ overtime pay rate = number of overtime hours).**

➤ **Is Michael's gross pay correct for 80 hours of regular pay and 12.5 hours of overtime? No; he was paid for 23.5 hours of overtime instead of 12.5 hours.**

Explain that it is possible that the company could have made a mistake in calculating his pay or that he may have received a bonus.

- Discuss the three different tables on the Pay Stub page. Explain that *net pay* is the amount of money an employee receives after all taxes and other deductions were subtracted from his gross pay.

DOMINION DISCUSSION

Guide the students in a discussion on what Michael's response should be if he knows his paycheck is incorrect.

➤ **Michael knows that he didn't work that much overtime for that pay period. What do you think he should do about the error in his paycheck? Answers will vary.**

- Read Proverbs 11:1 aloud. Explain that this verse teaches us what God thinks about a person being dishonest. During Bible times, the value of a product was often determined by its weight. Dishonest merchants might have used false weights on their balances to make a product appear to be heavier than it actually was. The customer would then overpay for the product. God hates when someone cheats another person in this way. However, God is pleased when money is exchanged in an honorable way.

Although Michael did not make the mistake in his paycheck, as a Christian he should love what God loves (a just weight) and hate what God hates (a false balance); therefore, he should report the overpayment error to his employer so that his paycheck can be corrected.

- Point out that math is used to give a value to many things in our world. Being able to accurately add, subtract, multiply, and divide money amounts is a powerful way to recognize and love "a just weight" and to recognize and despise a false balance.
- Tell the students about times when you were challenged to be honest about a fair exchange. Allow them to share similar stories.

Pay Stub



Company A
100 Working Lane
Sundale, LA 12345

Michael Jones
ID: 98765
1601 Peaceful Place
Sundale, LA 12345

Description	Rate	Hours	Earnings	Year to Date
Regular Earnings	8.50	80.00	680.00	6,800.00
Overtime Earnings	12.75	23.5	299.63	1,245.73

Deductions	Year to Date
Federal Tax	146.94
State Tax	68.57
SS Tax	41.14
Medicare Tax	28.41

	Gross Earnings	Deductions	Net Pay
Pay Period 3/12/12-3/25/12	979.63	285.06	694.57
Year to Date	8,045.73	2,341.31	5,704.42

LESSON 92

Activity: Calculate the monthly charge for cell phone plans to find the least expensive service

Materials

- Cell Phone Plans for display (page 26 in this section of the CD)

Procedure

- Do you or your family members have a cell phone?
Answers will vary.
- 1. Elicit a variety of uses for cell phones. *Possible answers: call and/or text family and friends, call a place of business, pay a bill, find information on the Internet*
- 2. Explain that the early technology for cell phones was developed in the late 1930s, but it was not until 1984 that the first cell phone was sold to the general public in the United States. The first cell phone cost about \$4,000, and it did not work in many areas because the radio towers needed for using the phones were only in certain locations.
 - Do you think many people were able to purchase a \$4,000 phone? Why? *No; elicit that only the very wealthy could afford to buy it.*
- 3. Explain that the cost of a cell phone is not the only cost to consider when purchasing one. There is usually a monthly charge for being part of a network. Additional charges are incurred if you “go over” (use more than) the number of minutes allotted in your plan and if you choose to use other features (e.g., Internet access, text messaging, Global Positioning System [GPS]).
- 4. Display the Cell Phone Plans page and discuss the plans offered by each company. Explain that when you are considering a new cell phone provider, it is good to know the average number of minutes you talk on the phone each month. Your previous monthly bills contain this information.
 - How could you find the average number of minutes you use per month? *Elicit that you could add the number of minutes you used in 1 year and divide the total by 12.*
- 5. Direct attention to the first problem on the page.
 - How could you find out which plan would be the least expensive for Matt? *Elicit that you must calculate the cost of 1,700 minutes for each plan.*
 - What is the monthly charge for Company A’s plan? *\$59.95 for 500 minutes*
 - How many additional minutes per month will Matt be charged for if he selects Company A? Why? *1,200; $1,700 - 500 = 1,200$*
 - How can you find the monthly charge for the additional minutes that Matt will be charged for? *Multiply the 1,200 additional minutes by \$0.06.*
- 6. Guide the students in writing and solving equations to find the charge for 1,200 minutes for Companies A, B, and C. Write the equations for display.

Company A: $\$59.95 + (1,200 \times \$0.06) =$
 $\$59.95 + \$72.00 = \$131.95$

Company B: $\$64.00 + (1,000 \times \$0.08) =$
 $\$64.00 + \$80.00 = \$144.00$

Company C: $\$89.99 + (200 \times \$0.08) =$
 $\$89.99 + \$16.00 = \$105.99$

 - Which plan would be the least expensive for Matt?
Company C’s plan

- Repeat the procedure for the second problem.

$$\text{Company A: } \$59.95 + (350 \times \$0.06) =$$

$$\$59.95 + \$21.00 = \$80.95$$

$$\text{Company B: } \$64.00 + (150 \times \$0.08) =$$

$$\$64.00 + \$12.00 = \$76.00$$

$$\text{Company C: } \$89.99 + (0 \times \$0.08) = \$89.99$$

- Which plan would be the least expensive for Jorge?
Company B’s plan

- Repeat the procedure for the third problem.

$$\text{Company A: } \$59.95 + (500 \times \$0.06) =$$

$$\$59.95 + \$30.00 = \$89.95$$

$$\text{Company B: } \$64.00 + (300 \times \$0.08) =$$

$$\$64.00 + \$24.00 = \$88.00$$

$$\text{Company C: } \$89.99 + (0 \times \$0.08) = \$89.99$$

- Which plan would be the least expensive for Anna?
Company B’s plan

DOMINION DISCUSSION

- Read John 6:5–12 aloud.
 - What does Jesus command His disciples to do at the end of this passage? *to gather up the pieces of food that were left Why did He command them to do this task? so that nothing would be lost or wasted*
- Read John 6:12 again.
 - How do you think this verse might apply to the reasons that we choose a certain cell phone plan? *Elicit that Jesus gives us an example of not wasting what God has given to us. Although this passage applies to our food, it also applies to our money. We should not waste our money on what we do not need, such as more expensive cell phone plans that include more minutes and/or features than we would use.*

Point out that one of the reasons that we learn math is that it gives us the tools we need to keep us from wasting the money that God gives us.
- Explain that cell phones can help us to exercise dominion (Genesis 1:28). They help us to communicate with other people and accomplish the tasks that God has called us to do. However, part of dominion is *self-dominion*. If we are going to use cell phones well, we must be sure that we are using them in a way that pleases and glorifies God.
 - What are some ways that cell phone use is not pleasing to God? *Answers will vary.*
 - What are some ways that cell phone use is pleasing to God? *Answers will vary.*
- Read Colossians 3:16–17 aloud. Point out that hiding God’s Word in our hearts and meditating on His Word will help us as we endeavor to do our best to please and glorify God in all that we say and do.

Cell Phone Plans

Company A Plan		Company B Plan		Company C Plan	
500 minutes	additional minutes	700 minutes	additional minutes	1,500 minutes	additional minutes
\$59.95/month	\$0.06/minute	\$64.00/month	\$0.08/minute	\$89.99/month	\$0.08/minute

1. Matt used his previous cell phone an average of 1,700 minutes per month. Which of the three company plans would be the least expensive per month for him?
2. Jorge's average cell phone usage per month is 850 minutes. Which plan would be the least expensive for him?
3. Anna spends an average of 1,000 minutes per month using her cell phone. Which plan would be the least expensive for her?

Cell Phone Plans

Company A Plan		Company B Plan		Company C Plan	
500 minutes	additional minutes	700 minutes	additional minutes	1,500 minutes	additional minutes
\$59.95/month	\$0.06/minute	\$64.00/month	\$0.08/minute	\$89.99/month	\$0.08/minute

1. Matt used his previous cell phone an average of 1,700 minutes per month. Which of the three company plans would be the least expensive per month for him?

Company C's plan

2. Jorge's average cell phone usage per month is 850 minutes. Which plan would be the least expensive for him?

Company B's plan

3. Anna spends an average of 1,000 minutes per month using her cell phone. Which plan would be the least expensive for her?

Company B's plan

LESSON 105

Activity: Explore the Pythagorean Theorem

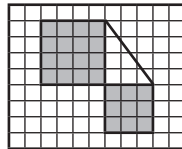
Materials

- Centimeter Graph page (page 29 in this section of the CD) copied on white paper and on colored paper (1 white and 2 colored for every student and the teacher)
- A ruler or straight edge for the teacher and each student
- A roofing square (optional)

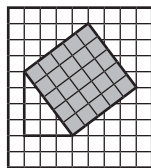
Procedure

- Explain that mathematician, Pythagoras, taught us about certain properties of all right triangles. His proof is called the *Pythagorean Theorem*. Tell the students that they will explore the Pythagorean Theorem in this lesson.
- Display and distribute the Centimeter Graph pages (1 white and 2 colored to each student). Demonstrate as you guide the students in drawing a triangle with a 3 cm base and a 4 cm height near the upper right corner of one of the white Centimeter Graph pages. Use a ruler to draw the hypotenuse and to assure that the sides of the triangle are straight.

- Instruct the students to cut a 3 cm \times 3 cm and a 4 cm \times 4 cm square from the colored grid paper. Demonstrate. Guide them in aligning the squares with the base and height of the triangle. Explain that the sides of the square should be equal to the length and height of the triangle.



- What equation can you write to show the square of the triangle's base? $3^2 = 9$ or $3 \times 3 = 9$
- What equation can you write to show the square of the triangle's height? $4^2 = 16$ or $4 \times 4 = 16$
- Use a centimeter ruler to find the length of the hypotenuse. 5 cm



- Direct the students to cut a 5 cm \times 5 cm colored square for the length of the hypotenuse of the triangle. Align the square with the hypotenuse. Point out that the lines inside this square will not line up exactly with the lines on the grid paper because the square is aligned with a diagonal.

Display these equations for triangle 1.

Triangle 1 square of the base: $3^2 = 9$
 square of the height: $4^2 = 16$
 square of the hypotenuse: $5^2 = 25$

- What equation can you write to show the square of the hypotenuse? $5^2 = 25$ or $5 \times 5 = 25$
- Explain that the square of the hypotenuse of any right triangle will always be equal to the sum of the squares of the other two sides. The Pythagorean Theorem expresses this mathematical rule as $a^2 + b^2 = c^2$.

Write the formula for display. Point out that c always represents the length of the hypotenuse, and a and b always represent the lengths of the other two sides.

- According to the Pythagorean Theorem, is Triangle 1 a right triangle? Yes, $3^2 + 4^2 = 5^2$ or $9 + 16 = 25$.

- Write the following dimensions for display.

Triangle 2: base = 6 cm, height = 8 cm

Triangle 3: base = 9 cm, height = 12 cm

Direct the students to draw Triangle 2 on the white graph paper near the lower left corner of the page with Triangle 1. Draw Triangle 3 in the center of the other white graph paper. Guide them to cut colored squares for the base and height for each triangle and to align the squares as they did for Triangle 1.

- Guide the students in calculating the square of the hypotenuse for triangles 2 and 3 using colored graph paper. Check calculations using substitution and the Pythagorean Theorem.

Triangle 2 square of the base: $6^2 = 36$
 square of the height: $8^2 = 64$
 base + height: $36 + 64 = 100$
 square of the hypotenuse: $10^2 = 100$

Triangle 3 square of the base: $9^2 = 81$
 square of the height: $12^2 = 144$
 base + height: $81 + 144 = 225$
 square of the hypotenuse: $15^2 = 225$

DOMINION DISCUSSION

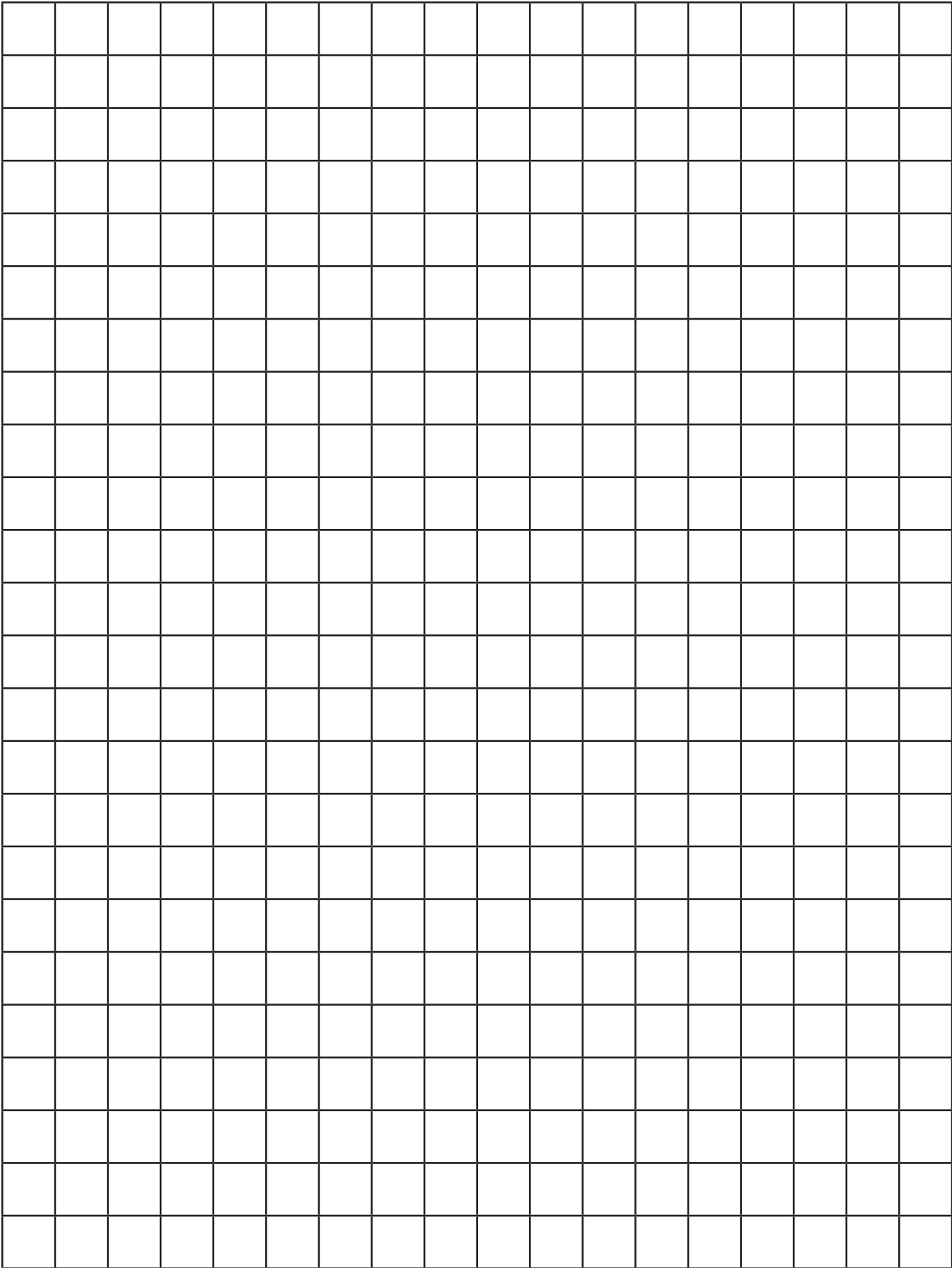
- Point out that mankind was created by God to use the world's resources and properties for the benefit of mankind. Remind the students that God commanded Adam to have dominion over the earth.

Explain that long before the time of Pythagoras, people understood the properties of right triangles and used them to construct buildings that contained true 90° angles. The Babylonians and Egyptians used their knowledge of right triangles to build their great structures. Today, right angles in building structures are what give the foundation and roof their strength and stability.

- Display the roofing square. Explain that it is important to have true right angles when constructing a roof. A roofing square contains a table of measurements based on the Pythagorean Theorem, which helps a carpenter to construct a safe and stable roof. A carpenter needs to have a thorough understanding of this geometric concept in order to use the roofing square correctly.

- How do you think a Christian carpenter can glorify God in his work? Answers will vary, but elicit that if the carpenter has a good mathematical understanding, he can build safe and beautiful buildings for God's glory and demonstrate care for his neighbor and community.
- How can you use your mathematical knowledge to bring glory to God or to demonstrate love or care for someone else? Answers will vary.

Centimeter Graph Paper



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LESSON 112

Activity: Design a package for a product

Materials

- Pictures of packaged products (e.g., a doll or a stuffed animal displayed in an open box; markers or crayons inside their packaging; candy in various types of containers)
- Patterns and ideas for making small paper boxes or packages (from paper craft books or resources on the Internet)
- 1 small item for each student to package (e.g., a small amount of candy, a small stuffed animal, or a set of markers; a small toy car or airplane; inexpensive jewelry)
- Colored construction paper and/or scrapbook paper
- Markers, colored pencils, or crayons for each student
- A ruler for each student
- Transparent or decorative tape for each student

Note

You may choose to allow the students at least one week to complete this project.

Procedure

1. Display the pictures of packaged items.
 - **Why do you think a company designed these packages as they did?** *Possible answers: to draw attention to the product, to protect the product from damage or theft, to explain what the product is or does*
 - **What 2-dimensional or 3-dimensional shapes do you see in the packages of these items?** *Answers will vary, based on the items pictured.*
(*Note:* Some of the pictured packages may have an irregular shape compared to the figures studied in Chapter 12. However, almost all irregularly shaped packages are formed using a more common shape or shapes. For an irregularly shaped package, guide the students in determining what basic shape or shapes were used to design the package.)
 - **What artistic elements do you see in the packaging?** *Possible answers: the shape of the package; the colors used on the package; the fonts used for the name of the product and any other text on the package; the logos or characters that identify the brand*
2. Guide a discussion about the message that is communicated about the product through the art and design of each pictured package. (For example, a package of a product for a young child might have been designed using primary colors, and/or a logo with a friendly looking animal might have been pictured on the package.)
3. Direct the students to refer to the ideas for making paper boxes and packages and to use the construction paper (or scrapbook paper) to make a package (container) for their product. Allow them to make a package like the ones on display from the materials list or to develop their own design. Instruct them to include in their package the following three items:
 - Text that shows the name of the product
 - A character or logo for the product
 - Artistic elements that communicate a message about the product

4. After the students have completed their packages, direct them to write a brief explanation of how and why they designed the package as they did. Display each item and its description in the classroom. Allow time for the students to view and read about their classmates' packages.

DOMINION DISCUSSION

- **Where do you see art and design here at school?** *Possible answers: bulletin board displays; classroom posters; wall and carpet colors at home?* **Possible answers: furniture; wall art; wallpaper; paint colors; flooring patterns at a park or zoo?** *Possible answers: landscaped gardens; stone paths; murals or informational displays and/or signs*
1. Allow the students to share their ideas as to why stores display items that are artistically or creatively designed. Guide a discussion as to whether it would be as pleasing to have all the products in a store wrapped in the same plain boxes with the name of the product printed on the box using the same simple font.
 2. Elicit that the Bible tells us that we are made in the image of God (Genesis 1:26–27). Point out that God is the creator of shapes, colors, patterns, and all that is pleasing and beautiful. These and many other elements of art and design are seen in all of God's creation.

Explain that since we are made in God's likeness, man enjoys creating works of art. Just as God looked at His creation and saw that it was good, so we enjoy the beauty of the items that He enables us to make. Many manmade items that we see in the world (including packages and products) are often made and displayed in a way that allows people to behold some artistic beauty.

Explain that one of the biggest industries in the world today is that of art and design. A Christian who works as an artist or a designer can rejoice in his work, knowing that He is glorifying God by cultivating his God-given ability to create beauty.
- **How can you glorify God by creating beauty?** *Possible answers: setting a colorful and nicely laid out table for a meal; keeping a neat and clean bedroom; keeping an attractive yard or garden; wearing nicely arranged clothing*

LESSON 116

Activity: Use the rate of the speed of sound to solve problems

Materials

- Speed of Sound page for display (page 32 in this section of the CD)
- A tuning fork
- A clear glass of water
- A calculator for each student

Procedure

1. Allow a student to hold the tuning fork to his ear.
 - **What sound do you hear from the tuning fork? none**
While holding the tuning fork near the student's ear, strike the fork with an object so that it makes a sound.
 - **Is the tuning fork making a sound now? yes**
2. Explain that sound didn't come from the tuning fork until it was hit. Call a group of students to the front of the room. Strike the tuning fork again and place it in the glass of water to demonstrate that when the fork makes a sound, it is creating waves (sound waves). Repeat the procedure with other groups of students until each student has seen the demonstration.
3. Explain that sound is created by vibrations. These vibrations move as sound waves through some medium such as air, liquids, or solids. When sound reaches your ear, it causes your eardrums to vibrate, allowing you to hear the noise created by the vibration.
Explain that scientists have studied the speed of sound and have discovered that sound does not travel as fast as light does. Point out that observations of the world around us provide further evidence of this fact.
 - **Which happens first, a flash of lightning or the sound of thunder? Elicit that they happen at the same time, but we see the lightning flash first, and then we hear the sound of the lightning, called thunder.**
The following statements are some other scientific findings about sound.
 - Some sounds cannot be heard by humans but can be heard by animals.
 - There is no sound in outer space because outer space is a vacuum: it has no air, liquid, or solids.
 - Many factors affect the speed of sound.
4. Display the Speed of Sound page. Explain that one of the factors that affect sound is temperature: the warmer the medium, the faster the sound travels. Remind the students that 32°F is the freezing point of water, and therefore, a cold temperature. Explain that scientists have also discovered that sound travels fastest through solids, and then liquids, and travels the slowest through gases.
5. Lead a discussion about using the information in the chart to write equivalent ratios to solve the word problems. Then guide the students in solving the problems, using an approximate number for the number of feet the sound traveled. Encourage them to use mental math to convert from feet to miles using compatible numbers: 5,000 feet \approx 1 mile. You may choose to allow the students to use calculators to check their calculations.

Problem 1: $16,732 \text{ ft}/1 \text{ sec} \times 2/2 = 33,464 \text{ ft}/2 \text{ sec}$
 $33,000 \div 5,000 \approx 6-7 \text{ mi}$

Problem 2: $1,136 \text{ ft}/1 \text{ sec} \times 30/30 = 34,080 \text{ ft}/30 \text{ sec}$
 $34,000 \div 5,000 \approx 6-7 \text{ mi}$

Problem 3: $4,754 \text{ ft}/1 \text{ sec} \times 3/3 = 14,262 \text{ ft}/3 \text{ sec}$
 $14,000 \div 5,000 \approx 2-3 \text{ miles}$

DOMINION DISCUSSION

1. Remind the students that when God created the world and man, He commanded Adam to have dominion over the earth. God wanted people to use the world's resources and its properties for the benefit of mankind.
2. Point out that through an understanding of sound, numerous scientists and inventors have developed technological devices that are beneficial to many people.
Explain that doctors use ultrasound waves in a variety of medical situations. Ultrasound waves are sound waves that are too high for the human ear to hear. Doctors use a device to send sound waves to a specific part of the body that is being examined. The sound is echoed back to a computer that transforms the wave message into an image that the doctor can see. This technology helps doctors diagnose many diseases by allowing them to observe the internal organs. Ultrasound is often used to check the health of an unborn baby inside its mother's womb.
Sonar is a technology that is used in ships and submarines. Point out that the "ping" sound the students may have heard when watching a program about a submarine comes from the use of sonar. In military use, sonar devices allow the echoes of sounds transmitted through the water to identify enemy ships or submarines that are nearby.
3. Discuss the fact that these two types of sound technology have helped to save the lives of medical patients and of soldiers serving in the military. Remind the students that when a Christian uses his understanding of God's creation to protect the lives of other people, he is fulfilling Christ's command to us to love our neighbors as ourselves.

Speed of Sound

Approximate Speed of Sound	
Medium	Speed
Air at sea level, 32°F	1,087 feet/second
Air at sea level, 77°F	1,136 feet/second
Seawater, 32°F	4,754 feet/second
Steel, 32°F	16,732 feet/second

1. On a cold winter day, work was being done on part of a railroad track. Two seconds after the work started, the sound of the hammering could be detected through the vibrating steel at an intersection down the line. Approximately how far away was the work being done from the intersection? Approximately how many miles was the intersection from the area that was being repaired?
2. On a warm spring day, an accidental explosion occurred at a factory. It took about 30 seconds for the blast to be heard in a neighboring town. About how many miles was the town from the factory?
3. A ship sent a sonar signal through freezing water. It took 3 seconds for the sound to reach another ship. What was the approximate number of miles between the ships?

Speed of Sound

Approximate Speed of Sound	
Medium	Speed
Air at sea level, 32°F	1,087 feet/second
Air at sea level, 77°F	1,136 feet/second
Seawater, 32°F	4,754 feet/second
Steel, 32°F	16,732 feet/second

1. On a cold winter day, work was being done on part of a railroad track. Two seconds after the work started, the sound of the hammering could be detected through the vibrating steel at an intersection down the line. Approximately how far away was the work being done from the intersection? Approximately how many miles was the intersection from the area that was being repaired?

$$\frac{16,732 \text{ ft}}{1 \text{ sec}} \times \frac{2}{2} = \frac{33,464 \text{ ft}}{2 \text{ sec}}; 33,000 \div 5,000 \approx 6-7 \text{ mi}$$

2. On a warm spring day, an accidental explosion occurred at a factory. It took about 30 seconds for the blast to be heard in a neighboring town. About how many miles was the town from the factory?

$$\frac{1,136 \text{ ft}}{1 \text{ sec}} \times \frac{30}{30} = \frac{34,080 \text{ ft}}{30 \text{ sec}}; 34,000 \div 5,000 \approx 6-7 \text{ mi}$$

3. A ship sent a sonar signal through freezing water. It took 3 seconds for the sound to reach another ship. What was the approximate number of miles between the ships?

$$\frac{4,754 \text{ ft}}{1 \text{ sec}} \times \frac{3}{3} = \frac{14,262 \text{ ft}}{3 \text{ sec}}; 14,000 \div 5,000 \approx 2-3 \text{ miles}$$

LESSON 131

Activity: Find an approximate metric measurement

Materials

- Thinking Metric page for each student (page 35 in this section of the CD)

Preparation

- Distribute the Thinking Metric Page a few days before you do this lesson. Direct the students to find and record for each category a customary measurement that he has seen at home or in a public place. Instruct the students to leave the Metric Measurement section blank.

Note

- This lesson assumes that you and your students live in the United States. If you live in a country where the metric system is used, change the lesson discussion and questions to help your students become more familiar with customary measurement. Change the title of the Thinking Metric page to *Thinking Customary*. Direct students to record metric measurements on the page; then in class, they will convert the recorded information to the approximate customary measurement.

Procedure

- Guide a brief discussion about the students' international travel experiences using the following, or similar, questions. Accept all reasonable answers.
 - **Have you ever traveled to or lived in a different country? What country?**
 - **How was that country different from the United States?**
- Point out that students who have traveled to or lived in other countries may have noticed that other countries use the metric system of measurement rather than the customary system.
 - **What are examples of the use of the metric system in other countries? Possible answers: road signs indicate the number of kilometers; fruits and vegetables for sale are measured in kilograms; temperatures in weather forecasts are given using degrees Celsius.**
- Explain that in 1790 (during the time of the French Revolution) the French Academy of Science began developing the metric system. They desired to create a system that would be simple to work with by having all the units based on powers of 10. They further desired that the different types of measurements be based on each other; for example, the standard of the gram was determined by the mass of 1 cubic centimeter of water. The metric system is based on concrete measurements; for example, the meter is 1/10,000,000 of the distance from the North Pole to the Equator along a particular meridian.

In 1840 France declared that the metric system was to be used exclusively. All other measurement systems were no longer allowed. After France made this change, many other countries also began using the metric system.
- Explain that in the United States the metric system is not used for recipes, mile markers, weather forecasts, or for the measurement of liquids such as gasoline. However, since 1866 the law has allowed US citizens to use the metric system for selling and trading with other countries. It is used exclusively in the study of science. Today, it is common to see metric measurements on various consumer packages, such as bottles of juice, canned food items, medicines, and so on.

- Direct the students to use the equivalency information on Student Text pages 314 and 316 to convert the customary measurements that they recorded on the Thinking Metric page to metric measurements. Encourage students to use mental math since they are finding approximate answers. Give guidance as necessary.
- Allow students to read aloud an item and its customary measurement that they recorded. Ask them to tell the approximate metric equivalent and to explain how they found that answer. **Accept all reasonable answers and explanations.**

DOMINION DISCUSSION

- Read Genesis 2:19 aloud.
 - **What command did God give to Adam? God told Adam to name all of the animals in the Garden of Eden.**

Discuss the possible difficulties of managing all of the animals without names. Point out that it was probably much easier for Adam to manage the animals after he named them.
 - **How is developing a measurement system similar to giving names to animals? Elicit that the units of measurement have specific names and meanings.**
- Explain that the name "cat" is a symbol invented by humans to represent an animal that has certain characteristics. In a similar manner, a measurement system—foot, yard, mile or centimeter, meter, kilometer—is a set of symbols invented by humans to represent how big or how heavy things are.
 - **Do you think that measurement systems are important? Why? Elicit that measurement systems are very important. Measurements help us to properly manage our God-given resources and to be fair and accurate in dealing with others.**
- Explain that it would be very difficult for us to manage the things God has given to us without standards of measurement. Remind students that, like all other man-created items, the metric and customary measurement systems have strengths and weaknesses.
 - **What is a strength of the metric system? Possible answer: All of the units are based on powers of 10, making it easy to work with.**
 - **What is a weakness of the metric system? Possible answer: It is not familiar to most people in the United States.**
- Engage the students in a discussion demonstrating from a Christian worldview the need to learn about the metric system and how they can use a measuring system to have dominion over God's world (Genesis 1:28).

Thinking Metric

1. Record an item for each category and its customary measurement.
2. Write an approximate metric measurement for each recorded item.

Category & Examples	Item	Customary Measurement	Metric Measurement
Length (height of a person, width of a piece of furniture, height or width of a doorway)			
Capacity (capacity of a glass, capacity of a gasoline tank, capacity of a swimming pool)			
Weight/Mass (weight of a person, weight of a package)			
Temperature (temperature of an oven, temperature outside)			
Distance (distance between home and church, distance across a field)			

LESSON 145

Activity: Enter data into an electronic table

Materials

- A database for organizing school information (an online sample or the program used by your school)
- A basic database application such as MS Access or another computer application that allows tables to be made (a spreadsheet or word processing application)

Note

- If you choose to show the database that your school uses, check with school personnel about how best to display the program to your class without revealing personal or confidential information about students or school personnel.

Procedure

1. Remind the students that data is information that is collected. In this chapter the students learned how data could be organized using various graphs. Direct the students to browse quickly through Chapter 15 of the Student Text.
 - **What kind of data is shown in the different graphs?**
Accept all correct answers.
2. Explain that we often use collected data from various sources to help us accomplish tasks and make decisions.
 - **How can a list of the math test scores for the class help a teacher decide who should be in the advanced math class next year?** *Elicit that the teacher can know which students excel in math by looking at the highest test scores.*
 - **How can data about crime help the police department?** *Elicit that those areas that have the most crime occurrences need to be patrolled more than areas with very little crime.*
3. Point out that most businesses and professions use computer programs to record and manage collected data in a *database*. The data might include customer contact and billing information, employee contact information and work history, and patient information and medical history (including a list of medications taken).

Explain that schools use secure databases that are designed specifically for them to collect data about the administrators, faculty, staff, and students.
4. Display a table from the database. Explain that a database usually contains several tables. Point out that each row is called a *record*; each column is called a *field*. The fields have categories of information.

Briefly display two more tables in the database.

 - **What kinds of tables could a school database contain?**
Possible answers: a table for each student's personal information (address, phone number, guardian information, and ID number); a table for attendance information; a table that shows grade information; a table for extracurricular information; a table for student health or medical information.
5. Explain that new database records or changes to information in fields can be entered in a table or in a form. Discuss the fields in those forms. Point out that forms often contain buttons that allow certain functions to be performed.

Point out that a computer database is helpful because it allows users to coordinate and combine information from all of the different tables.

Explain that once the database is coordinated, an administrator or teacher can find specific information by making a *query*, a request to the database to find information from different tables and to make a list of that information. For example, a teacher can query for a list to show how many sixth-graders were absent during the first quarter of the school year.

- **What information from your school's database could be helpful to teachers?** *Possible answers: a list of students that have all A's; a list of students with A's and B's; a list of all students with severe allergies.*
6. Direct the students to write their first and last names, mailing addresses, email addresses, and phone numbers on paper. Collect the papers and fasten them together; label them with a sticky note that says "student information." Follow a similar procedure to document the extracurricular activities each student is involved in; label the papers "extracurricular." Discuss how to organize the records (rows) and fields (columns) of a table for the student information. Do the same for the extracurricular information.
 - **How could the information in these two tables be useful to the school band director?** *Elicit that he could make written communication much simpler by setting up an e-mail group; he could see if any of his students have conflicting schedules due to their participation in more than one extracurricular activity.*
 7. Use the basic database program or other application to create tables for the two types of information. Allow each student an opportunity to enter data from the two categories until all the information has been entered. Give guidance as needed. If you use a database program, demonstrate simple queries based on the data collected (e.g., a list of the students in your class who play soccer; a list of all the students in the class who have the same zip code; a list of the students who are involved in 2 or more extracurricular activities).

DOMINION DISCUSSION

1. Read Colossians 3 aloud. Explain that this chapter instructs Christians in having a heavenly perspective while here on earth. This heavenly perspective is seen in a Christian's relationships with others and with God. Direct attention to verses 23–24. A person who has been forgiven of his sins and delivered from eternal punishment should desire to do his best in all things, serving the Lord Jesus Christ, Who paid the penalty for his sins.
2. Point out that being able to make or use a computer application, such as a database, is one way that a Christian can do his best for the Lord. Using a database allows some tasks to be done faster, so that more time can be spent on more important matters. Computer programs can help with organizing medical records; access to such information enables medical personnel to treat patients and to help save lives. Allow students to give other examples.
3. Remind the students that God will reward us when we do our best in our everyday duties, which may include using a computer program to organize data (verse 24).

LESSON 148

Activity: Record encounters with probabilities

Procedure

1. Explain to the students that, at the end of Chapter 16, they will need to record real-life situations in which either they or a family member hear of or use probability. Suggest that the students make notes about the situations as they notice them, including the specific probability statement that was used (e.g., parents determining the probability of rainy weather on the day an outdoor event is scheduled; a pastry shop owner using probability to determine the number of pastries needed for a weekend).
2. On the day of the Chapter 16 Review or the Chapter 16 Test, direct each student to record at least two of the situations in the Journal section of his math notebook. Explain that each situation should be recorded using at least 4 well-written sentences and should include the specific numbers that were used.
3. At some point after the Chapter 16 Test, provide time for the students to tell about their real-life experiences with probability.

DOMINION DISCUSSION

1. As the students tell about their experiences with probability, ask them to explain whether their situation is an example of exercising dominion over the earth and its resources and/or showing love to God.
2. Remind the students that God's Word teaches us that a person is not saved by doing good works. A person is saved when he trusts in Christ as his Savior from sin. God then enables us to do good works (Ephesians 2:8–10). Using your understanding of probability for the benefit of others and for God's glory is a good work that is pleasing to the Lord and is one of the good works that God has saved us to do.

LESSON 159

Activity: Balance a bank register

Materials

- Seth's Account Balances page for teacher display (page 39 in this section of the CD)
- Seth's Account Balances page for each student

Procedure

1. Display and distribute Seth's Account Balances page. Explain that Seth recently opened a checking account for his produce business. The activity on this page will show the debits and credits to Seth's account from April to August.
 - **When Seth deposits money into his account, it is called a credit. What happens to Seth's account balance when an amount of money is a credit? Elicit that a credit adds to an account; the balance goes up, or increases.**
 - **When Seth pays for an item or service from his account, it is called a debit. What happens to Seth's account balance when an amount of money is a debit? Elicit that a debit subtracts from an account; the balance goes down, or decreases.**

Point out that paper checks may be used to pay for items or services, but that people often use a debit card to pay with money from their checking accounts.
2. Guide the students in reading the text on the page through number 2. Point out the corresponding information on the checkbook register. Explain that a checkbook register is a table where the credits and debits of an account are listed. Keeping track of the debits and credits in a timely manner allows a person to know how much money is in his account at any given time.
3. Choose a student to answer question 3 and to explain his answer. **A negative balance; Seth will not have enough money to make a \$5.00 purchase because he has only \$2.00 in his account. He would have a -\$3.00 balance.**

Explain that most banks charge a fee if someone has a negative balance in his account. A standard fee for writing a check that exceeds a person's bank balance is about \$30.00.

 - **What would Seth's checking account balance be if he wrote a check for \$5.00, resulting in the bank charging him \$30.00 because he didn't have enough money in his account to cover the check that he wrote? $\$2.00 - \$5.00 - \$30.00 = -\33.00**

Point out that if you write a check for a purchase, and you have an insufficient amount of money in your checking account to cover that check, the store to which you wrote the check will usually also charge you a fee.
4. Guide the students in reading numbers 4–5, entering them in the check register and calculating the balance after each transaction.
5. Choose a student to answer question 6 and to explain his answer. **-\$4.00; elicit that since Seth only has \$4.00 in his account, writing a check for an \$8.00 purchase would give him a -\$4.00 balance. A \$30.00 fee charged by the bank would give him a balance of -\$34.00. Another fee would likely be charged by the store, giving Seth a deficit greater than -\$34.00.**

- G. Guide the students in recording the deposit given in number 7 and the balance after the transaction. Then guide the students in recording the deposits listed in number 8. Reinforce financial responsibility and good stewardship as the balance is recorded after each transaction.

➤ **What is Seth's account balance after his deposit on August 26? $\$301.00$**

DOMINION DISCUSSION

1. Read Proverbs 27:23 aloud. Point out that all of us have been blessed with possessions and money.
 - **Do you think God is pleased when a person does not keep track of the money in his account and loses money because of overdraft fees? Why? No; elicit that this verse teaches us that we should keep track of our possessions so that we don't lose what we have.**
2. Explain that having a good understanding of positive and negative bank balances can help us to obey God's Word and bring Him glory. Discuss other ways to manage your money in a way that pleases the Lord. Possible ideas include the following: first setting aside your tithe and offering, not incurring library fines, paying bills on time to avoid late fees, following the speed limit so that you are not fined for speeding, and so forth.

Seth's Account Balances

Seth sells garden produce at the farmer's market. Using the entries below, help Seth balance his checkbook by adding what he earns and by subtracting the expenses.

1.	April 1	Opened checking account with a \$50.00 deposit
2.	April 2	Wrote check 100 to Pleasant Hill Seeds for \$48.00
3.	April 5	Will Seth have a positive or negative balance if he makes a plant purchase of \$5.00?
4.	April 10	Deposited \$30.00 from a yard cleanup job
5.	April 15	Wrote check 101 to Happy Valley Greenhouse for \$28.00
6.	April 29	Seth would like to purchase a new hoe for \$8.00. What will his account balance be if he writes a check?
7.	May 20	Deposited \$20.00 from a lawn mowing job

8. Seth made the following deposits in July and August from the money he earned selling produce at the farmer's market:

July 8	\$20.00	July 15	\$27.00	July 22	\$38.00	July 29	\$39.00
August 5	\$42.00	August 12	\$43.00	August 19	\$36.00	August 26	\$32.00

9. What was the account balance after the deposit on August 26?

[illegible]

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9. What was the account balance after the deposit on August 26?

Check Number	Date	Description of Transaction	Payment/Debit (-)		Deposit/Credit (+)		Balance	
	4/1	Open account			\$50	00	\$50	00
100	4/2	Pleasant Hill Seeds	\$48	00			\$2	00
	4/10	Deposit			\$30	00	\$32	00
101	4/15	Happy Valley Greenhouse	\$28	00			\$4	00
	5/20	Deposit			\$20	00	\$24	00
	7/8	Deposit			\$20	00	\$44	00
	7/15	Deposit			\$27	00	\$71	00
	7/22	Deposit			\$38	00	\$109	00
	7/29	Deposit			\$39	00	\$148	00
	8/5	Deposit			\$42	00	\$190	00
	8/12	Deposit			\$43	00	\$233	00
	8/19	Deposit			\$36	00	\$269	00
	8/26	Deposit			\$32	00	\$301	00