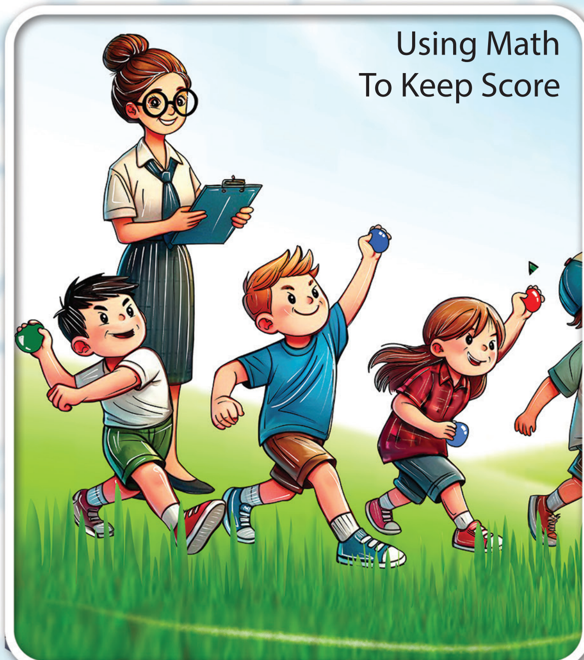
Core Knowledge® MATHEMATICS

Connecting Math to Our World:
Using Math Every Day


Using Math To Make Things


Using Math In Music


Using Math To Keep Score


Measuring To Compare

THIS BOOK IS THE PROPERTY OF:

STATE ____________

PROVINCE ____________

COUNTY ____________

PARISH ____________

SCHOOL DISTRICT ____________

OTHER ____________

Book No. ________

Enter information in spaces to the left as instructed.

ISSUED TO	Year Used	CONDITION	
		ISSUED	RETURNED

PUPILS to whom this textbook is issued must not write on any page or mark any part of it in any way, consumable textbooks excepted.

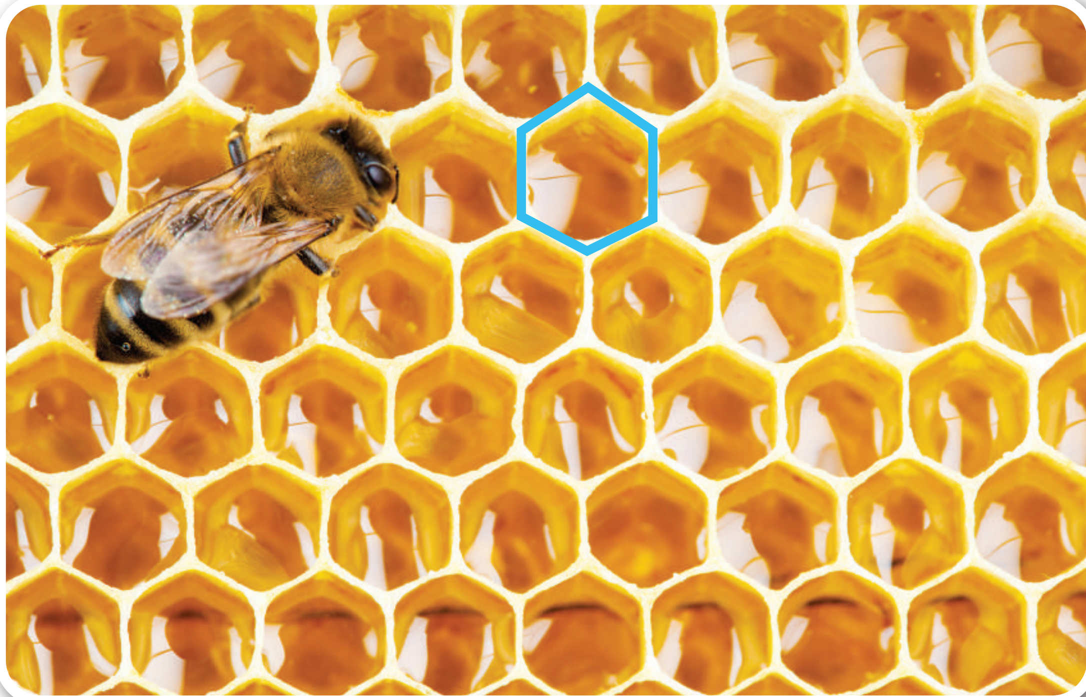
1. Teachers should see that the pupil's name is clearly written in ink in the spaces above in every book issued.
2. The following terms should be used in recording the condition of the book: New; Good; Fair; Poor; Bad.

Using Math Every Day

ISBN: 979-8-88970-537-6

Using Math Every Day

Table of Contents



Let's explore math in our world!

Math is everywhere, even in nature.

Math helps us plan . . .
a pizza party.

Math helps us create. . .
a gift for your grandmother.

Math helps us answer questions like . . .
is it an insect?

What else can math do?

Let's find out!

CHAPTER 1

Math Is Everywhere!

Sasha comes into the house and hears some strange sounds. She walks into the living room to discover her younger brother Michael setting up a game.

“Michael, I thought you said you have math homework to do,” says Sasha.

“I do. But math is boring. It is too hard,” replies Michael.

“What are you talking about, Michael? Math is fun!” Sasha exclaims. “You use math all the time. Math is everywhere!”

“Sasha, the only time I use math is at school. And it is not fun,” says Michael.

“Well, let me show you a thing or two about math,” Sasha exclaims.

“Do you remember when we took turns playing that game on my phone last week?” asks Sasha.

“Yes, and I remember I won each game we played,” replies Michael.

Sasha asks Michael, “How do you know you won?”

“Because my scores were higher than your scores,” Michael says.

“Without math, you can’t keep score. And if you can’t keep score, you’ll never know who wins,” says Sasha.

“Oh, man! We have to keep score! That’s how we know I beat you every time!” Michael says with a grin.

"What about when we made chocolate chip cookies. We used math to measure the ingredients and the time they baked," Sasha says.

"Okay, that was fun. Remember how I almost put 2 cups of sugar in the bowl instead of 1 cup?" Michael asks.

Sasha laughs. "Yes, that would have been one super-sweet cookie!"

"You know what's better than baking cookies? Eating them!" Michael says with a smile.

Sasha asks her brother, “Michael, how did you use math when you bought that toy train you wanted last month?”

Michael replies, “Well, I earned money by doing extra chores. Then mom and I looked online to find the cheapest place to buy the train. I guess we used some math to find out how long it takes to get to the store. Of course, we used money at the store, too.”

“Without math, you wouldn’t have known when you had enough money to buy the train! I am proud of you!” says Sasha.

"I guess you are right, Sasha. Math is everywhere. And I have had a lot of fun using math. Do you think you could help me with my math homework?" Michael asks.

Sasha replies, "Absolutely! Maybe after we finish, we can play some more games."

Main Idea

We use math every day.

Puzzled

When you hear the word *puzzle*, you probably think of jigsaw puzzles. But there are many types of puzzles. Puzzles are problems that we solve. They are designed to make solving problems fun. They make us use our imaginations. Puzzles make our brains stronger!

Jigsaw puzzles have you put pieces of pictures together.

Other puzzles have you take tangled objects apart.

Some puzzles use numbers.

Others use letters and words.

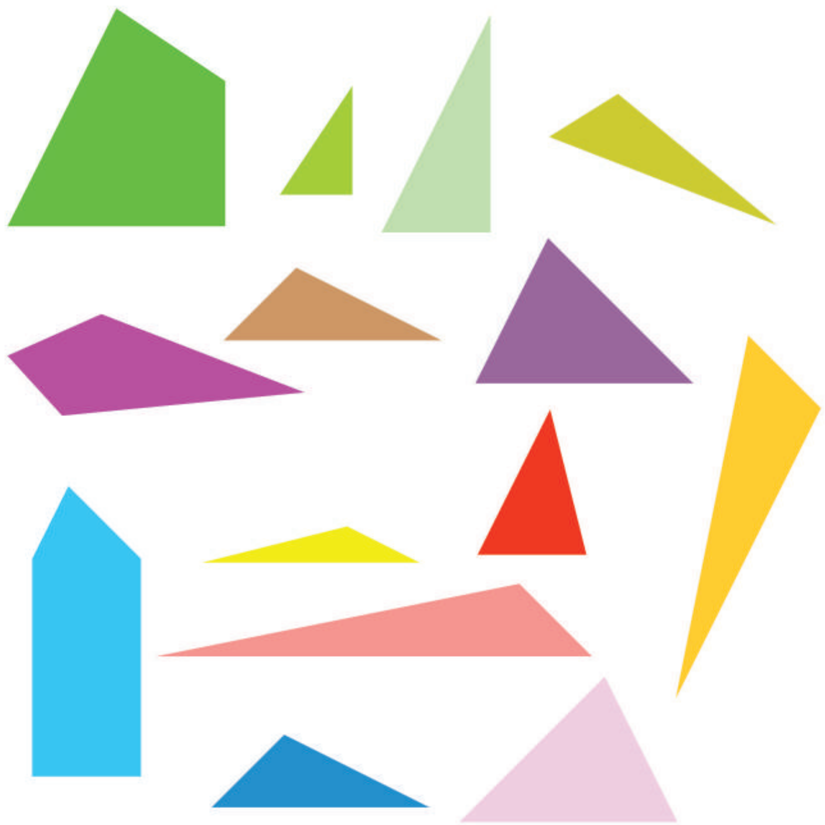
The jigsaw puzzle was invented in 1766. John Spilsbury was a British mapmaker. He glued one of his maps onto wood. Then he cut the wood into pieces.

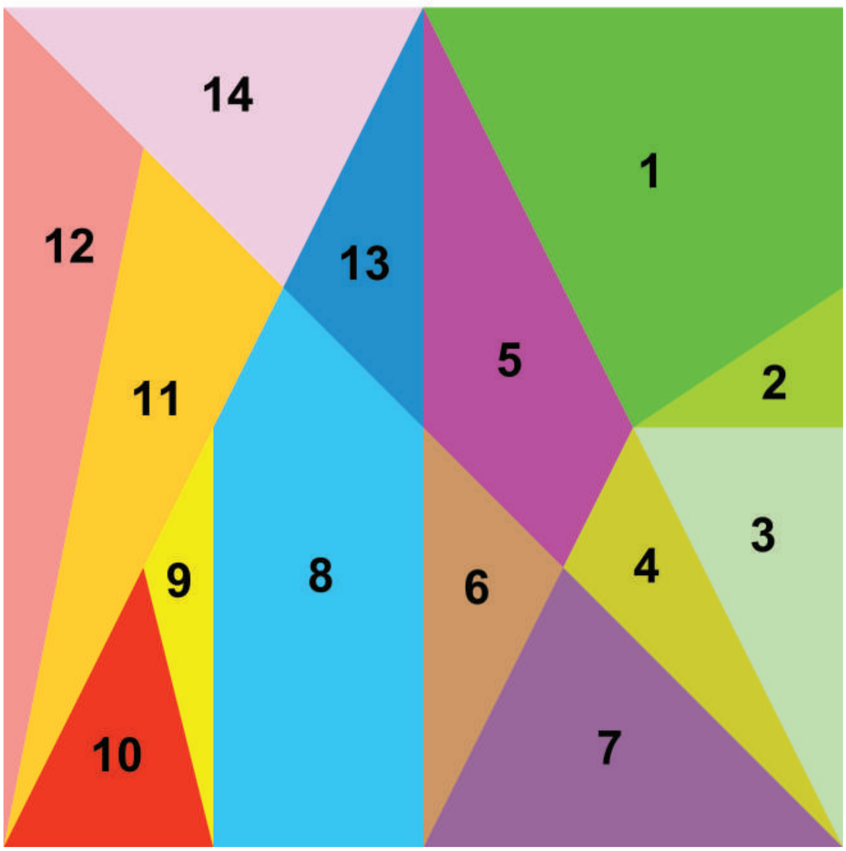
Putting the map back together would help children learn about geography. Soon, people were making puzzles about history, plants, the alphabet, and animals.

To complete a jigsaw puzzle, you have to study the pieces. You have to look at the shape of each piece and the colors on it. What is missing on one piece is found on the pieces that connect to it!

Many years before John Spilsbury made his map puzzle, a Greek mathematician named Archimedes created a puzzle made of 14 pieces with flat sides and different numbers of corners. To solve the puzzle, the pieces must be arranged into a box so that they make a square. The puzzle is called Archimedes's box.

Do you think there could be another way to put the pieces together to make a square?





The tangram puzzle was invented in China many years ago. A story of the tangram tells of a king who asked for a new window. A craftsman made a perfect square of glass. He tripped on a rock and dropped the window! It broke into seven pieces: a square, a parallelogram, and five triangles.

The craftsman tried to put the pieces back together. He made a rectangle and then a parallelogram. He couldn't believe how many shapes he could make. The king had so much fun with the seven pieces of glass that he never used them as a window!

Fox

Rearrangement Puzzles

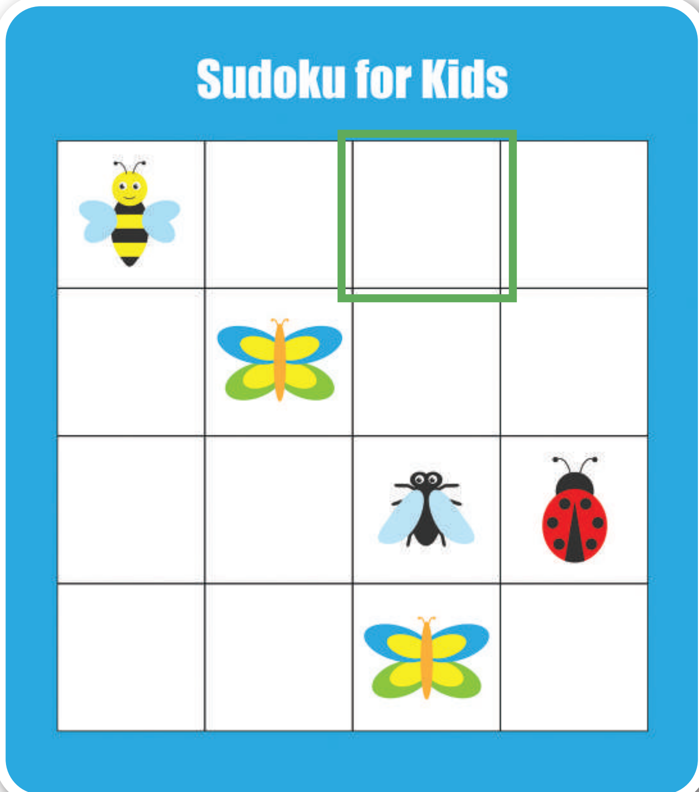
Jigsaw puzzles have pieces that fit with only a few other pieces. Rearrangement puzzles have pieces that can line up in many ways. You can make different shapes!

Cat

Sudoku is a puzzle that uses patterns. A sudoku board is a grid of squares divided into rows and columns. Some of the squares are filled, and some are empty. To solve the puzzle, you must fill the empty squares. Most sudoku puzzles use numbers, but some use pictures. Numbers or pictures can appear only one time

- per row,
- per column, and
- in each bold-outlined box.

Beginner sudoku puzzles use pictures. This puzzle shows four different bugs. Remember that each different bug can only be used once in each column and row. Can you figure out which type of bug should go in the square outlined in green?



More advanced sudoku puzzles use numbers. These number puzzles still use patterns. Look at this puzzle. In the second column, the numbers are 1, 2, and 3. The missing number is 4 because 4 is not found in the column. Can you solve the rest of the puzzle?

4	3	2	1
2	1	4	3
3	2	1	4

A way to check your answers is to find the sum of the numbers in each column or row. Each column or row will have the same sum when the squares are added together. That is because each row or column should have the same numbers in them. In this case, the numbers in each row or column should add up to 10.

Sudoku puzzles can be challenging, but they are fun to solve! To solve the puzzle, you must look for patterns.

Main Idea

Looking for patterns can help you solve puzzles.

CHAPTER
3

Placing the Bases

Alena, Parker, and Honora can see that something is changing at the corner lot. Parker sees his dad working there, and the friends go over to ask Mr. Madison what is going on. Mr. Madison says that they are turning the lot into a baseball field. He asks the kids if they would like to help.

Honora and Alena nod with excitement.

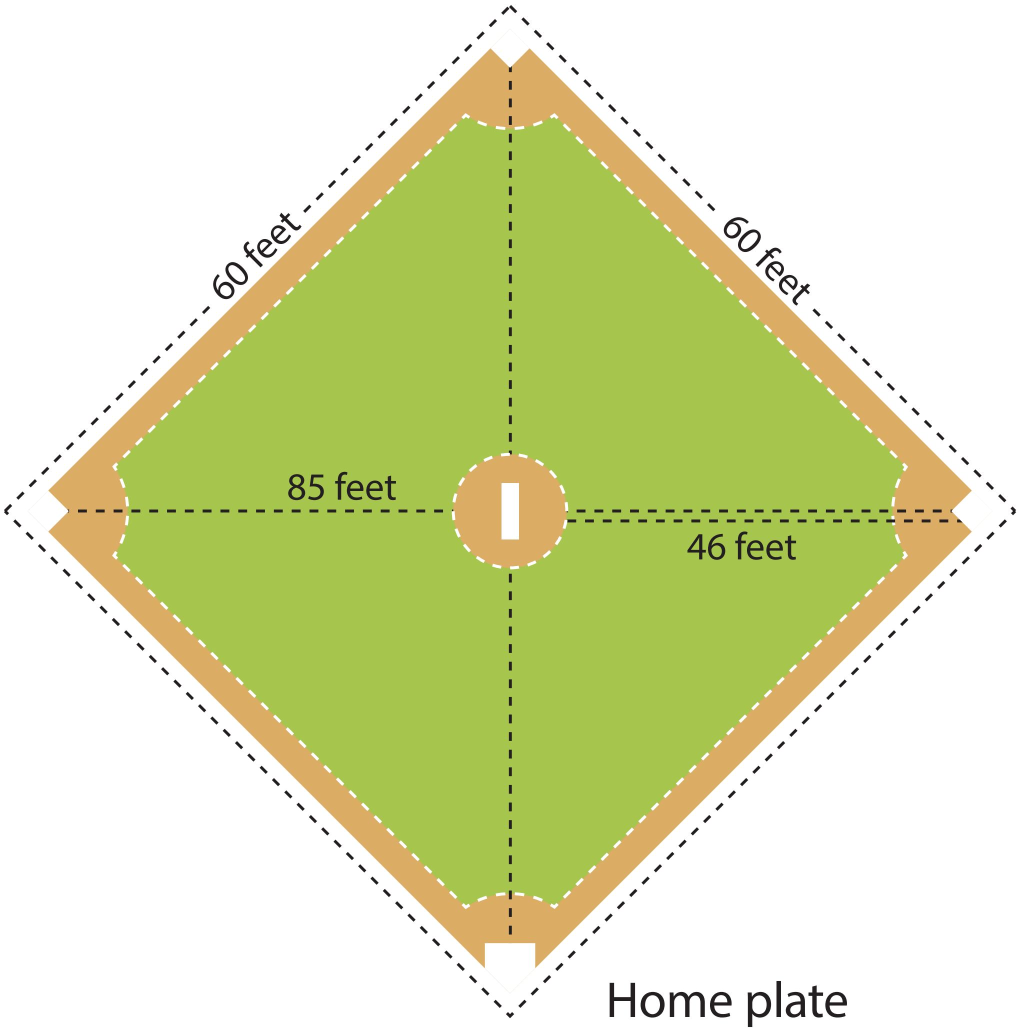
Parker wonders, “How will we know where to put the bases?”

Alena knows all about baseball. It is her favorite sport! “We’ll use math! Right, Mr. Madison?”

“Right!” Mr. Madison unfolds a piece of paper from his back pocket. It is a drawing.

Honora studies the paper. “I can see the 3 square bases and home plate. Home plate has 5 sides instead of 4.”

“You’re right! Notice which way home plate is pointing. We need to make sure ours is facing that way,” Mr. Madison says.



Mr. Madison claps his hands together. “Let’s get these bases on the field. We’ll start with home plate.” Mr. Madison walks to the spot where he wants to put home plate. He hammers a giant red plastic nail into the ground. He places the 5-sided rubber mat down so that the pointed part of the base is on top of the nail’s head. Mr. Madison explains, “Sometimes the bases get moved during a game or storm. The nails make it easy to put the bases back into place without remeasuring.”

Next, Mr. Madison gives Parker a square rubber mat. “That’s second base,” Mr. Madison says. “You need to place it eighty-five feet away from the point of home plate.”

“Why do we put second base down before first?” Alena asks.

“Good question!” says Mr. Madison. “Second base is lined up with home plate. Once second base is in place, we’ll use it to place the other two bases.”

“Would a ruler work?” Honora wonders. “We would have to flip it over a lot of times.”

“We could estimate using our footsteps,” Parker says. “But that won’t be an exact measurement.”

Mr. Madison hands Alena an orange object. It is shaped like a cross and has a handle. Its arms hold a big white tape measure. “It’s a really long tape measure!” Alena exclaims.

Alena places the tape measure’s frame at the point of home plate. Honora grabs the loop on the end of the tape. She and Parker walk straight forward from home base’s point. When they are 85 feet away, they lay the tape measure on the ground.

"Eighty-five feet!" Honora calls.

Mr. Madison jogs over with his hammer and a big plastic yellow nail. He puts a nail in the ground at the 85-foot mark.

"Nice work!" Mr. Madison says. "Second base should be centered over this nail."

"Now we can place the first and third bases. This field has a 60-foot baseline. Does anyone know what that means?"

Parker raises his hand. "It means there's 60 feet between each base."

"That's right! Pro baseball fields have 90-foot baselines. But this field is for kids. I didn't think kids would want to run that far."

Alena crosses her arms and says confidently, “I can run 30 extra feet, Mr. Madison.”

Honora laughs. “That’s only if you get to first base. If you hit a home run, you have to run to all four bases. That’s an extra 120 feet!”

Alena laughs, too. “Sixty feet between bases sounds good to me,” she agrees.

Mr. Madison grins. “Great.” He shows them the drawing again. “Use this to place the first and third bases. Don’t forget to measure to double-check that there is always 60 feet between each base. Then we’ll place the pitcher’s mound. Where does it go, Parker?”

Parker looks at the drawing. “It’s 46 feet away from the tip of home plate. It goes between home plate and second base.”

“What’s after that, Mr. Madison?” Honora asks.

Mr. Madison smiles. “Then we play ball!”

Main Idea

We plan and measure to build playing fields for sports such as baseball.

CHAPTER 4

Finding Math Outdoors

"Did you know you can find math everywhere?" Ms. Walker asks the class. "You are going to collect pictures that show examples of this. We are going to save these pictures to a digital scrapbook!"

Miles raises his hand. "Are we looking for numbers?"

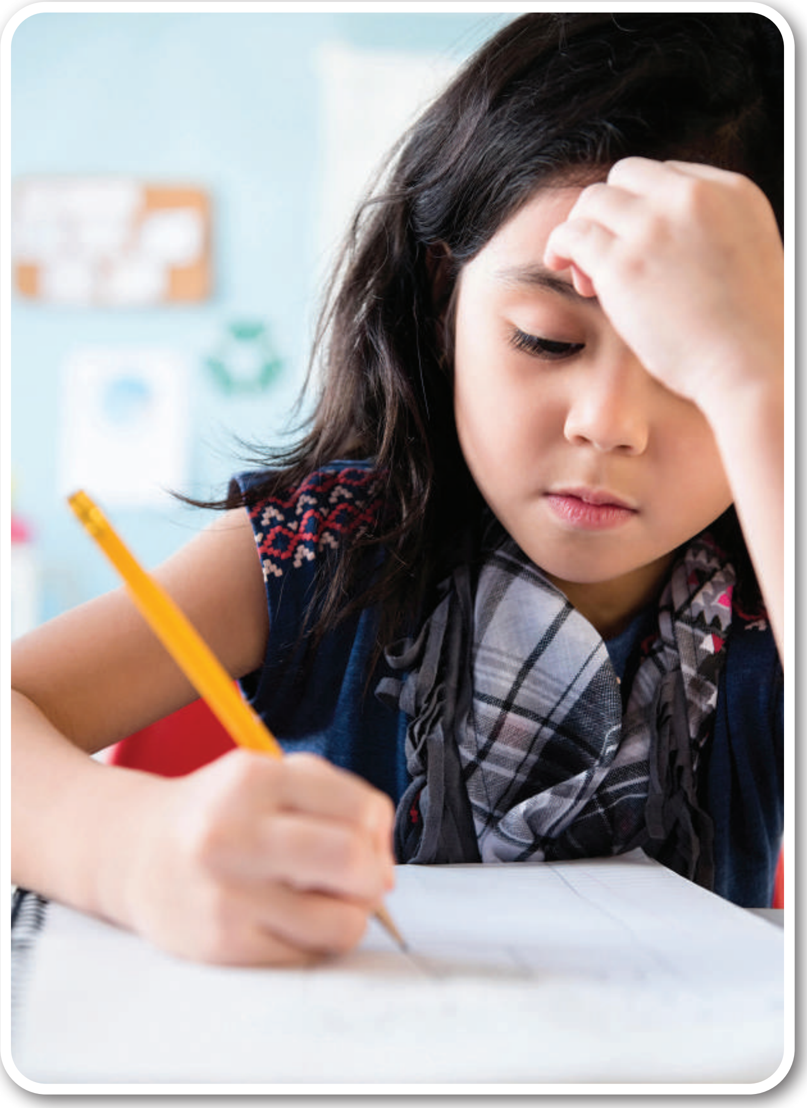
Ms. Walter answers, "We are going to focus on shapes and patterns. The pictures must be things found outside. You can take pictures yourself or find pictures online."

Ms. Walker divides the class into groups of 3. Lilly, Miles, and Becca are excited to be in a group together. Becca suggests, "Maybe we should make a list of things we want to find pictures of first." Lilly and Miles agree with the plan.

Becca puts the label "Shape" on one side of a piece of paper and "Pattern" on the other side of the paper. "Let's start by listing things with patterns. Then we can list shapes found outside," Lilly says. The group starts listing things, and Becca writes them down. Lilly thinks aloud, "A pattern repeats a shape, color, or design. The stripes on a tiger make a pattern."

Miles says, "It is hard to make a list."

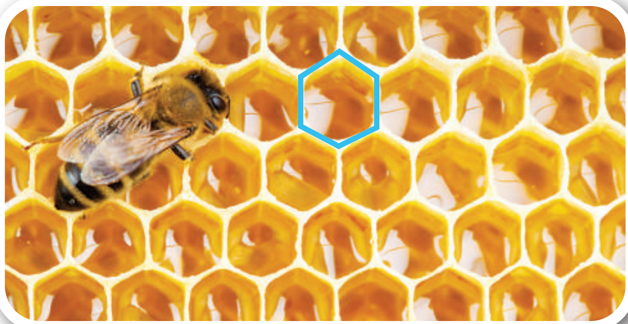
Lilly says, "I think we will be able to find more examples when we are looking at pictures online. This is just to get us started."

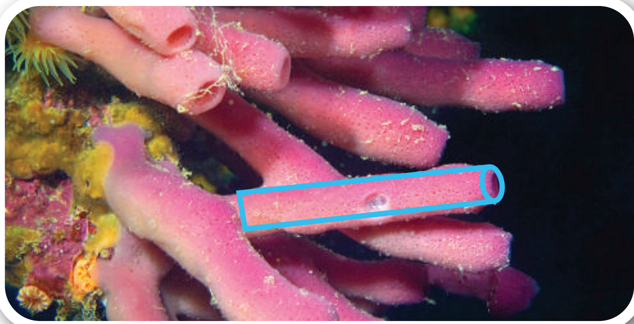


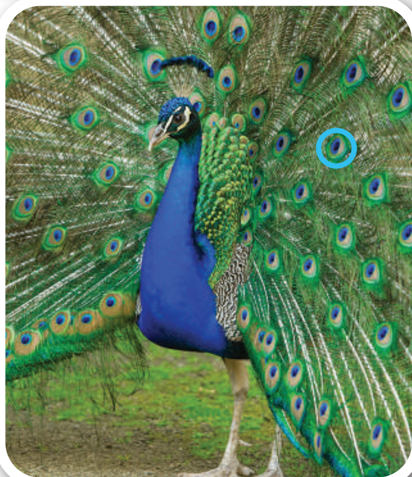
Miles says, “Now that we have our list, let’s start finding pictures for our digital scrapbook.” The group looks over their list and finds pictures of shapes outside.

Becca exclaims, “Wow, I never realized how many shapes are outside!”

Miles replies, “I know! We probably could put 10 slides in our scrapbook just with shapes.”







Next, the students start looking for pictures of patterns.




“Look at the different patterns we found,” says Lilly. What patterns do you see in the pictures? Do you see more than 1 pattern in any of the pictures? Which ones?

Lilly, Miles, and Becca must choose a cover picture for their scrapbook. “What about stripes on a zebra?” asks Becca.

“I think it should be a water drop in a lake,” Miles says.

“I vote for a spider web,” says Lilly. “I don’t think I will ever be able to look at an image again and not look for shapes and patterns!” says Becca.

Miles and Lilly agree.

Main Idea

Math ideas like shapes and patterns are found all around us.

CHAPTER
5

Paper Art

Origami is the art of making objects out of folded paper. Let's take a look at where origami came from and learn how people make this special type of paper art.

Origami began in Japan more than 500 years ago. Paper is even older than origami. Paper was invented in China. Origami figures were made for festivals and celebrations. Some shapes, like cranes, have special meanings for the people who make them.

These first origami artists liked the challenge of making shapes out of a whole sheet of paper without cutting it or using glue.

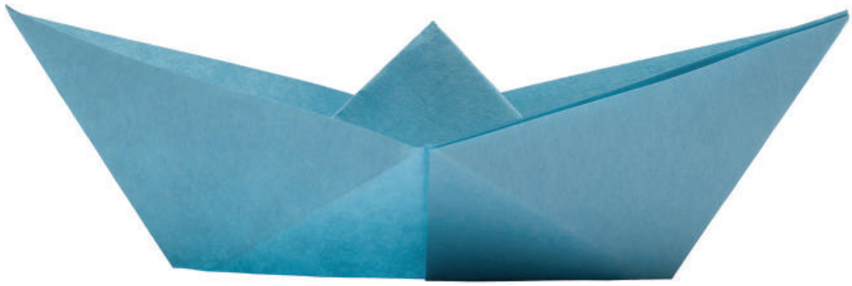
Paper Cranes

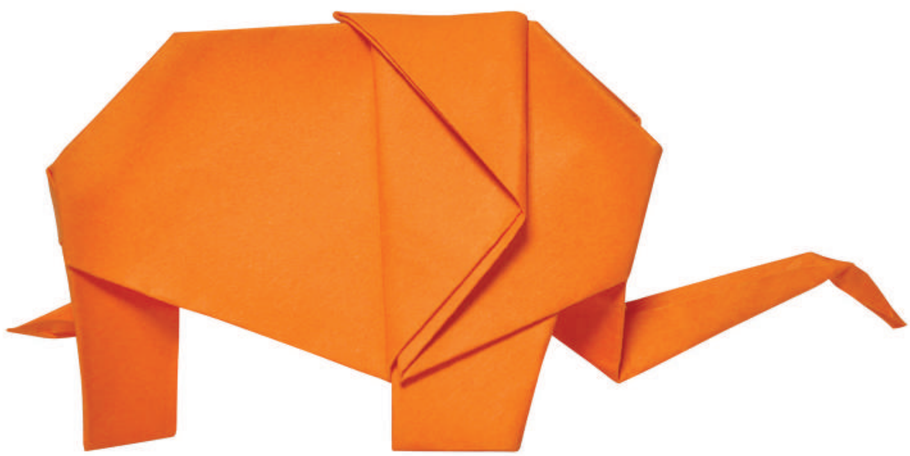
Cranes are the most popular animal made with origami. The crane is a "bird of happiness."

In the 1850s, people from Japan, Europe, and North America saw paper folding as a useful tool to teach about math. The part of math that studies shapes is called geometry. This inspired the Japanese to begin using paper folding as a teaching tool, too. Origami spread around the world.

Origami is a very simple form of art. All you need is a sheet of paper. After that, it's about the artist's creativity!

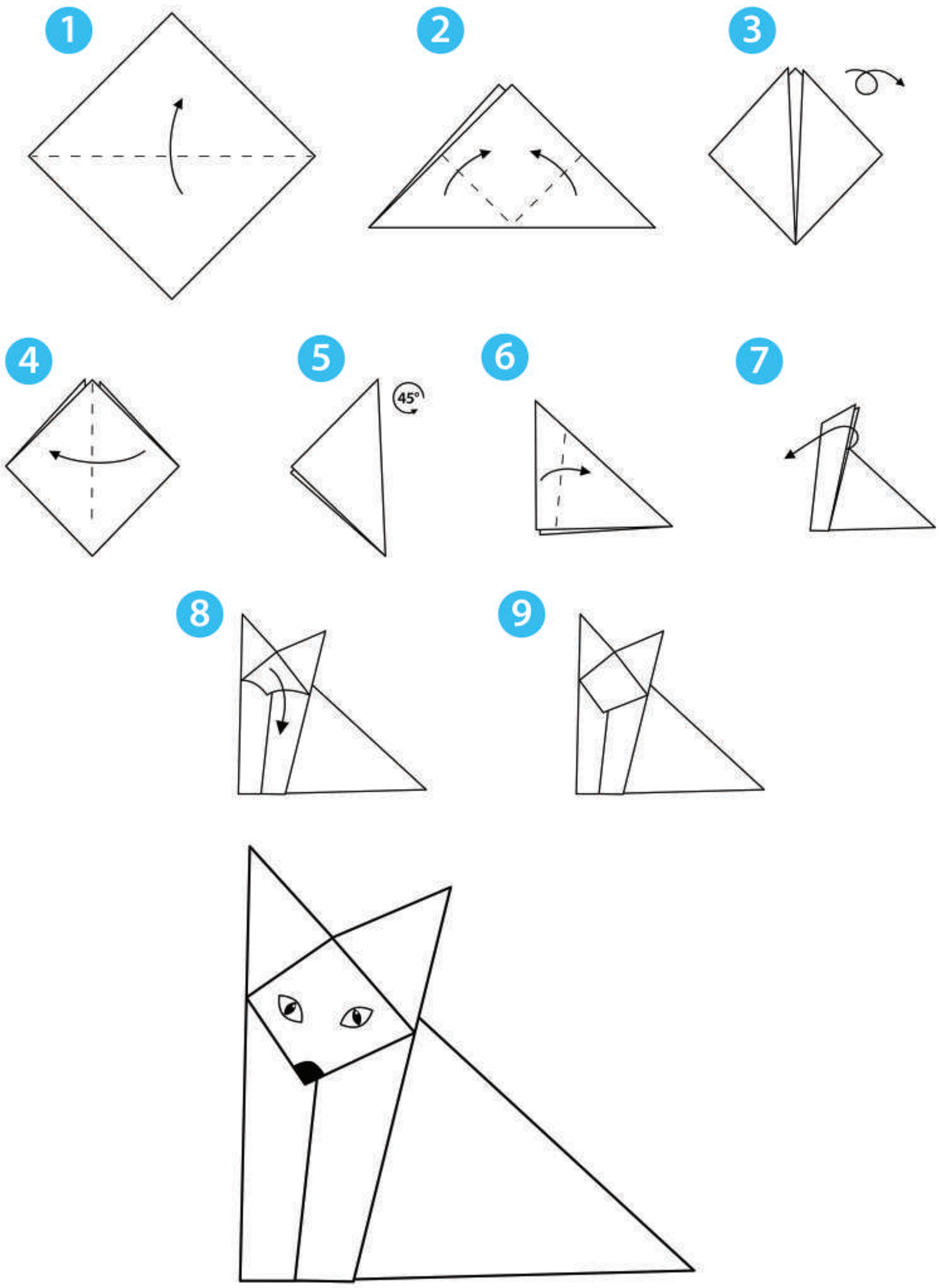
Look at the art on this page. How are all these shapes made? Remember that each fold is made carefully. The angles make new shapes. It's all geometry, and that means math!





Let’s see how origami works. Look at the picture for steps to make a fox.

Do you see that the square paper is folded into triangles? Real foxes have a lot of triangle-like shapes! They have a face that narrows and pointy ears. Triangles are a common shape in origami because they are easy to make by folding.



Origami helps us think about math, like angles, shapes, and solving problems. Origami also allows us to use our time to make beautiful art. It can be a very relaxing and rewarding hobby.

Main Idea

A flat shape can be folded to make many other shapes.

CHAPTER
6

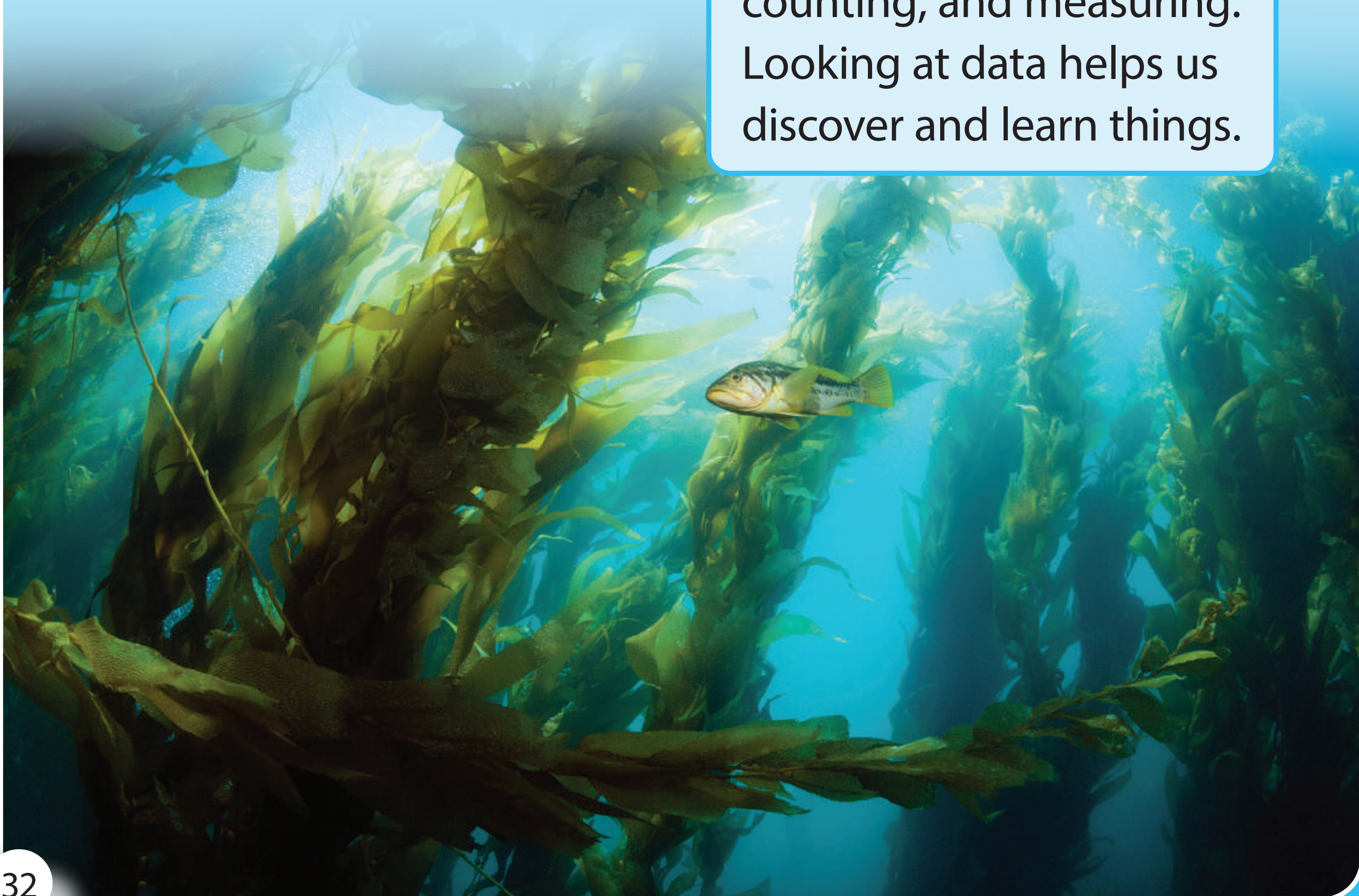
An Ocean Forest

Did you know that there are underwater forests? These forests are made up of kelp. Kelp is a seaweed that grows in groups in cold seas. Animals that live in these underwater forests use the kelp for food.

Scientists use math to gather information so that they can check the health of the kelp forest ecosystem. By gathering this information, called data, scientists learn about the connections between the plants and animals that live here.

What does *data* mean?

Data is information that is gathered by observing, counting, and measuring. Looking at data helps us discover and learn things.



Prickly purple sea urchins eat kelp. In some places, sea urchins have eaten a lot of kelp. Too many sea urchins can mean too little kelp. This means there is less kelp for other animals to eat.

Many animals also use the long kelp leaves to hide from other animals. The kelp also keeps animals safe during strong storms.

Sea otters live in kelp forests and eat sea urchins. One otter can eat hundreds of sea urchins in a day!

Fewer sea urchins mean more kelp for other animals.

Balance is important in nature. If sea otters eat all of the sea urchins, the kelp is safe, but there won't be any more sea urchins to eat. This can mean animals that eat sea urchins will not have food.

There must be the right number of kelp, sea otters, and sea urchins to keep the kelp forest ecosystem balanced so that every living thing has what it needs.

Because scientists compare data over time, they know that when too much kelp is eaten, it can destroy the ecosystem. They know if there are too many or too few of any type of plant or animal in the ecosystem. When the balance is not right or there's a sudden change in the numbers of one group of living things, scientists know they have a problem to solve.

Miles of Forest

Kelp forests can cover huge areas. Scientists gather data about the forests. They monitor, or watch, the data. That tells them about changes over time.

When scientists see that the ecosystem is out of balance, they come up with solutions to help. They can grow kelp and replace what is eaten. They also know when it is time to remove some of the sea urchins from the environment. Scientists can use the data that they collect to know when they need to act to help balance the ecosystem.

Kelp forests are being watched and protected. As scientists help kelp forests, they use math to gather more data. The data can be used to show when an ecosystem is getting healthier, too!

Main Idea

Scientists keep track of how many plants and animals live in an ecosystem to see if it is balanced.

CHAPTER 7

Beach Heroes

Faith's family visits Crystal Lake every Fourth of July. Crystal Lake Beach is Faith's favorite place. She loves swimming in the lake and walking on the beach.

Faith's family gets to the beach as it is getting dark. They watch the fireworks where they can see their bright reflection in the water.

The next morning, Faith and her dad go back to the beach to walk along the water.

As they reach the beach, Faith stares in sadness. The beautiful place that they had enjoyed visiting last night is now a mess! Empty water bottles float in the water. Soda cans dot the sand. Plastic cups are everywhere.

“People can put trash in the trash cans,” Faith says, hugging her sweater closer.

“People can put plastic in the recycling bin, too,” Faith’s dad says.

“Look,” Faith’s dad says, pointing behind her. People wearing bright yellow vests arrive. They carry bags and gloves.

The people work for the city. They are here to clean up the beach. Faith and her dad ask if they can help. Before long, they have gloves and bags and are ready to work.

As they pick up the trash, Faith is deep in thought. What can be done so that the trash doesn’t build up on the beach next year after the fireworks? She looks around and sees that the trash cans on the beach are full. She starts to count the trash cans. “Dad!” she squeals. “There is too much trash to fit in the trash cans that are here. That is the problem!”

Faith's dad slowly nods as he looks around. "I think you are right! I don't mind helping to clean up the beach, but maybe we can find a solution that will solve the problem of the trash on the beach next year."

Faith tilts her head and taps her chin as she thinks. "We can tell the beach needs more trash cans and recycling bins, but how many more?"

Then she notices the bags of trash and recycling. "What if we count the bags we fill to see how many more trash cans and recycling bins we needed last night to keep the beach clean?"

Faith's dad smiles at her. "What a great idea!" he says. "Let's write a letter to the mayor when we get home to share the information you have and how we think this problem can be solved."

Faith makes notes of how many bags have been filled. The beach is beautiful again. The sand is clean. The water sparkles.

As they drive home, Faith and her dad brainstorm what else might keep the trash off the beach. Faith thinks that where the containers are placed might be important, too. She thinks about how using math might help her figure this out.

Faith and her dad write up their ideas, including the numbers she collected, and send a note to the mayor.

"I like thinking of ways to help my community," Faith says with a smile, "and I like using math to figure out solutions!"

Helping to Clean Up

We can all help keep our environment clean. One thing we can all do is tidy up after ourselves! Always pick up your own trash and put it in the right place—that way other people don't have to clean up after you.

Main Idea

Math is used in all kinds of problem-solving, including keeping our communities clean.

CHAPTER
8

Mr. Bixby Bakes

After weeks of getting his new bakery ready, Mr. Bixby is eager to invite customers inside. But before he can open his door, he has one thing left to do: bake!

Mr. Bixby mixes a big batch of bread dough. He knows that the dough needs time to rise, or expand. Mr. Bixby's recipe says the dough needs 2 hours to rise the first time. It needs another 1 hour to rise a second time. That gives Mr. Bixby 3 hours to make cookies while he waits for the bread dough.

Rise and Time

Mr. Bixby uses time to figure out the best way to do things. He makes a schedule of when to do things based on how long certain things take. He sure doesn't want to waste time!

Mr. Bixby plans the cookies for opening day. He knows that people like chocolate chip cookies the best. The next favorite is sugar cookies, followed by peanut butter cookies. He makes a note of this.

Bestsellers
1. chocolate chip cookies
2. sugar cookies
3. peanut butter cookies

Mr. Bixby bakes his cookies on big rectangular baking trays. Because he wants each type of cookie to be a different size, he must figure out how many cookies of each type will go on each tray. He uses a large scoop for the sugar cookie dough. Customers like big sugar cookies! He places 4 rows of scooped dough on the baking tray. Each row has 4 scoops of dough. He adds the total number to his notes.

Bestsellers
1. chocolate chip cookies
2. sugar cookies
3. peanut butter cookies

Cookies per Tray
16 sugar cookies

Mr. Bixby's customers like medium-sized chocolate chip cookies. He uses a medium scoop for the dough. He places 4 rows of chocolate chip cookie dough on the baking tray. Each row has 5 scoops of dough. He adds another note.

The peanut butter cookies sell better when they are small. Mr. Bixby uses the small scoop for these. He puts them in 7 rows. Six of the rows have 7 scoops of dough. The last row has 8 scoops. Figuring that 6 rows of 7 plus 8 makes 50 cookies, he writes down the total.

Mr. Bixby checks his chart to figure out how many trays of each type of cookie he should make.

Besttsellers

1. chocolate chip cookies
2. sugar cookies
3. peanut butter cookies

Cookies per Tray

16 sugar cookies
20 chocolate chip cookies
50 peanut butter cookies

Because chocolate chip is the most popular, he will make a total of 4 trays.

Trays Needed
4 trays of 16 is 64 sugar cookies.
4 trays of 20 is 80 chocolate chip.

The next most popular treat is sugar cookies. He decides to make a total of 4 trays of sugar cookies.

He has 50 peanut butter cookies on 1 tray. That should be enough.

Mr. Bixby quickly and carefully scoops more cookie dough. He lines the round dough on the trays and bakes them. His grand opening has to be perfect!

After they cool, he puts the cookies in the display case. They look ready to eat!

Mr. Bixby is right on time! The bread dough is ready. Mr. Bixby uses half of the bread dough to make pretzels. Some of the pretzels are twisted into loops. They are wide but not very tall. Mr. Bixby can fit 2 rows of twisted pretzels on a tray. Each row has 4 pretzels in it.

The rest of the pretzels are rolled into narrow sticks. Mr. Bixby can fit 6 rows of stick pretzels on a pan. Each row has 2 sticks.

Each Row Counts

Instead of counting every pretzel on the tray, count the number of pretzels in a row and then count the rows. To find the total number of pretzels, multiply these numbers.

Mr. Bixby is glad that he made a plan. He had a lot to do, and it was a lot of work!

To Mr. Bixby, baking doesn't feel like work, though. He loves making things for other people to enjoy. He is ready to open the door to his bakery!

Main Idea

When running a business, we use math to make a plan.

CHAPTER
9

Virtual Bike Adventure

"Destiny, come look at this new bike game. You can use your own bike."

Destiny rushes over to her mom. "Mom, how can I ride my bike in the house?" asks Destiny.

Destiny's mom explains, "Your bike sits on a rack to keep it in place. The rack keeps track of the number of times your wheel turns and sends it to the game. When you pedal, the bike on the game moves."

"Time to start my 25-kilometer ride," says Destiny. "It's 3 kilometers through the woods to Red Riding Hood's grandmother's house."

Destiny smiles at herself on the screen. "I'm glad I made my avatar look like me!"

"Now I'll chase the Gingerbread Man for 6 kilometers. I already biked 3 kilometers. Now I will add 6 more. That's 9 kilometers already. WOW, I love this game! So 25 minus 9 means. I have 16 kilometers to go!"

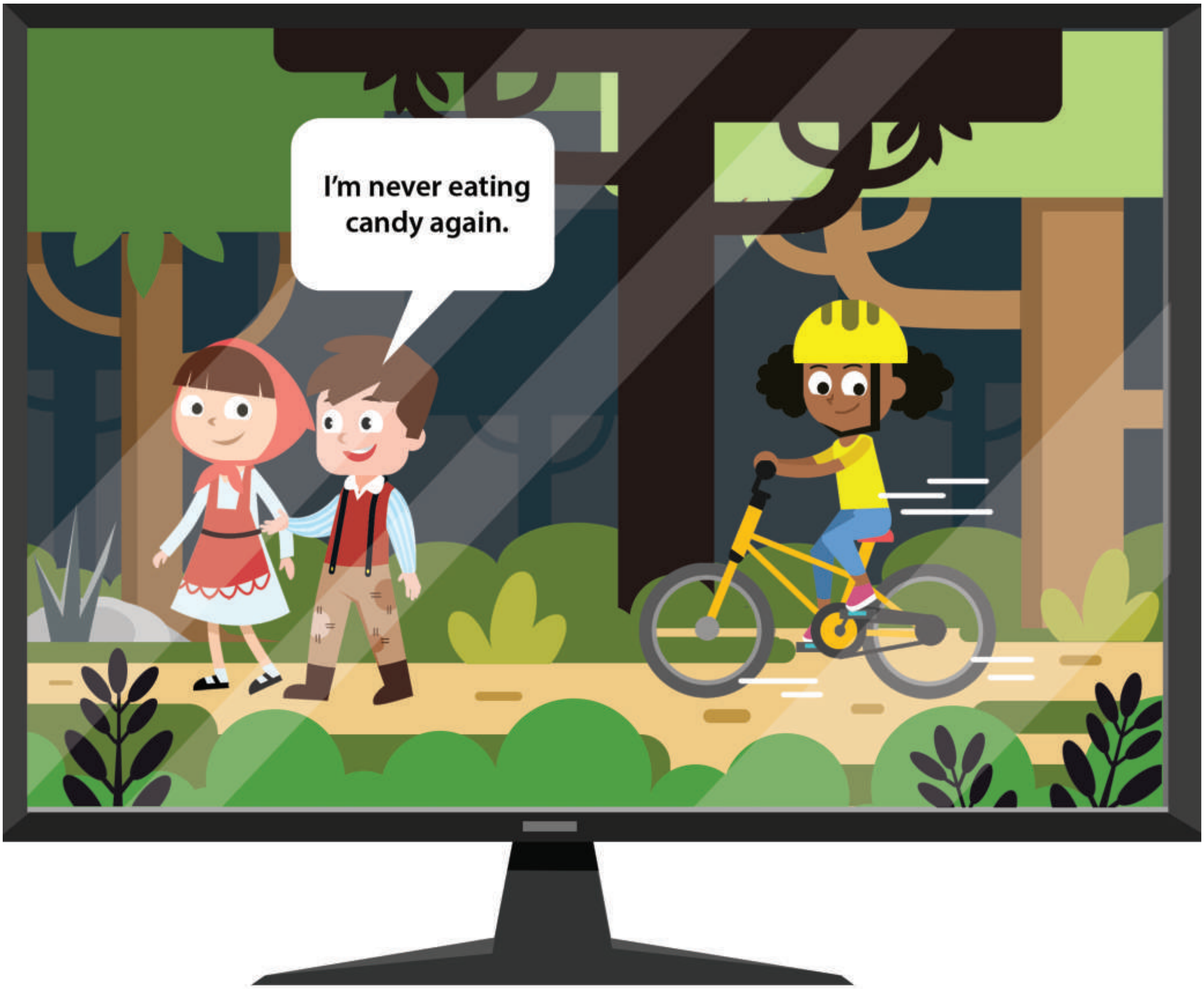
Destiny knows that 25 kilometers is a lot. But she has unlimited time to bike that far. She wonders if the bike on the game will go faster if she pedals faster. She tries it. IT DOES! "This is fantastic!"

How Many Kilometers?

Destiny adds up the distances she traveled. Then she subtracts that number from the total distance goal she has set. This tells her how much farther she has left to go.

"Now it's time to help Hansel and Gretel find their way home," says Destiny. "That's a 5-kilometer ride through the woods."

When Destiny finishes the Hansel and Gretel route, she has to rescue the Three Little Pigs from the Big Bad Wolf. She bikes on a path that is 6 kilometers long to find the Three Little Pigs.



Destiny is almost finished riding! It is time to pass the troll under the bridge and make it to the castle. This final path is 5 kilometers. She knows that completing this path will take her to 25 kilometers total. If she finishes, that means she will reach her goal and earn lots of points for the day's ride!

Destiny cheers. "I did it!"

Destiny thinks about the last time she and her mom rode their bikes outside together. "Mom, maybe next week you can ride with me outside."

Mom says, "I'd like that."

Main Idea

We add and subtract to tell how far we have traveled and how far we have to go.

CHAPTER
10

Beads and Bracelets

Nina crosses her arms. “I don’t know if I have enough beads to make the friendship bracelets,” she says.

Nina’s dad stands behind her. “We ordered 1,000 beads and 100 charms,” he says. “That should be enough!”

“I want to make 50 friendship bracelets, Dad,” Nina says. “This doesn’t look like enough beads.”

“We can count the beads,” Nina’s dad says.

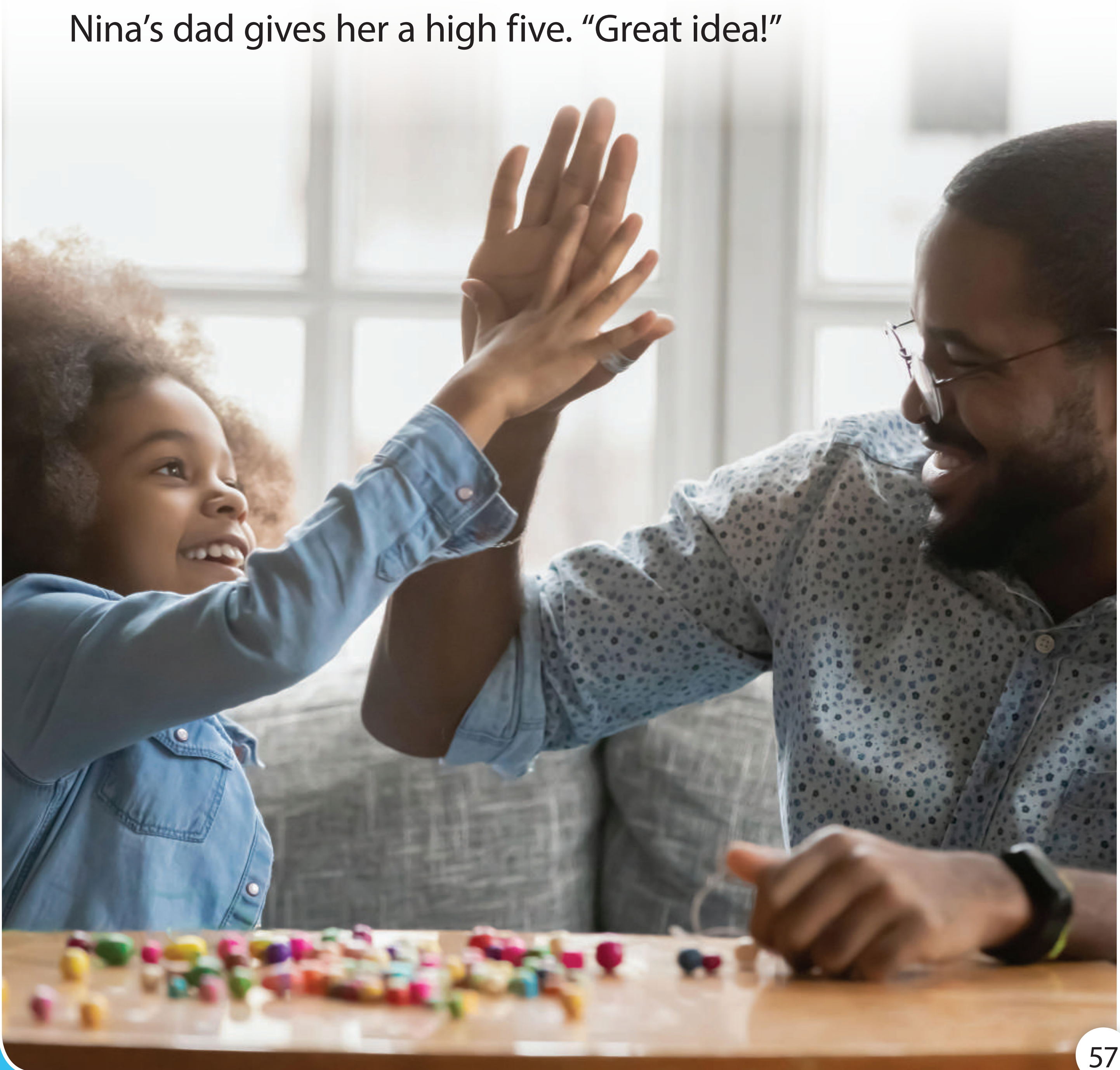
Beads	Charms
1,000	100

Nina says, “We shouldn’t open the bags to count the beads. That will make a big mess!”

Nina’s dad agrees. “And counting all of those beads will take a long time.”

Nina says, “Well, we know that the beads come in bags of 100.” She holds up one bag. “We can skip count!”

Nina’s dad gives her a high five. “Great idea!”



"We start by counting by 100s," says Nina. "Each bag of beads is a set of 100."

"As you count each bag, I'll put the bag in a pile," Nina's dad says.

Nina points to each bag of beads. "First, it's 100, then 200, 300. . . ."

Bags	Beads
1	100
2	200
3	300
4	400
5	500
6	600
7	700
8	800
9	900
10	1,000

Equal Groups

Nina and her dad can skip count the beads because each bag has 100 beads. If each bag did not have the same number of beads, skip counting would not work.

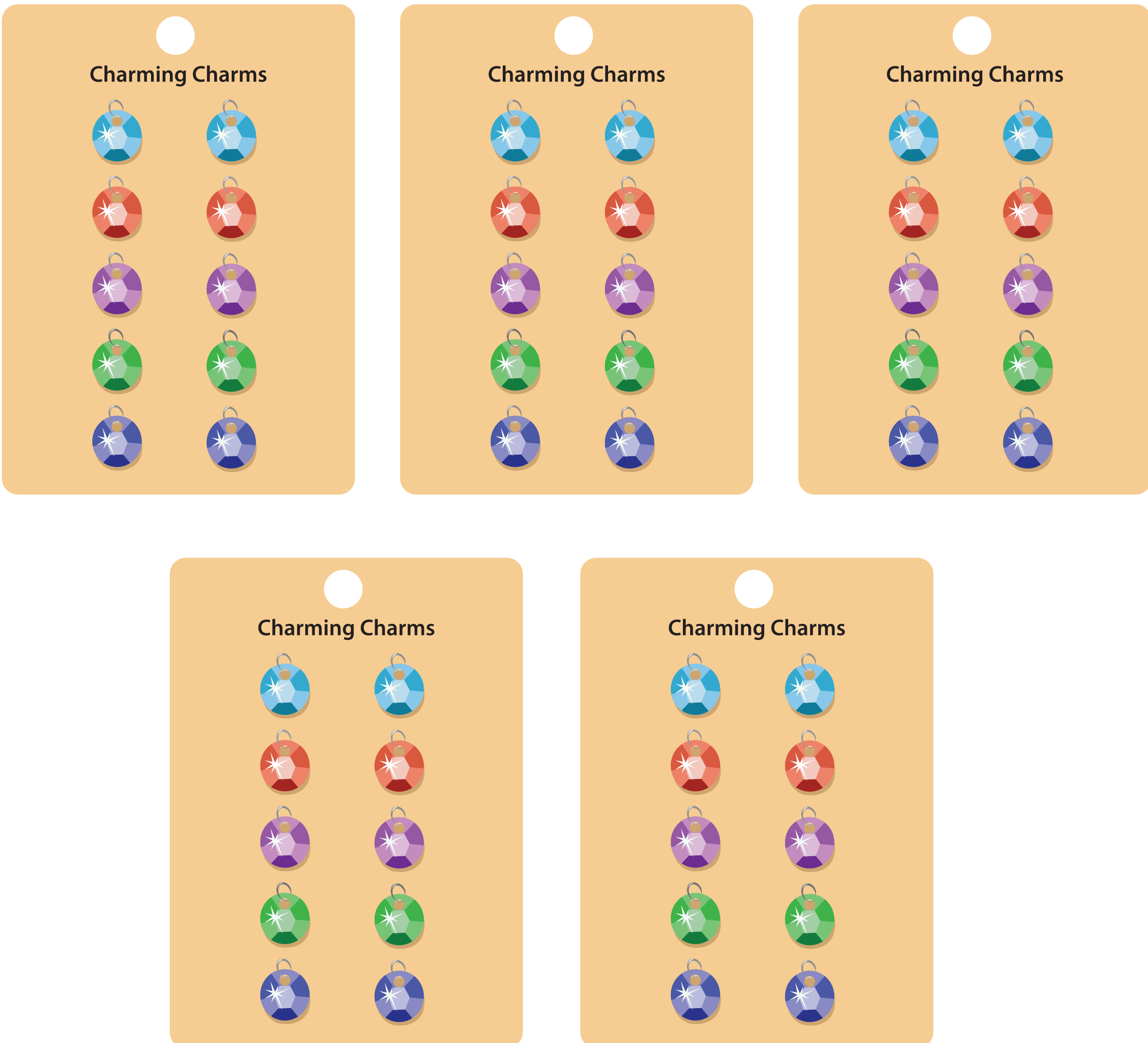
“. . . 800, 900, 1,000!” Nina’s voice gets louder as she finishes counting.

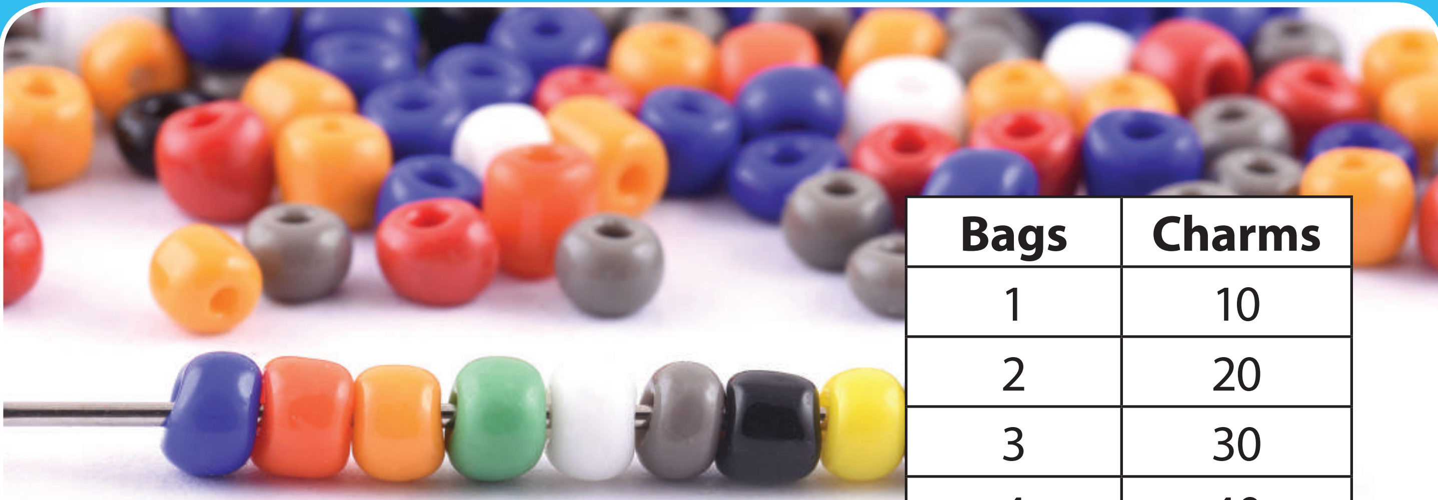
“Great!” Nina’s dad says. “We have all 1,000 beads. Now we should count the charms.”

“There are 10 charms in each bag,” says Nina. “We’ll skip count by 10s.”

Rethink and Recount

How did Nina know that they needed to skip count the charms by a different number?





Bags	Charms
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100

Nina skip counts the bags of charms from 10 to 100. All 10 bags of charms are there.

“We have all 100 charms!” says Nina’s dad.

“Let’s make some bracelets,” Nina says.

Nina and her dad make colorful friendship bracelets with many patterns of beads and charms.

“Done!” Nina says holding up one of the bracelets. “Our friendship bracelets are beautiful.”

“We made so many,” says Nina’s dad. “I think we’re going to need some more friends!”

Main Idea

Skip counting by 10s and 100s helps you quickly count a large number of items.

CHAPTER 11

Planning on a Budget

The soccer team's kickoff party is only days away! Honora, Parker, and Alena meet Talia, the soccer coach, after practice.

"My mom said 40 people are coming to the party," Parker says. "I think we need 40 pizzas for the party!"

"That's a lot of pizza," Talia says.

Coach Talia says, "Let's think through our details and plan."

Party Planning

Part of planning involves figuring out how much of something you will need. When planning a party, you must know how many people will attend.

"The budget for the party is $100," says Talia.

"Is that enough for 40 pizzas?" Parker asks.

"Let's see if we really need 40 pizzas," Talia says. "And we are going to need more than just pizzas to have a fun party."

"Let's make a list of everything we will need," says Honora.

"Then we will see how much of each thing we need," adds Alena.

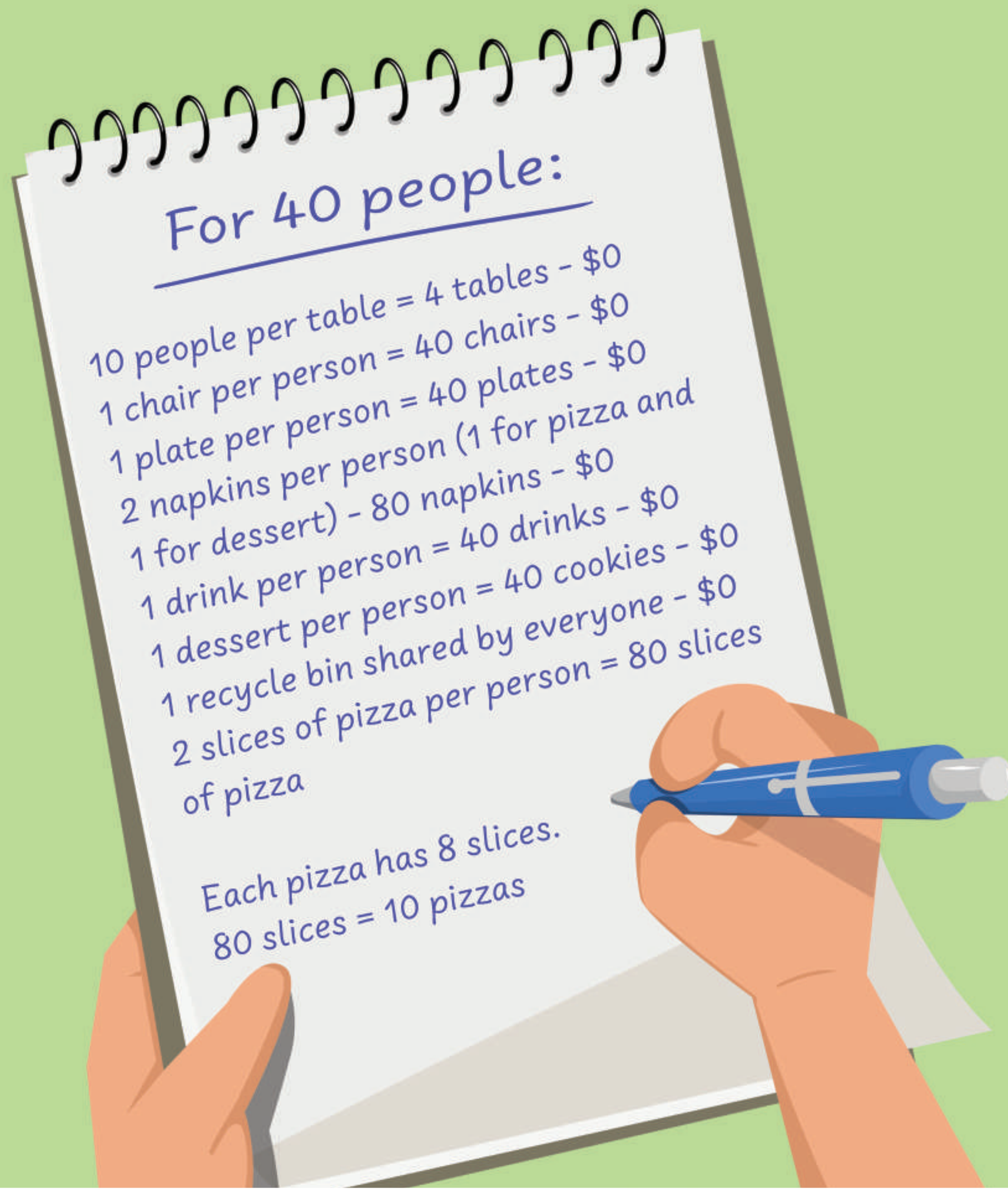
Talia writes a list as the students call out items—tables, chairs, plates, napkins, drinks, desserts, a recycle bin, and, of course, pizza!

Talia asks the group an important planning question. “How many of each of these things do we need for a party for 40 people?”

The friends talk through each item on the list. Talia flips to a new page in her notebook and writes down what they say.

Parker is worried that they will not have enough money for everything on the list. Alena makes him feel better. “Most of these items can be borrowed or donated!” she says.

Talia writes $0 next to the items that will not cost anything.



Talia turns to a new page in her notebook to focus on the only thing they need to buy—the pizza. She points out that pizzas from Gordo's are $12 dollars each.

Parker does the math. If they need 10 pizzas for the party, that would be $120.

"We don't have enough money for the pizza," Parker says in a low voice.

"I have an idea," Honora says. "Don't give up on our plan."

When everyone arrives at the party, Parker is excited to see 10 pizza boxes on one of the tables. “How did you do it?” he asks Honora.

“Gordo is my uncle,” she replies. “He gave us a discount. We only had to pay $10 per pizza, so we came in right on budget!”

Main Idea

We use math when we make a budget.

CHAPTER
12

Hundreds of Nuts

Mr. and Mrs. Carter own Carters' Black Walnut Orchard. Most of the trees in the orchard were planted from seeds. In fact, Mr. Carter planted some of the seeds when he was a young boy.

They love the beauty of the trees. In the fall, the leaves change from green to a bright yellow. The Carters sell the black walnuts to local restaurants. Black walnuts are good in cakes, breads, and soups.

In late summer, the black walnut trees begin to drop their nuts. The outer layer of the nut is a dull green. The walnut gets its name from the black husk that is under the green covering. Most black walnuts are around 2 inches wide.

The Carters need help picking up all the fallen black walnuts. Mrs. Carter puts a sign out by the front gate. It reads "Come pick up black walnuts! We will pay 1¢ for each walnut picked, up to 100 walnuts a day."

Oliver's mom sees the sign. She says to Oliver,

"Why don't you and your cousin go see Mr. and Mrs. Carter and pick up black walnuts for money? This is a good way to earn money for the game system the two of you want to buy." Oliver calls his cousin Sally to tell her about the plan.

Oliver and Sally go to the Carters' early the next day. Oliver brings 10 paper bags and Sally brings 1 large basket to collect black walnuts. They meet Mr. Carter at the orchard. Mr. Carter says, "Come see Mrs. Carter when you are done." The cousins are excited to get started.

Oliver puts 10 black walnuts in each paper bag. Sally puts all the black walnuts she picks up in the basket. When the cousins are ready, they go see Mrs. Carter.

Oliver greets Mrs. Carter. "Hi, Mrs. Carter. Sally and I have black walnuts for you."

Mrs. Carter replies, "Wonderful! How many black walnuts did each of you collect?"

Sally tells Mrs. Carter she has 100 black walnuts in her basket. Mrs. Carter gives Sally 2 rolls of 50 pennies.

Penny

Dime

Oliver tells her he has 10 bags with 10 black walnuts in each bag. Mrs. Carter gives Oliver 10 dimes.

The cousins count their coins. Oliver says, "Wait, we both picked up 100 black walnuts. Why do you have more money? I only have 10 coins, and you have 100 coins."

Sally replies, "I do have more coins, but they have the same total value as yours.

"I have 10 dimes that are worth 10¢ each. So I have 100¢ worth of dimes," Oliver responds.

"That is right! And I have 100 pennies that are worth 1¢ each. I also have 100¢ worth of coins," says Sally.

Each time Oliver and Sally go back, they each pick up 100 black walnuts. Some days the Carters give them dimes, and other days the Carters give them pennies. A few times they get a $1 bill. They know that 100 pennies = 10 dimes = $1 bill. And whether they get 100 pennies, 10 dimes, or $1 bill, they always get money worth 100¢.

The cousins start trading the pennies and dimes for $1 bills. Then they trade 10 $1 bills for 1 $10 bill. Eventually the cousins have 4 $10 bills.

“We have enough for our game system!” Sally says.

While playing games on the new game system, the cousins are proud of how much they worked picking up black walnuts.

Main Idea

The value of a digit is based on its position in a number.

CHAPTER 13

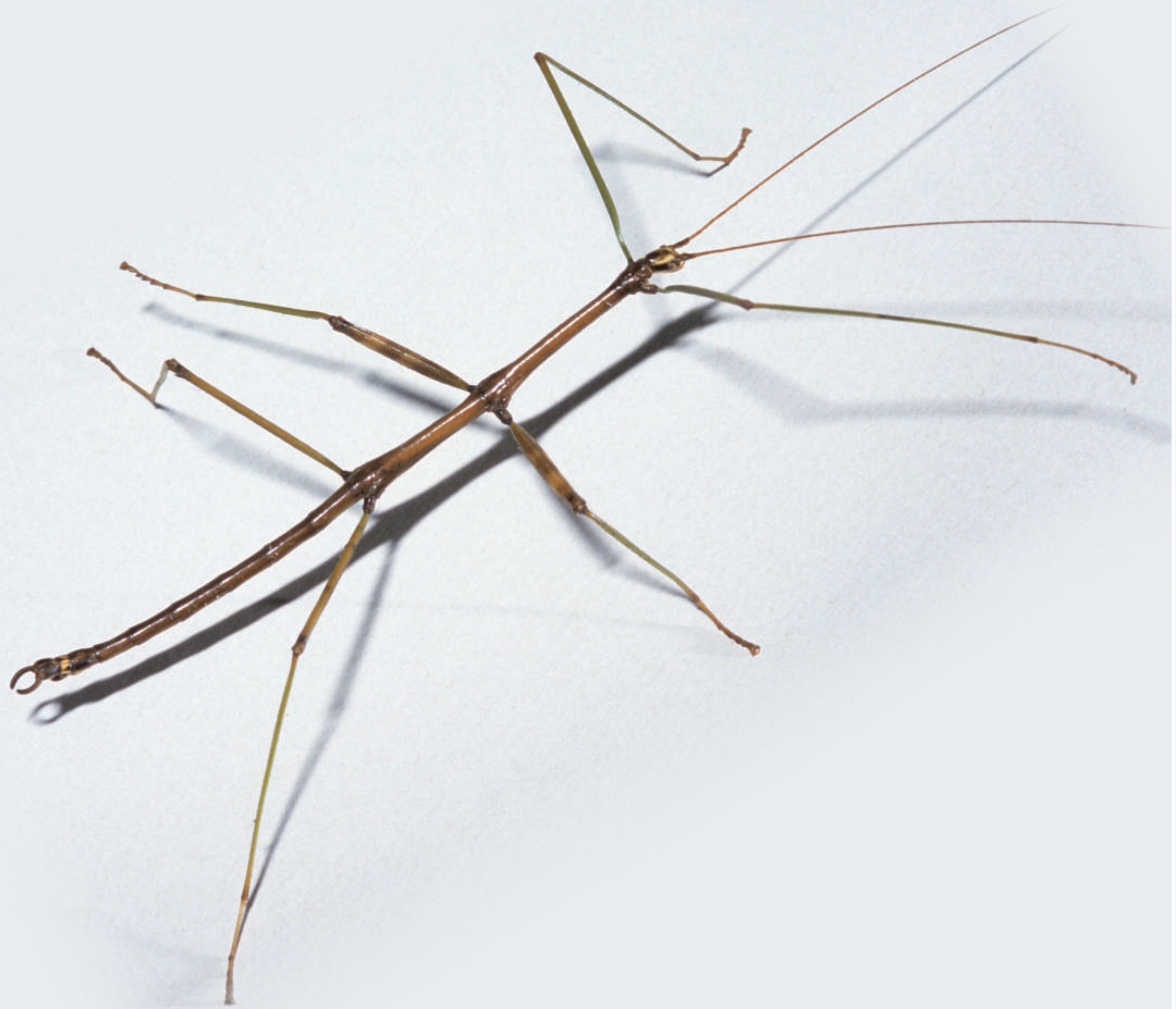
Is It an Insect?

Welcome to the Museum of Natural Wonders. My job is to take care of the museum's insect collection.

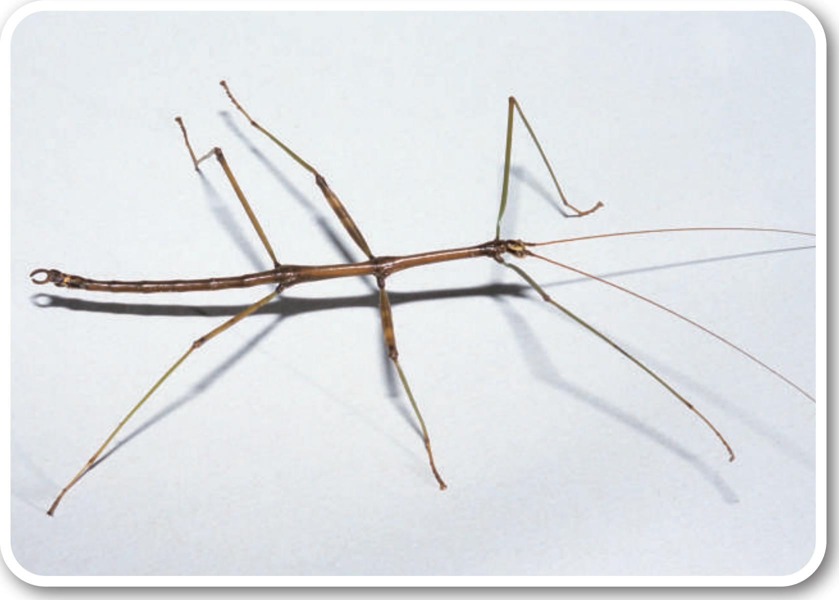
This museum isn't like a zoo. The insects in our collection are no longer alive. But they're still important.

Museums help people better understand the world around them.

This animal is new to the museum. I need to decide if it is an insect. I know that insects have 3 body sections. I see the 3 body sections on this animal. Insects also have 6 legs. Now, I will count the legs. This animal has 3 body parts and 6 legs. I can say that this is an insect. It is called a walkingstick.



One of my jobs is to classify the insects in the collection. To classify means to group things that are similar, or alike. For example, insects are classified into 2 groups based on if they have or do not have wings. I'm going to take another look at that particular walkingstick. I do not see any wings. This insect will be part of the insects without wings group.



At times, I can quickly decide if an animal is an insect. When I saw this spider, I knew it was not an insect. Do you know why? It has 8 legs. We know that insects have 6 legs.

Another part of my job is to find the differences between similar insects. Take a look at these butterflies. They all have wings. But the butterflies have differences, too. They are different colors. Another difference is their size. I can measure each butterfly with a ruler to get the exact measurement. I can also quickly see the 4 yellow butterflies at the top are larger than the 3 red butterflies at the bottom by comparing them.

Just because an insect in classified with other insects, it does not mean they are the same. They may have differences, too. Take a look at these insects. They belong to the group of insects with wings. Most insects with wings have 2 pairs of wings, or 4 wings. The bee on this page has 2 pairs of wings. A few insects with wings only have 1 pair of wings. Can you find the insect on this page with only 1 pair of wings? If you guessed the housefly, you are correct!

I like to classify insects because it is like solving a puzzle. I like looking for how they are the same and how they are different. This helps me understand them.

Main Idea

We use math to classify.

CHAPTER 14

The Lesson Inside the Story

Many stories are written to teach us a lesson. The story of the tortoise and hare is one of these stories.

The hare is very confident. He tells everyone that he is the fastest animal in the area. He asks the other animals to race him. Most of the animals tell him, “No!” But one animal, the tortoise, decides he will race the hare. The other animals tell the tortoise not to race the hare. They tell him he will lose. The tortoise keeps his promise to race the hare.

On the day of race, the hare and the tortoise meet at the starting point. The hare starts the race with a quick burst. The tortoise starts very slow. Soon the other animals can't see the hare anymore.

Once the tortoise makes it up over the hill, he notices that the hare is nowhere to be seen.

The hare runs so fast that he is almost at the finish line. The hare spies on the tortoise from behind a tree. The hare decides he has plenty of time to take a nap and still win the race. So he does!

The tortoise continues on the race path. Even though he is slow, he keeps on going.

Eventually, the tortoise sees the hare sleeping behind a tree. The finish line is in sight. The tortoise slowly passes the sleeping hare.

The hare wakes up in a jolt. He searches behind him to see where the tortoise is on the path. He thinks that the tortoise is so far behind that there is no way the tortoise can win.

Then the hare turns around. Just as he does, he sees the tortoise crossing the finish line. The hare runs to finish the race. But he is too late.

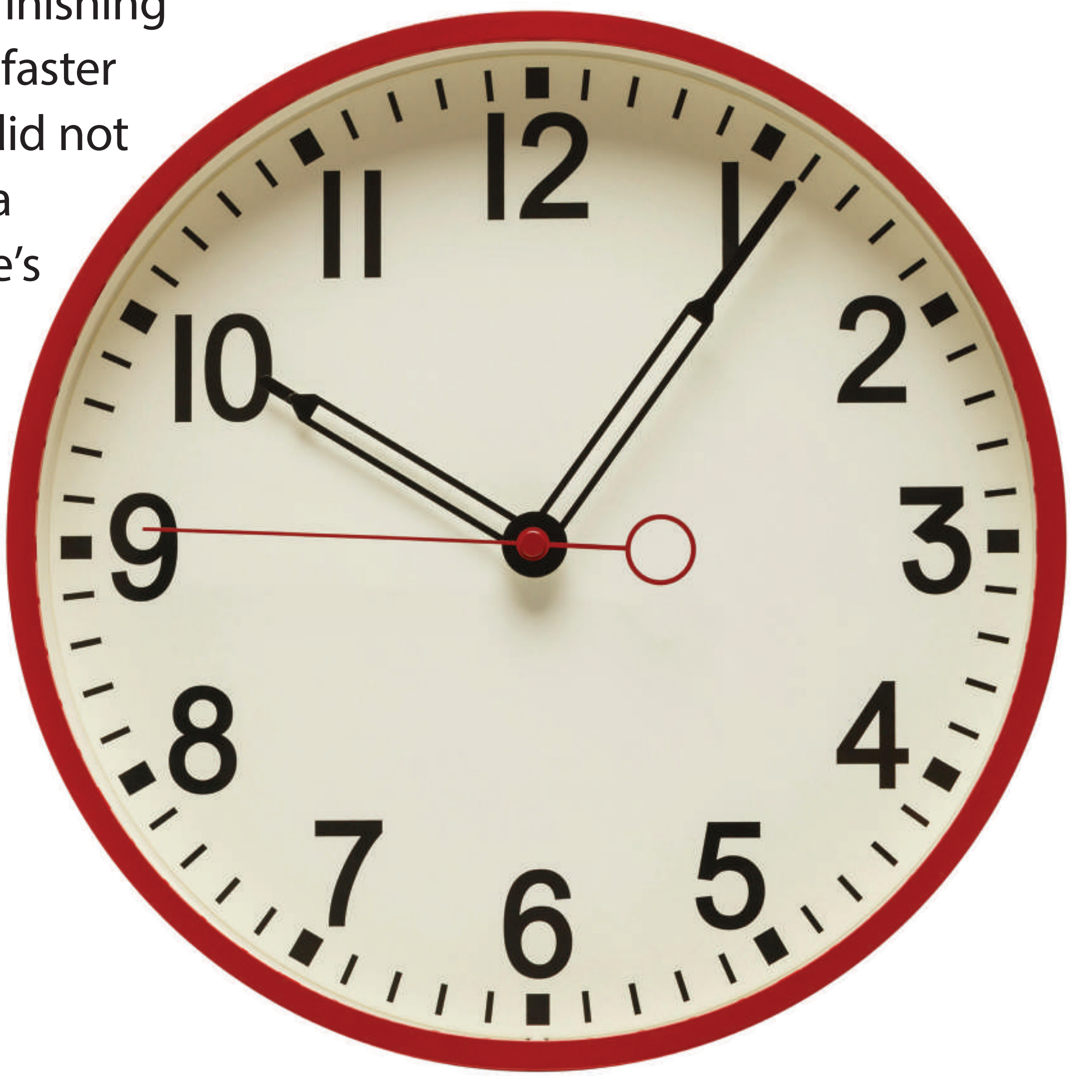
The distance in the story is the same for the hare as for the tortoise. They follow the same path. The only way distance changes is if a new path is taken.

What can we learn from this story? We learn that slow and steady wins the race. We also can learn about distance.

Distance is the amount of space between two things. The road from one city to another city is measured in distance. The distance in the story begins at the starting line and ends at the finish line.

Another thing this story teaches about is time. Time is how long something takes to do. In the story, the time is measured by how long it takes from the start of the race to cross the finish line. There are many ways to measure time. Seconds, minutes, hours, days, weeks, months, and years are all measurements of time.

Distance stays the same in this story, but the hare and the tortoise have different times. The hare is a fast animal. If he had not stopped to take a nap, he would have beaten the tortoise across the finish line. The tortoise is a slow animal. But his time finishing the race was faster because he did not stop to take a nap. The hare's nap can be measured in time.



Many things can change the time it takes to do something. Think about driving to the store with your family. Suppose that the 3-mile drive usually takes 10 minutes. But one day, there is a lot of traffic. Traffic can make it take longer to drive the same distance. Weather can also change the travel time.

Remember that slow and steady wins the race. At least it did for the tortoise.

Main Idea

When we travel, we pay attention to both time and distance.

CHAPTER 15

A Precious Gift

Emma sits at the small desk in her room. She looks at the photo taped above her desk. It is a photo of her and Abuela. Tomorrow is Abuela's birthday.

Emma thinks about a gift that she could buy. Everything she thinks of would cost a lot of money.

How Much?

Why does Emma need to think about how much a gift for her abuela might cost?

Emma's mom walks in and sees Emma sitting at her desk.

"What is making you sad, Emma?" her mom asks.

"I don't know what to buy Abuela for her birthday," Emma says. "I want to buy her something special."

"Well, how much money do you have?" her mom asks.

Emma opens the pretty box on her dresser. She takes her money out to show her mom.

Emma spreads the coins and bills out on her desk.

“There’s a $10 bill and a $5 bill,” her mom says. “You have at least $15.”

“I can count the coins,” Emma says. She separates the coins into groups. There are 7 quarters, 2 dimes, 2 nickels, and 1 penny. “I know 4 quarters is a dollar, so I have $1.75 in quarters. That’s $16.75 in all so far.”

Then she counts the dimes, nickels, and pennies in order. “$16.85, $16.95, $17.00, $17.05, $17.06.”

Good Groups

Emma organizes the coins to make them easier to count. She counts the dimes by 10s and the nickels by 5s.

“I don’t think that’s enough money,” Emma says.

Her mom says, “Think about what Abuela always says. People don’t need to spend money to show that they care about someone.”

Emma collects the money and puts it away. She looks at the bright pink flowers on her jewelry box.

“Mama, did Abuela make this box for me?” she asks.

“Yes, a long time ago,” her mom says. “She already had the box, and she painted the flowers for you.”

An idea starts to float around in Emma’s head.

Emma points to the photo of her and Abuela.

"Abuela loves pictures," Emma says.

"She does," agrees her mom.

"Abuela loves flowers," she says.

"She does. She especially loves purple ones," her mom agrees, smiling.

Emma points to a white frame sitting on her desk that she had never used.

"Let's use the silk craft flowers we have been saving," her mom says.

Emma tells her mom, “I have everything I need to make Abuela the best gift ever, except for one thing. I need some glue. Will you take me to get some art supplies?”

At the store, Emma is able to purchase a bottle of craft glue for $2.06. She still has $15.

After Emma gets home, she works for over an hour. She glues artificial flowers all around the frame.

The next day, the glue is dry.

“I chose this photo.” Emma holds up a picture of her, her mom, and her abuela. “Do you think Abuela will like it?” Emma asks her mom.

“Abuela will love it,” her mom says. “I love it, too!”

Main Idea

Knowing how much money you have and finding ways to save it are important.

Science Investigation

Mr. Kazama tells the class about their next science investigation. "Today, we are starting our investigation on growing plants. Each of you will plant 1 seed in each of 5 different pots. You will work in groups of two. Once the plants sprout and develop leaves, 1 person in each team will use plant food, and the other will not. Each of you will give the plants 4 tablespoons of water a day and place your plants on the same shelf by the window."

Alena and Parker are working together.

Alena and Parker each plant 1 seed in each pot. Then Alena says, “We need to add 4 tablespoons of water to each pot.”

Parker asks Mr. Kazama, “When I help my dad water plants, he tells me to use the watering can and count to 5 for each plant. Why can’t we just count instead of measure?

Mr. Kazama says, “For our investigation, we need all the measurements to the exactly the same.”

At the end of the week, all the plants have sprouted leaves and are about the same height. Mr. Kazama visits each group and gives them liquid plant food. He asks, “Which of you will be using the plant food?”

Alena says, “We decided I will use the plant food and Parker won’t.”

“Which plants do you think will grow taller?” asks Mr. Kazama.

Alena and Parker at the same time say, “The ones with plant food!”

During the next 6 weeks, Alena and Parker give each of their 5 plants 4 tablespoons of water each day. They keep the plants on the same shelf so they get the same amount of sun. Alena gives each of her plants 1 teaspoon of liquid plant food every 7 days.

Up or Down, Round!

Sometimes numbers are not exact. Sometimes we measure to the nearest whole unit to compare measurements.

After 8 weeks, Parker exclaims, “Look how our plants have grown in 8 weeks. Let’s measure the height of each plant to the nearest inch.”

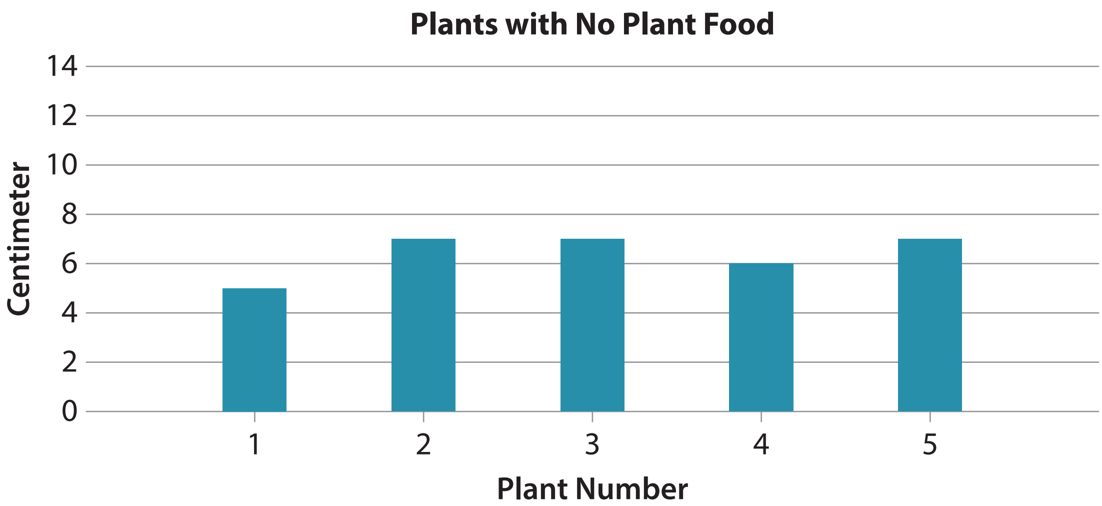
Alena and Parker agree that measuring to the nearest inch is a good idea. They will write their measurements on a chart.

Alena and Parker start measuring each of their plants.

Alena and Parker use their measurements to make bar graphs. Alena makes a bar graph showing the growth of her 5 plants. Parker makes a different bar graph showing the growth of his 5 plants. Then they compare the data on the bar graphs.

Bar Graph

A bar graph represents numerical information. The height of each bar represents measurements. The taller the bar, the greater the measurement.



“The plants that weren’t given plant food didn’t grow as much,” says Parker. “The tallest plants in my group are 7 inches tall.”

“The tallest plant in my group is 13 inches tall,” says Alena.

Parker adds, “And the plants that got plant food have more leaves than the plants that didn’t.”

“We made some good observations in our science investigation,” says Alena.

“Yes, and our guess was correct. The plants that had the plant food did grow taller,” replies Parker.

“Let’s share our bar graphs with the rest of the class.

Main Idea

We use math to measure in science investigations.

CHAPTER 17

The Coziest Shapes

The first Saturday of the month in Kate's house is quilt folding day! Kate's family has a lot of quilts! Some quilts cover beds, and some quilts hang on walls. The rest of the quilts are packed away, carefully folded.

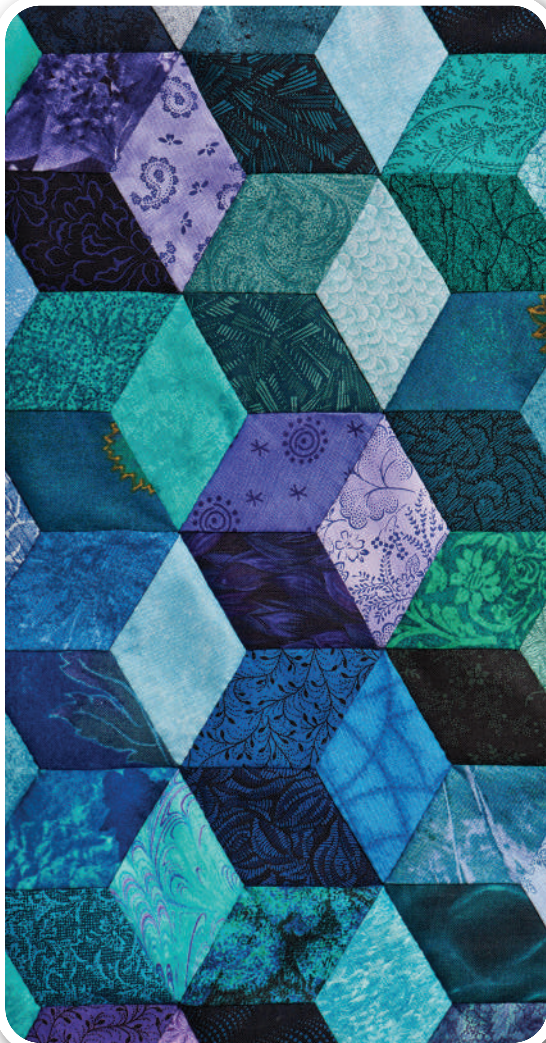
Kate and Grandpa carefully unfold one quilt at a time. "We unfold the quilts every month," Grandpa explains. "The fabric needs time to rest. This keeps the quilts from having permanent creases."

“We’ll refold in a different direction,” Grandpa says. “We don’t want to always fold the same fibers.”

Grandpa points to one colorful quilt. “This quilt was made in the 1930s,” he says. “What do you see when you look at it?”

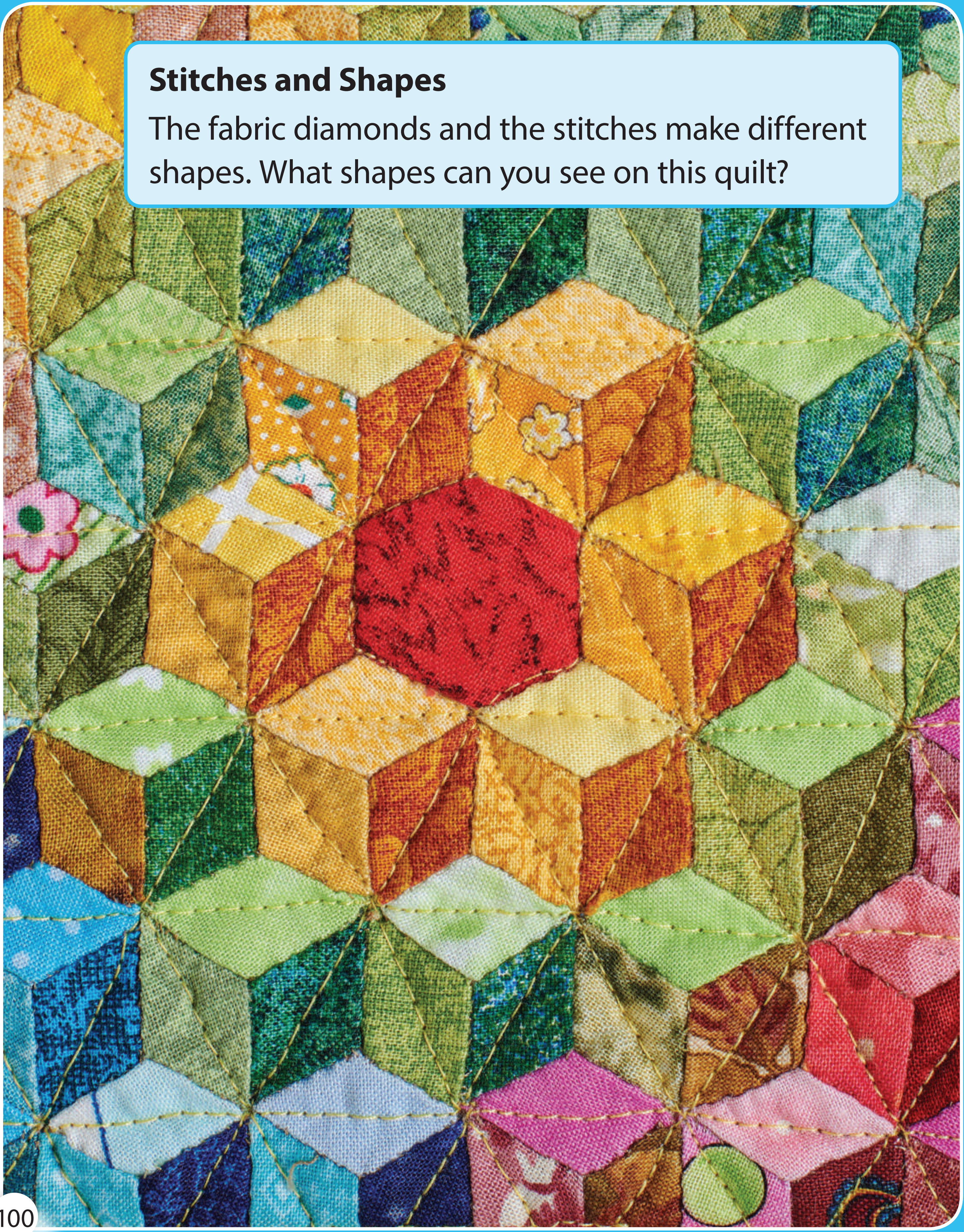
Kate thinks for a moment. “Blocks,” she replies. “Square blocks that are popping out of the fabric.”

“That’s right!” Grandpa says. “But look at the pieces that make them.” He points out single shapes on the quilt. “Quilters call these shapes diamonds.”



Stitches and Shapes

The fabric diamonds and the stitches make different shapes. What shapes can you see on this quilt?



Kate points to a diamond. "This shape is a rhombus," Kate says.

"How do you know that?" Grandpa asks.

"There are 4 sides," Kate says. "You can call this shape a diamond, but it is also called a rhombus."

"That's right! Now, look at this. This is my favorite quilt," Grandpa says. "What shapes do you see in this one?"

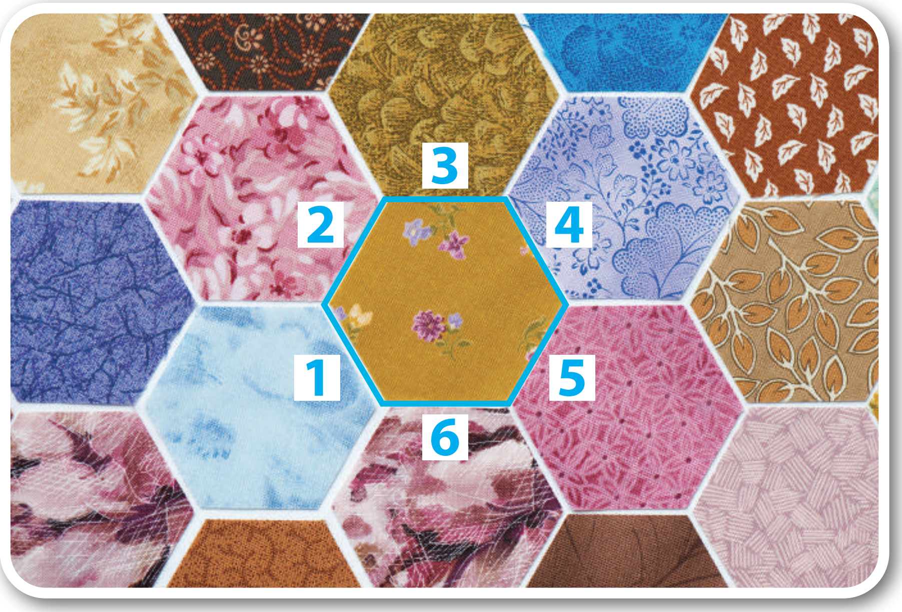
Kate smiles. "I see triangles.

Kate notices the shapes in one quilt that is resting on a table.

Kate points to the 6-sided shapes. She asks, “Are those hexagons?”

“I suppose they are,” Grandpa says. “They have 6 sides, don’t they?”

“It’s a fun shape,” Kate says. “It’s neat how you take different shapes and make new shapes in a quilt.”



“It is really neat,” Grandpa says. “Quilt makers spend a lot of time planning the shapes and the colors.”

Kate sees a quilt she's never seen before. It has hundreds of little pieces. Each one is a hexagon.

"Your grandma made that quilt," Grandpa says. "She made it for me."

"Look at how many different patterns the hexagons make," Kate says.

"Yep," Grandpa agrees. "It just depends on where you put the different colors."

Kate thinks that this is one of the best parts about quilts. With all the different colors and fabrics in the world, every quilt is special.

Main Idea

Shapes can make up interesting patterns.

CHAPTER 18

Blankets for Pets

Marco shuts the lid on the big bin of dog food. He washes his hands. Then he follows his stepdad into the supply room. For once, the small room is tidy. Rope leashes hang from pegs on the walls. Tall shelves hold boxes labeled “balls” and “biscuits.”

Marco’s stepdad slides more boxes onto an empty shelf. “Here’s some more food for the week,” he says to the woman standing near the doorway.

“Great!” The woman’s smile lights up her face. Her name is Amy. She leads the volunteers at Sunshine Animal Shelter.

Marco's stepdad, Diego, has been volunteering at the shelter for years. This is Marco's fourth time volunteering.

"Diego, could you help me? Some of the dogs need walks," Amy says.

"Of course," Marco's stepdad replies.

"I have a job for you too, Marco," Amy says. "Can you help Tina make some dog beds? We have two new dogs who need a soft place to sleep."

Marco doesn't know anything about making dog beds. He nods his head anyway.

He finds Tina in the shelter's break room. "Hi, Marco! Ready to make some beds?"

Marco looks at the sewing machine sitting on a table. "I've never sewn before."

"That's all right," Tina says. "I'm doing the sewing. But you can be my extra set of hands." Together, Tina and Marco unfold a big bedspread onto the floor. "All of our dog beds are made from blankets people donate. We need soft blankets that are easy to wash and dry."

Marco looks at the bedspread. It covers almost the entire floor. "This would make a really big dog bed."

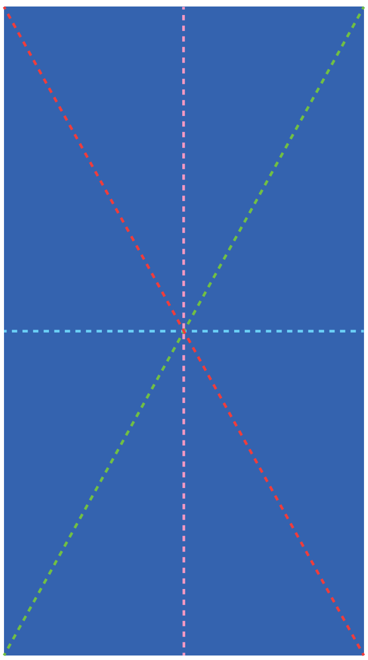
Tina laughs. "That's why we're going to cut it into pieces. I'll use the sewing machine to make the beds." She tilts her head. "So what do you think? We have two dogs that need beds. How should we cut the bedspread?"

Marco knows they should cut the bedspread in half. But which shape would be the best? Marco checks the size of the kennels. Would a long, narrow rectangle be best? Or would a short, wide rectangle do? What about a triangle? He draws his ideas on a piece of paper, then shows it to Tina.

“Should we measure it?” Marco asks. “I want to make sure we do it right.”

“Well, I would normally measure everything before I cut the fabric, but in this case, we don’t need to be exact. Folding the bedspread into the shape we want is close enough,” Tina says. She picks up 2 corners of the bedspread. Marco does the same. Tina hands her corners to Marco.

Marco realizes that Tina is folding the bedspread in half. “Oh! We can just fold the bedspread in half, then see if it fits.”



Many Ways

A rectangle can be split in half in different ways. It can be cut down the middle

- from top to bottom,
- from left to right, or
- diagonally.

Tina nods. “And if that shape doesn’t work, we’ll fold it in half another way. We can try all the shapes in your sketch.”

Marco tries to put the folded bedspread on the kennel’s floor. It is way too big.

Marco and Tina work out that they could fold the bedspread another way to make a triangle. But that isn’t a good shape for the rectangular kennel.

Marco knows that the long, skinny rectangle won’t fit into the kennel either.

"We should cut the bedspread into 4s," Marco says.

Tina raises her eyebrows in surprise.

"I know we only need 2 beds now. But the shelter is always getting more dogs. It would be good to have extras on hand," Marco explains.

Tina smiles. "That's a really smart idea, Marco."

Marco makes a new drawing that combines his first 2 ideas. They will cut the bedspread in half the long way first and then the short way. Tina uses a marker to draw lines on the bedspread. She and Marco take turns cutting through its many layers. Then Tina sews the cut edges.

Marco feels happy that he helped make at least a few dogs sleep better.

Main Idea

Dividing a shape into equal parts can make different and smaller shapes.

CHAPTER
19

Packing Up

Farrah checks her watch. The day has gone fast. Farrah once thought that working at a shipping center would be boring. But Farrah is always packing something new: lamps, dishes, even furniture.

Finding the right box and packing materials is the best part of Farrah's job. She is great at it. Her coworkers often ask her for help.

"Farrah, could you help me?" Mohammed asks. He is carrying a tall metal bird painted in bright colors. It has sharp claws that will help it sink into the grass. "This guy is 44 inches tall and 14 inches wide. Do we have any boxes that will fit him?"

Farrah looks closely at the statue. "He's not very deep, is he?" she observes. "He looks 3D, but he's mostly flat." She thinks for a few seconds. "We have boxes that are long and narrow. Stick a block of foam on his sharp claws. Then wrap him in thick paper so his edges won't cut the box."

Measurement

Mohammed needs to give Farrah the exact size of the metal bird. She needs to know how big the object is to find the right box for it.

The next item Farrah packs is a rug. When Farrah first started at the warehouse, she thought rugs were shipped flat. She quickly learned that rugs are rolled for shipping.

First, she wraps a tape measure around it. She wants to make sure she has a container that is big enough to hold the rolled rug.

Some people in the shipping department pack rugs in long rectangular boxes or cylinder-shaped tubes. Farah likes triangular tubes. They don't roll around in delivery trucks.

Cylinders

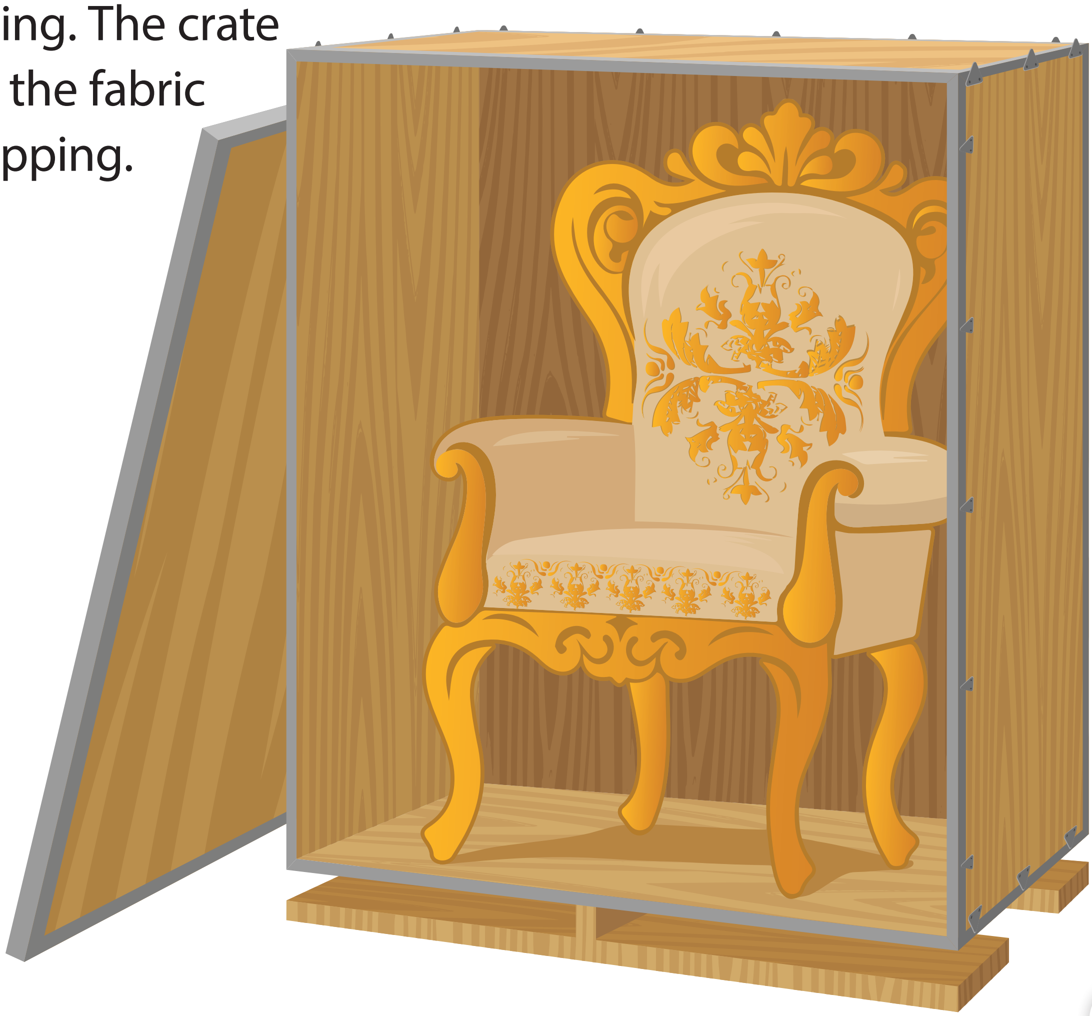
A cylinder is a 3D shape that looks like a tube. Each end is a circle shape. Cans and paper towel rolls are in the shape of a cylinder.

The rug isn't the biggest thing Farrah has ever shipped. Some things, like couches, are too big for boxes. Couches are usually wrapped in thick plastic. Then they are taken directly to people's homes. Other couches can be taken apart and sent in several boxes. They need to be put together when they arrive.

Some armchairs are also taken directly to people's homes. Others are shipped in wooden crates.

Crates are sturdier than boxes. They don't rip or tear. They can also hold a lot of weight. You can stack other boxes on top without worrying about crushing anything underneath.

Farrah had helped a coworker put an armchair into a crate that morning. The crate protected the fabric during shipping.



Farrah packs a lot of small items, too. People shop on the company's website for candles and drinking glasses.

The company also sells a lot of artwork. Some of it is attached to stiff pieces of wood. Other pictures are framed behind glass. All of those are shipped in rectangular boxes.

But some of the art Farrah packs isn't framed yet. When Farrah has those orders, she places a piece of tissue paper over the top of the artwork. Then she gently rolls the paper into a cylinder. She has to be very careful not to crease the paper. The artwork is placed into a cylinder tube for shipping. It doesn't weigh very much, so it is okay if it rolls around during transport.

Farrah's boss rolls another cart to Farrah's workstation. "I know you're almost done for the day," she says. "But I could really use some help with this one."

Farrah frowns. Inside the cart is a large chandelier with 8 lightbulbs. "Oh, I see," she says.

"It is a bit unusual, I know," Farrah's boss says. "But you are good at this! I am sure you can work it out. What do you think, Farrah?"

"I think for this we're going to need a big crate, 8 cylindrical tubes, and a lot of packing straw," Farrah said. "Let's get started!"

Main Idea

Size, shape, and material determine how objects are packaged.

CHAPTER
20

Blocks Stacked to Last

Pyramids are found all over the world. Some of the most famous are in Egypt. But many pyramids were also built in North and South America. Several pyramids built by ancient people called the Maya still stand today.

The ancient Maya lived about four thousand years ago in what is now southern Mexico, Northern Guatemala, and northern Belize. Today, people remember the ancient Maya for their art and their deep understanding of math and science. They are also known for their pyramids.

Mayan pyramids are different from Egyptian pyramids. The first is how they were used. Egyptian pyramids were tombs. A tomb is a special place for the dead. Some Mayan pyramids were used as tombs. But most were temples, or places of worship.

Temples were very important in Mayan cities. People gathered inside and outside for events. That's why temples are often found in large open spaces.

Another difference is how they look. The shape of the Egyptian pyramids is called a pyramid. The pyramid's sides run in straight edges from the ground to the point on top. Mayan pyramids are stepped. They look like they were built in layers of stacked blocks.

Mayan pyramids have flat tops. A steep stairway runs up the center of at least 1 side of the pyramid. Some pyramids have stairs on all 4 sides.

Egyptian Pyramid

Mayan Pyramids

Mayan pyramids are mostly made of limestone. Limestone was easy for the Maya people to get. It was easy to work with. Limestone is softer than some other rocks. It can be cut easily. It hardens after it is exposed to air.

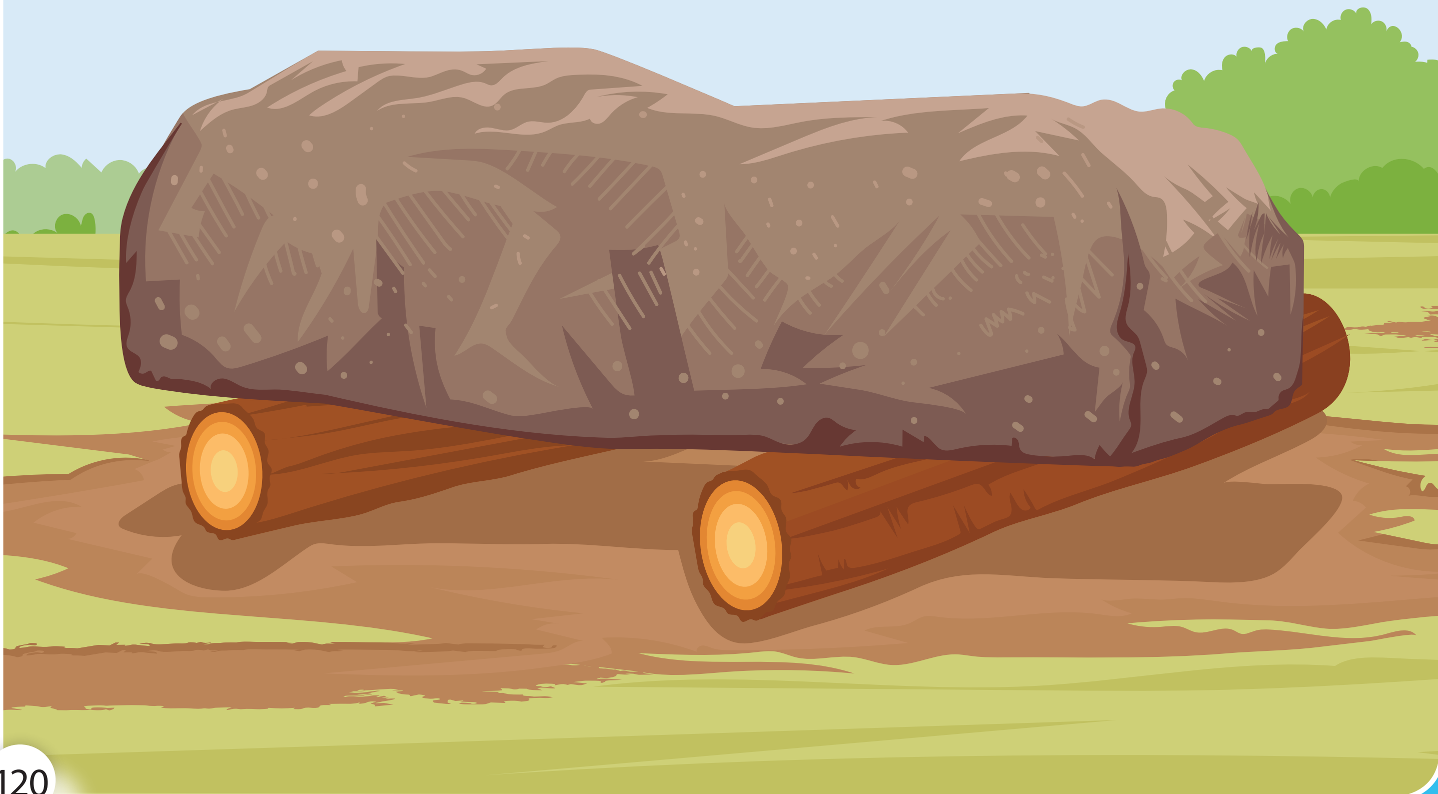
The Maya didn't know about sharp iron tools. Instead, they made their tools out of other stones that were sharp enough to cut and shape large limestone blocks.

Historians still aren't sure how the limestone was moved. The Maya didn't have pack animals like oxen or horses. They didn't know about the wheel. Everything had to be brought to the building site by humans.

Big limestone blocks were heavy. One person couldn't carry them alone. Experts think the Maya moved their limestone blocks by placing them on top of logs. Logs are round, so they roll.

Shapes That Help

What makes the shape of a log so helpful for moving heavy materials?



Today, the Mayan pyramids are mostly gray. But when they were first built, they were a rainbow of colors. The Maya put plaster on the outside of their pyramids. Then they painted the plaster with bright paints. The pyramids were joyful structures. Over time, the paint and plaster washed away. Luckily, some of the carvings in the blocks themselves still remain.

Main Idea

Mayan pyramids have a special and unique shape.

CHAPTER 21

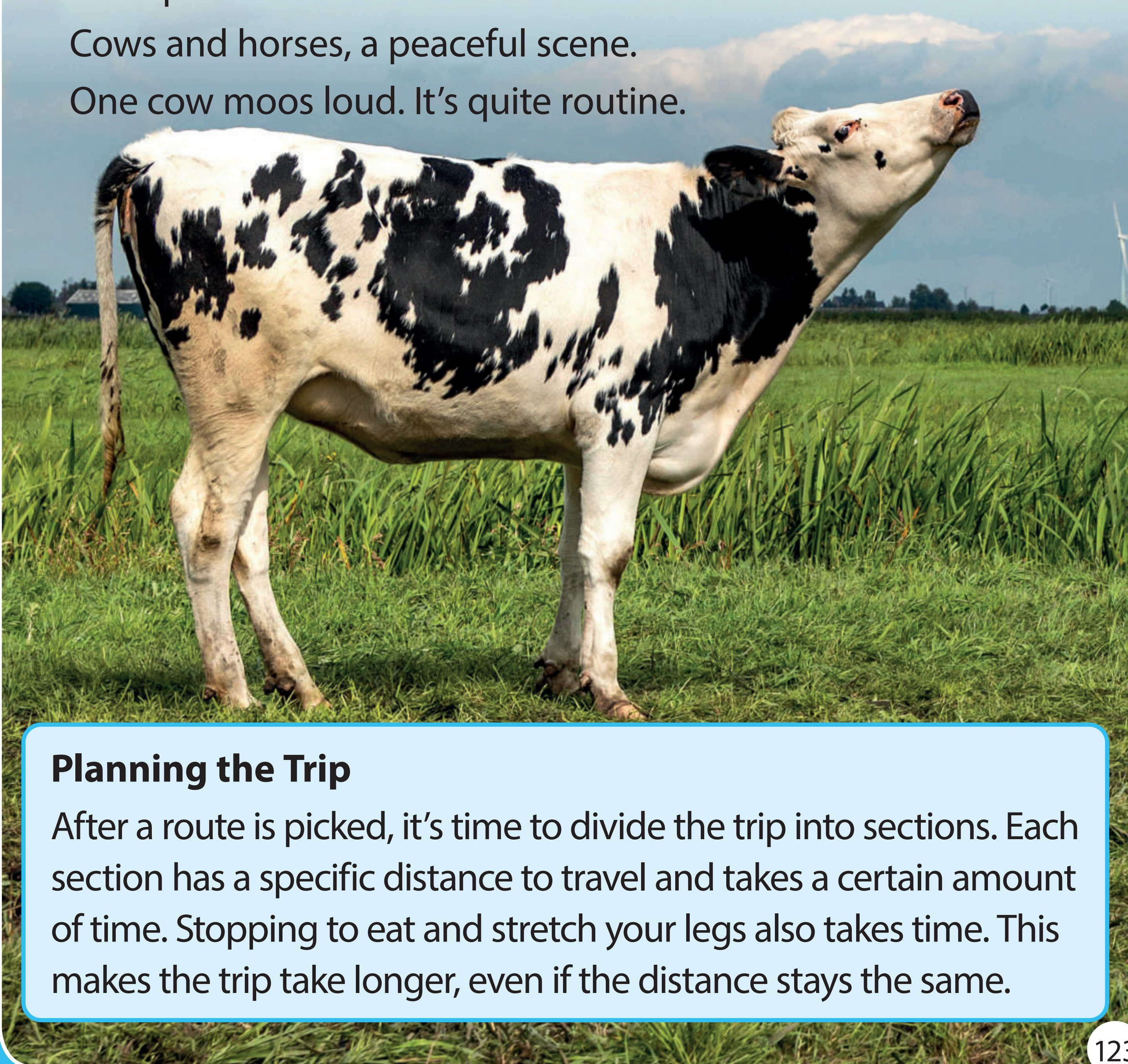
Are We There Yet?

The car is packed, it's time to drive,
With snacks and toys, our gang of five.
A long road trip, good times await,
Laughter, games, and best playmates.

We plan the trip, which way we'll go,
On curvy roads, or faster flow.
The highways are a straighter route,
But country roads are nice, no doubt!

Throughout the trip, we'll have to stop,
To stretch our legs and find a shop.
But first we need to settle down,
Buckle our belts as we leave town.

60 miles pass in a blur.
Anticipation starts to stir.
Cows and horses, a peaceful scene.
One cow moos loud. It's quite routine.



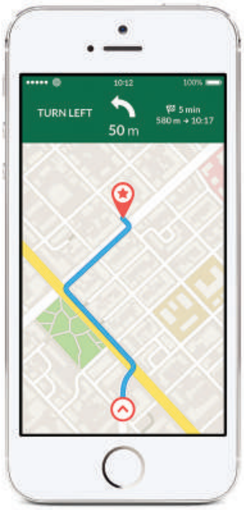
Planning the Trip

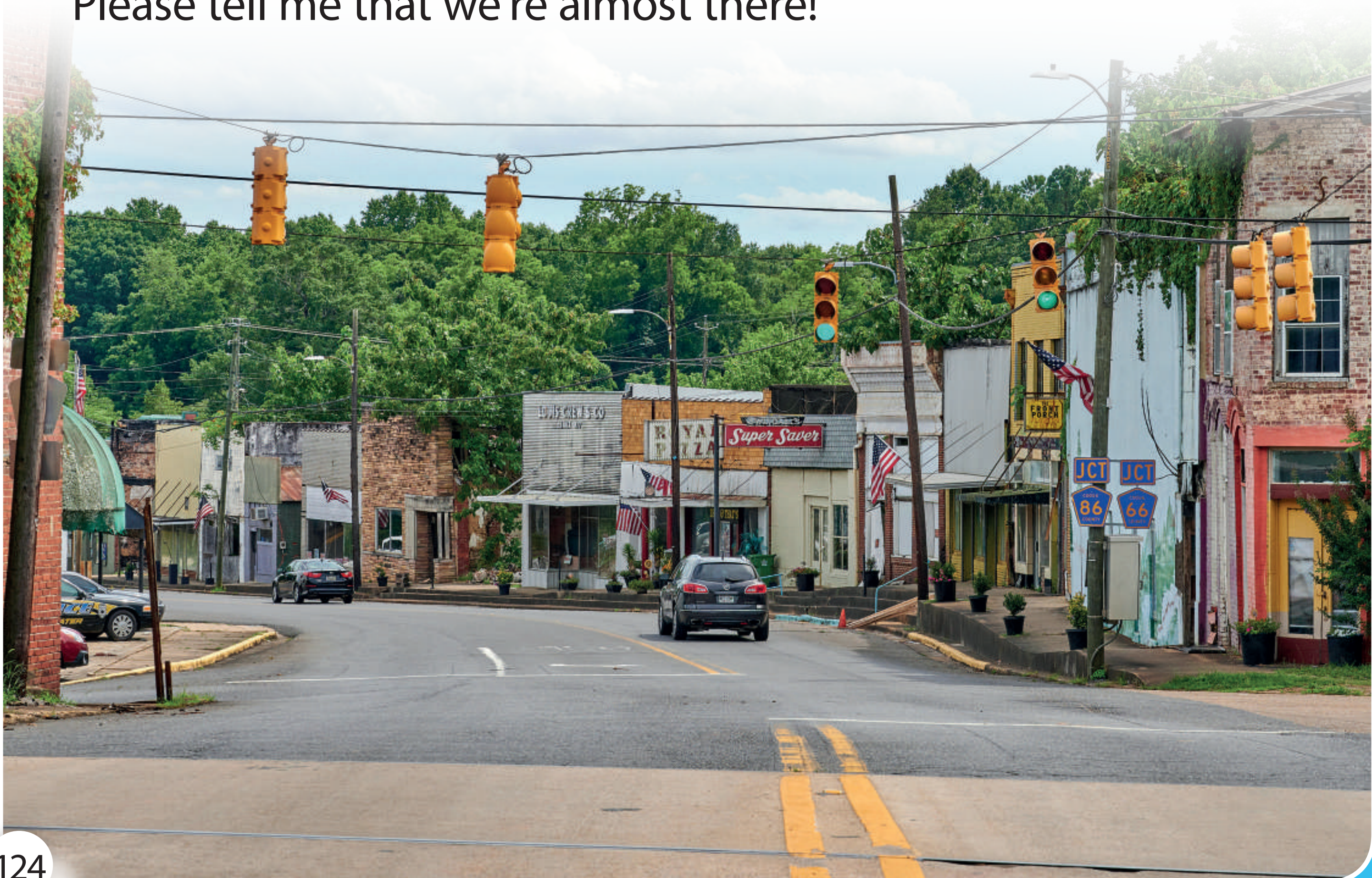
After a route is picked, it's time to divide the trip into sections. Each section has a specific distance to travel and takes a certain amount of time. Stopping to eat and stretch your legs also takes time. This makes the trip take longer, even if the distance stays the same.

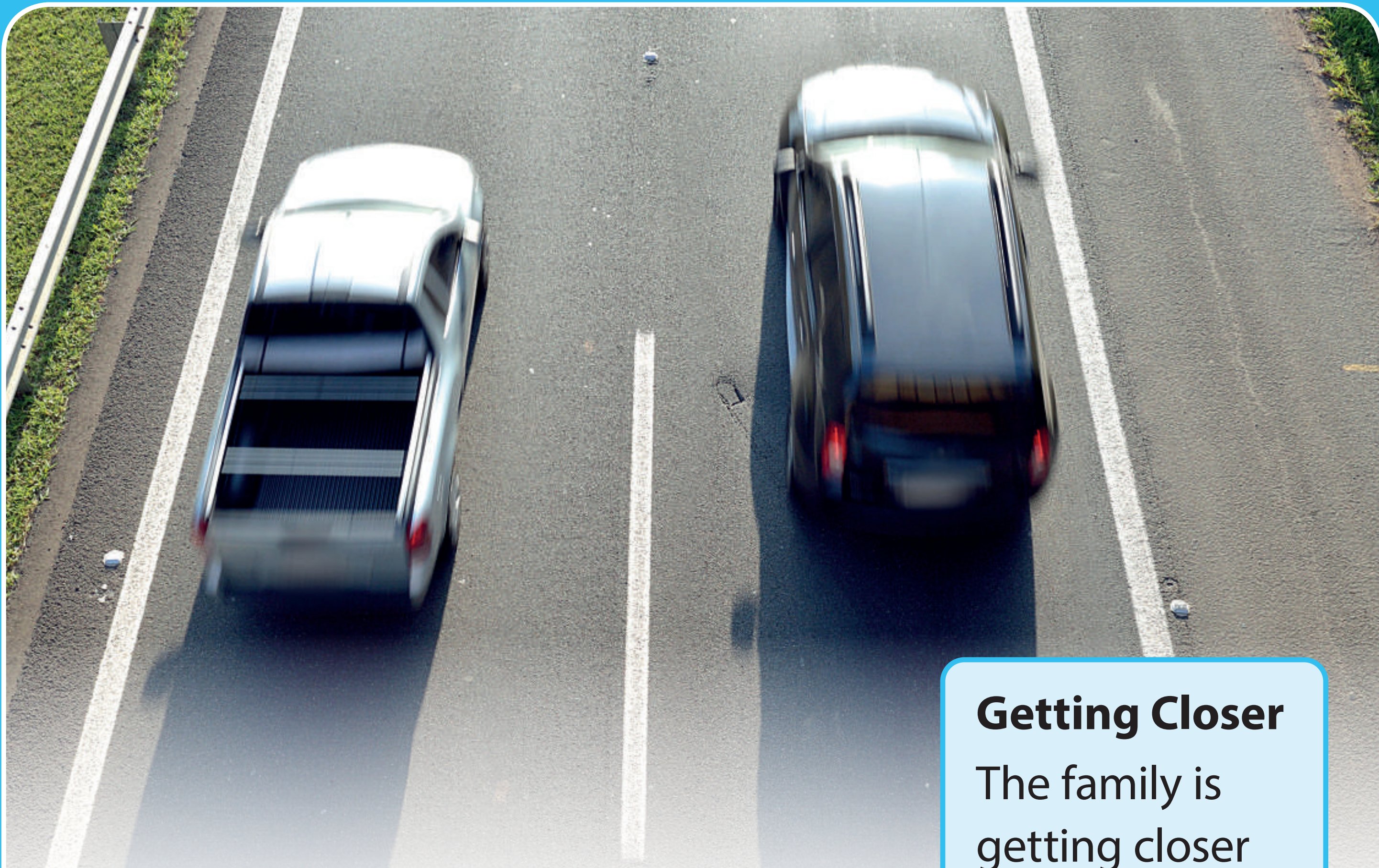
Our speed picks up, we're on the way.
It's such a warm and sunny day.
A truck pulls up, the kiddies wave!
A horn blares out, "Can you behave?"

A little town, with weathered sign,
A sandwich shop, with subs divine,
Ice cream cones, a tasty treat,
A happy pause, this town is neat!

Little voices, "Can we stop?
We are so bored, we think we'll drop!"
"She took my book!" "He grabbed my bear!"
"Please tell me that we're almost there!"







And so it goes, for quite a way.
We've only traveled half a day.
The time has come to take that break.
We follow a road past a quiet lake.

306 miles still to go,
Dad says we have 6 hours or so.
The snacks are gone, the drinks are drained,
The children fidget, the mood is strained.

Back on the freeway, and faster we drive,
Reducing the hours until we arrive.
We see a billboard with a dancing bear!
We take a moment to stop and stare.

Getting Closer

The family is getting closer to the end of their trip. As the total number of miles they have traveled goes up, the number of miles they have left goes down. The fewer the miles to go, the less time left in the car.

The sky is clear, so bright and blue,
Songs fill the car as we drive on through.
The children watch with wide eyed glee,
As hawks fly high for all to see.

Kiddies settle and fall asleep,
It's so quiet, there's not a peep.
The radio plays, a soothing song
It's so peaceful as we drive along.

The Countdown

The farther the family goes, the fewer miles and the less time is left in the trip.

93 miles left, the sky's still blue,
The canyon is deep, a beautiful view.
The land spreads out as far as I see,
A voice chirps up, "I have to pee!"

The trip was long, but the end is near
The car slows down, we're finally here.
The trip is done, the stars are bright,
I think next year we'll take a flight.

Main Idea

As the distance we have left becomes smaller, so does the time we have left to travel.

CHAPTER 22

Time for Soccer

Today is the first day of soccer practice! Sammy can't wait to play with his new teammates. But before he goes to the soccer field, he needs to make a quick stop.

"Mom, we need to go to the store. I need a water bottle and some snacks for practice!" Sammy reminds his mom as they get in the car.

"Okay, Sammy. We'll make it quick," Mom replies as they drive to the store near their house.

Inside the store, Sammy's eyes widen at all the choices. There are water bottles in every color! Sammy finally chooses a bright blue one.

Next, they move on to the snacks. Sammy grabs a granola bar and a banana. Just as they are about to leave, Sammy spots a basket of soccer balls.

"Mom, which soccer ball should I get?" Sammy asks, pointing to the display.

"We don't want to be late for your first practice," Mom reminds him.

Sammy thinks for a moment. He really wants a new ball, but he also doesn't want to be late to practice. He looks up at the big clock hanging on the store wall. It seems like the big hand has moved a lot since they came in.

"Okay, no new ball today. Let's go!" Sammy says, rushing to the checkout line with his mom.

On a clock with 3 hands, the thinnest hand on the clock is called the second hand. It keeps track of the 60 seconds in a minute.

They quickly pay for the items, and soon they are driving to the soccer field. Sammy looks out the window. He watches as the trees and houses zoom by. He worries they might be late.

As they pull into the parking lot, Sammy sees some of his teammates are already kicking a soccer ball around. “You were smart to forget about the new ball,” says Mom. “It usually takes us 15 minutes to drive here. With that extra stop, we took a half hour!”

Counting the Minutes

A half hour is the same as 30 minutes. If the trip usually takes 15 minutes and today it took 30 minutes, that means they must have spent 15 minutes at the store.

Sammy jumps out of the car. He grabs his water bottle and snacks, and runs over to his new teammates.

“I made it just in time!” Sammy exclaims with relief. He ties his shoes and then runs onto the field. Sammy joins the warm-up, passing the ball back and forth with a friend.

Sammy knows that being on time is important. It gives him time to settle in before soccer practice really starts. He can catch up with friends and get into his soccer groove. Then he’ll be ready when the coach starts practice.

The coach gathers the team. “We’ll use our time wisely during practices,” he says. “We’ll spend 15 minutes on kicks and 15 minutes on dribbling. Then we’ll take a short break. And then we’ll do it all again!”

Sammy is ready to roll. He knows the coach has the practice time all planned out. In 30 minutes, it will be time for break. After the break and another half hour of drills, it will be time to head back home. Having a schedule makes sure that we get it all done!

Main Idea

To make the most of our time, we pay attention to when activities start and end.

CHAPTER
23

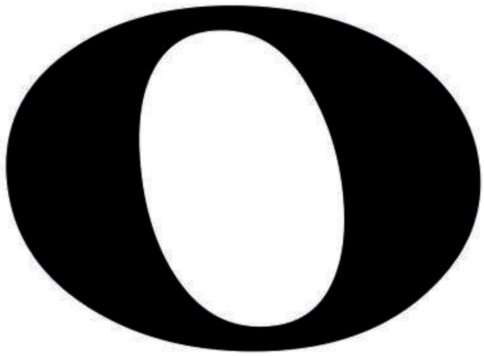
Making Music

Do you want to be a musician? Some people think you are born with the gift to play music. But really, you just need to practice a lot! And you need to know how to count to 4.

You can count to 4, right? 1, 2, 3, 4! You're ready to start reading and making music!

Music is made up of notes. How a note looks shows us how long to play or sing it.

Here's a whole note. It looks like an oval that's not colored in. When you see a whole note, you hold it while counting to 4. 1, 2, 3, 4.



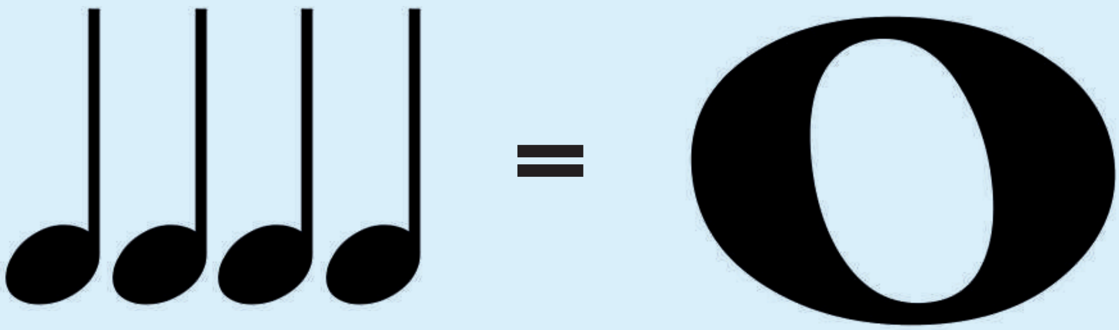
Now, this is a half note. It looks a bit like a whole note, but it means you hold it for half the time. So you only count to 2.

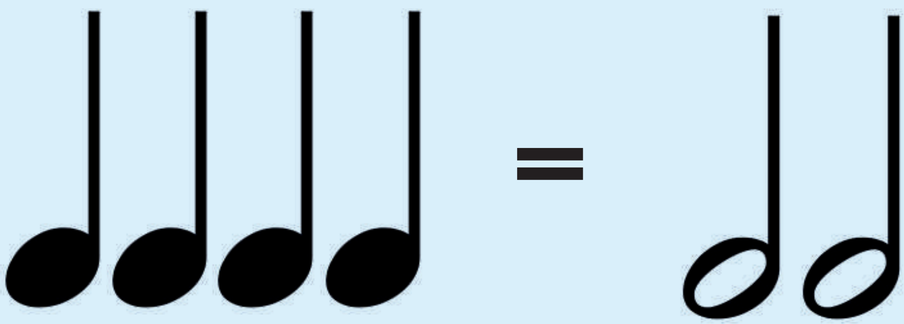
And this one? It's a quarter note. The oval is filled in. You hold this note for even less time—just 1 count. When you see a quarter note, you just count to 1.

So in the time it takes you to play 1 whole note, you can play 4 quarter notes!

Musical Combinations

It takes the same amount of time to play 1 whole note as 4 quarter notes. What other combinations of notes add up to 4 counts? 2 half notes!

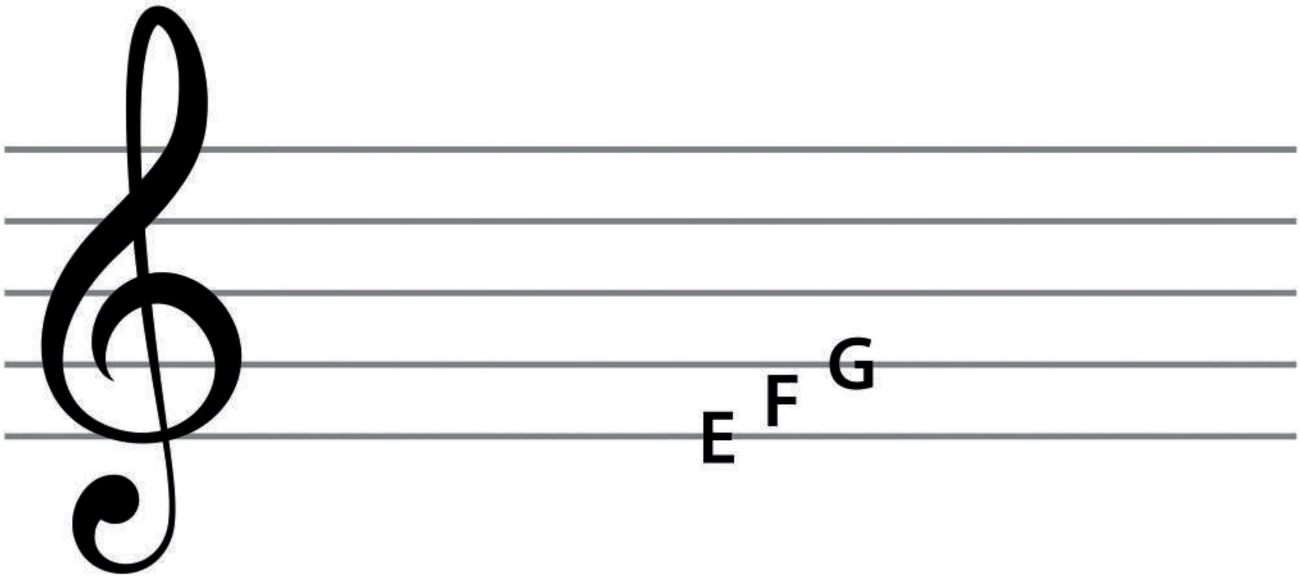




These lines make up a music staff. It's where we draw notes to show musical sounds. The lower a note appears on the staff, the lower the note's sound. The higher a note appears on the staff, the higher the note's sound.

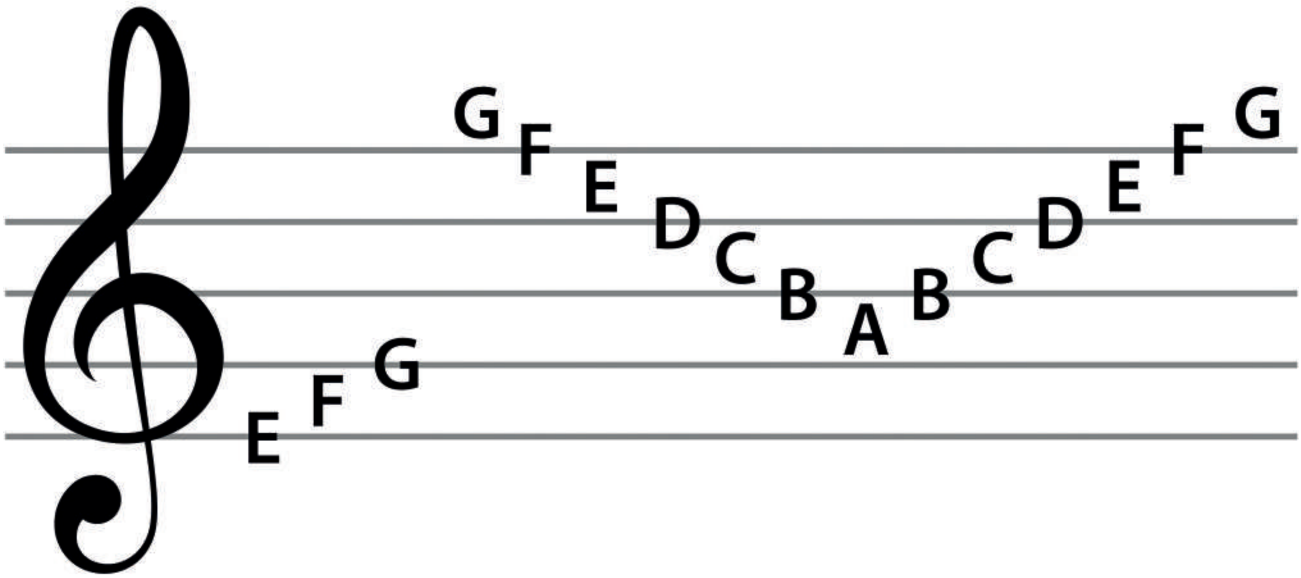
Notes can sit on the lines or in the spaces between lines. Each line and space is identified by a letter. That's how we name the notes, too.

The lowest line on this staff is called E. The space right above it is F. The line above that is G.



What note do you think comes after G on the scale? You might think it's H, right? Surprise! It isn't H; it's A.

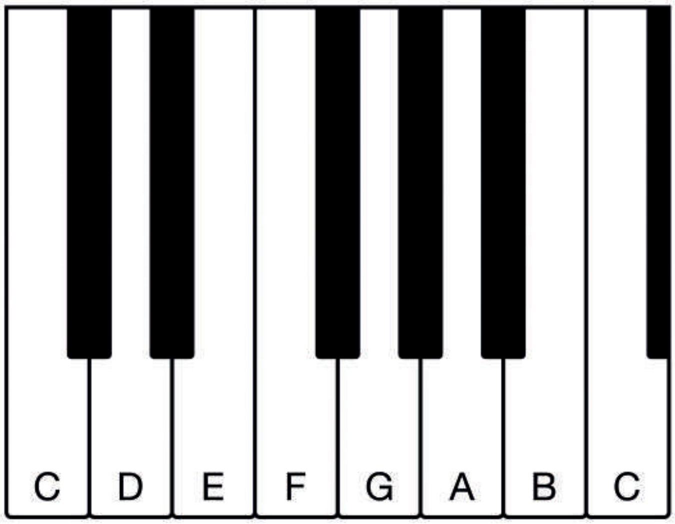
Notes are only named A through G. After these 7 letters are all used climbing up the musical scale, there are still sounds that are higher. The letters are used over again, continuing in order to keep labeling the higher and higher notes.

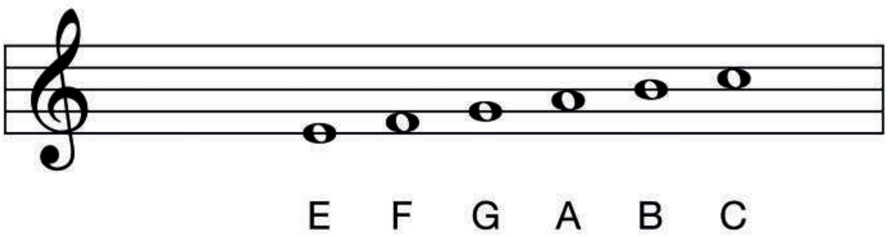


You can read the notes from a musical staff to play a tune! Each note shown on the staff matches with a note on an instrument.

What kind of notes are on this staff? How long do you count as you play each note?

Counting helps a lot in music. When you start learning, you'll count a lot. Recognizing order is another math skill. Knowing that the order of sounds on the staff means lower to higher sounds from bottom to top is a type of math thinking. The more you practice, the easier it gets. Soon, you'll be reading music and playing beautiful tunes!





Main Idea

Reading and playing music use math.

CHAPTER 24

Field Day

Today is the day Jace's class has been waiting for all year. It's field day! It's a day of fun when everyone plays outside all day long.

"I want to do the shoe kick and the water balloon toss," says Jace.

"I don't really want to play today," says Sarah. "I just got my cast off last week, and I'm supposed to be careful with my arm. I wonder if Mrs. Kahn will let me keep score instead."

"I'm sure she would," says Jace. "Every game needs a scorekeeper!"

The kids get together for the shoe kick. Each player has to kick their right shoe into the air to see who can fling it the farthest.

The students divide into teams. Players get 1 point for flinging their shoe past the first line. They get 2 points for flinging the shoe past the second line.

After each kick, Sarah rushes out onto the field and writes down the points. At the end, she adds up the points for each team. The scores are close!

Jace and Sarah watch other students play different games. There's a parachute game. The players have to bounce balls on top of a parachute. Each player has a ball of a different color. Everyone wiggles the parachute but tries to keep their own ball from falling off.

"That looks like fun," says Jace.

"But they don't need a scorekeeper," observes Sarah. "The last player with a ball on the parachute wins."

Next, it's time for the water balloon toss. The goal is to throw the balloon as far as possible. The person who throws it the farthest wins. Sarah is ready to keep score for this game!

Each player tosses and splashes the balloons as far as possible. Jace pulls his arm back, feels the squishy balloon in his hand, and throws it with all his might. It flies far and then—splash! It hits the grass.

Sarah runs out to measure how far each one flew before landing. She writes everything in her notes. Her shoes and socks get soaking wet!

Field day is coming to a close, and it's time to see the results of the games. "I've got results for the scored games," says Sarah proudly. The crowd gathers around, and she shows a poster she has made to display the numbers she recorded. She had added all of the points and measurements into tables.

Shoe Kick Results	
Blue Team	42 points
Green Team	46 points

Water Balloon Toss Results	
Player Names	**Distance**
Alex	11 feet
Jordan	19 feet
Jace	15 feet
Crystal	16 feet
Sophie	10 feet

The Results Are In

Which team won the shoe kick? Who won the water balloon toss?

"Hey," says Jace. "It's a good idea to have a scorekeeper for our games. Knowing the score while you are playing a game makes the game more exciting. It let's you know how much better you must play to win. Thanks, Sarah!"

"It was fun," says Sarah. "It might have been almost as fun as playing!"

Main Idea

Adding up points and measuring distances can tell us who won a game.

Core Knowledge®

CKMath™

Core Knowledge Mathematics™

Managing Editor, STEM
Sally Guarino

Subject Matter Expert

Holly Caldwell-Taylor, DBA, CPA
Associate Professor and Department Chair
Department of Economics and Business Administration
Bridgewater College
Bridgewater, VA

Illustration and Photo Credits

A LaRue / Alamy Stock Photo: 69a
Album / British Library / Alamy Stock Photo: 9
Aleksandr Davydov / Alamy Stock Photo: 57, 60b, 86, 91b
Alexandr Kucherov / Alamy Stock Photo: 83
Amnad Bumrungvong / Alamy Stock Photo: 131
Anastasia Maslova / Alamy Stock Vector: 31
Andrew Paterson / Alamy Stock Photo: 102a
Andrew Unangst / Alamy Stock Photo: 71a
Andrey Kuzmin / Alamy Stock Photo: 1, 22a
Andriy Blokhin / Alamy Stock Photo: 49
Andrzej Tokarski / Alamy Stock Photo: 8c
Ann Cutting / Stockimo / Alamy Stock Photo: 33b
Anna Averianova / Alamy Stock Photo: 104
Annie Kuster / Alamy Stock Photo: 5
Anton Ivanov / Alamy Stock Photo: 118a
Arman Zhenikeyev / Alamy Stock Photo: 39b
Ashway / Alamy Stock Photo: 85
B Christopher / Alamy Stock Photo: 44b
Bert Folsom / Alamy Stock Photo: 47d, 56
Big Cheese Photo / Alamy Stock Photo: 105b
Bill Truran / Alamy Stock Photo: 129b
Björn Wylezich / Alamy Stock Photo: 48
blickwinkel / Alamy Stock Photo: 78c
Blue Lemon Photo / Alamy Stock Photo: 47b
canbedone / Alamy Stock Vector: 10
Candice Bell / Alamy Stock Photo: 45c
Carlos Barquero / Alamy Stock Photo: 40, 43
Carolyn Eaton / Alamy Stock Photo: 74
Chad Robertson / Alamy Stock Photo: 18
Chris Hill / Alamy Stock Photo: 14
Chris Willson / Alamy Stock Photo: 26
Chronicle / Alamy Stock Photo: 28
Clara Bastian / Alamy Stock Photo: 123
Daniel Borzynski / Alamy Stock Photo: 69b
Dave Marsden / Alamy Stock Photo: 78d
David Chapman / Alamy Stock Photo: 78e
David Davis Photoproductions RF / Alamy Stock Photo: 88
Dinodia Photos / Alamy Stock Photo: 29b
Dmitry Melnikov / Alamy Stock Photo: 98a
Dorling Kindersley ltd / Alamy Stock Photo: 44a
dpa picture alliance / Alamy Stock Photo: 6
Elisabeth Burrell / Alamy Stock Photo: 70a
Elly Russell / Alamy Stock Photo: 91a
Endless Travel / Alamy Stock Photo: 77
Erickson Stock / Alamy Stock Photo: 16
Erik Lam / Alamy Stock Photo: 109
Ernie Janes / Alamy Stock Photo: 81
Fiona Graham / Alamy Stock Photo: 24c
Florian Neukirchen / Alamy Stock Photo: 118c
Frank Chmura / Alamy Stock Photo: 22e
Glasshouse Images / Alamy Stock Photo: 8b
Gustavo Rezende Santos / Alamy Stock Photo: 125
Helen Hotson / Alamy Stock Photo: 87b, 89
Henner Damke / Alamy Stock Photo: 23a
Hervé Lenain / Alamy Stock Photo: 68a
Hipatia / Alamy Stock Vector: 30
i creative / Alamy Stock Photo: 79, 130b
Iggino Van Bael / Alamy Stock Photo: 82
Image Source Limited / Alamy Stock Photo: 37
imageBROKER.com / Alamy Stock Photo: 17, 22b, 22d, 76b, 78b, 117, 121a
Indiapix / Alamy Stock Photo: 73
IULIIA SAVKO / Alamy Stock Vector: 11
Ivan Kmit / Alamy Stock Photo: 129a
Ivan Pesic : Cover A–D, i, iii
Jens Hertel / Alamy Stock Photo: 68b
JOHN KELLERMAN / Alamy Stock Photo: 129d
jvphoto / Alamy Stock Photo: 27
Kat Gallagher / Alamy Stock Photo: 38
Katho Menden / Alamy Stock Photo: 22c
Kemal Taner / Alamy Stock Photo: 24a
Ken Barber / Alamy Stock Photo: 75, 76a
Konstantin Gushcha / Alamy Stock Photo: 42
Konstantin Kalishko / Alamy Stock Photo: 119
Kumar Sriskandan / Alamy Stock Photo: 128
Laura Dwight / Alamy Stock Photo: 2, 3, 4, 7
Luis Costa / Alamy Stock Vector: 135b–c, 136a–c
m@t.d / Alamy Stock Photo: 133
MadeleinWolf / Alamy Stock Photo: 34
Maksym Kapusta / Alamy Stock Photo: 98b, 99a–c, 100, 101b, 102b
Mar FERNÁNDEZ NAVARRO / Alamy Stock Photo: 8a
Marek Uliasz / Alamy Stock Photo: 72
mark higgins / Alamy Stock Photo: 101a, 101c
Matthew Heinrichs / Alamy Stock Photo: 71b
Miceking / Alamy Stock Photo: 135a
Michael Burrell / Alamy Stock Photo: 84
Michael Dwyer / Alamy Stock Photo: 121b
Michael Greenfelder / Alamy Stock Photo: 35
Michael Matti / Alamy Stock Photo: 127
Michele and Tom Grimm / Alamy Stock Photo: 23c
Michele Ursi / Alamy Stock Photo: 39a
Mikalai Lipski / Alamy Stock Photo: 22g
Mike Ford / Alamy Stock Photo: 103
Myrleen Pearson / Alamy Stock Photo: 20
Nature Collection / Alamy Stock Photo: 78a
neha sadaye / Alamy Stock Photo: 60a
Nicolariccimn / Alamy Stock Photo: 90b
Oleksandr Perepelytsia / Alamy Stock Photo: 129c
Olga Kashurina / Alamy Stock Vector: 137, 138
OZGUR TOLGA ILDUN / Alamy Stock Photo: 41
P Tomlins / Alamy Stock Photo: 24b
Peacock Graphics / Alamy Stock Photo: 8d
Peter Hermes Furian / Alamy Stock Photo: 139
Pixel-shot / Alamy Stock Photo: 105a, 106a
PRISMA ARCHIVO / Alamy Stock Photo: 116
Rawpixel Ltd / Alamy Stock Photo: 106b
Rick Lewis / Alamy Stock Photo: 124
Rob Walls / Alamy Stock Photo: 36
Rocklights / Stockimo / Alamy Stock Photo: 8e
RooM the Agency / Alamy Stock Photo: 108
Roy Rambo / Alamy Stock Photo: 25a
Sarah Jay Photography / Alamy Stock Photo: 19
Scott Nodine / Alamy Stock Photo: 22f
Sébastien Lecocq / Alamy Stock Photo: 118b
Sergiy Tryapitsyn / Alamy Stock Photo: 132
Shirley Kilpatrick / Alamy Stock Photo: 80
Stepan Popov / Alamy Stock Photo: 29a
Stephen Hyde / Alamy Stock Photo: 12a
StockPhotosArt - Sweets / Alamy Stock Photo: 47c
Streetfly Stock / Alamy Stock Photo: 23d
TasiPas / Alamy Stock Photo: 90a
Tetiana Vitsenko / Alamy Stock Photo: 29c
Tetra Images, LLC / Alamy Stock Photo: 21, 25c
THINGX / Alamy Stock Photo: 87a
Tom Holt / Alamy Stock Photo: 25b
Tony Cordoza / Alamy Stock Photo: 130a
Vastram / Alamy Stock Photo: 70b
Visual&Written SL / Alamy Stock Photo: 33a
vivoo / Alamy Stock Photo: 122
Vladimir Grigorev / Alamy Stock Photo: 115
Volha Stasevich / Alamy Stock Vector: 12b
Voodziavka / Alamy Stock Photo: 23e
WaterFrame / Alamy Stock Photo: 24d, 32
Wavebreak Media ltd / Alamy Stock Photo: 134
Witold Skrypczak / Alamy Stock Photo: 126
Zoonar GmbH / Alamy Stock Photo: 23b, 58

CKMath™

Core Knowledge MATHEMATICS

CONNECTING MATH TO OUR WORLD

GRADE 2 - USING MATH EVERY DAY

Math is found in almost every aspect of our lives. This series encourages learners to *find the math* in familiar situations, where they can benefit from seeing real-world connections to math. The instructional focus for this series is not on *practicing* math skills but on *where, when*, and *why* we use math. Through both fiction and nonfiction readings, learners see how math skills are useful. The readings increase an overall understanding of and interest in math and demonstrate the importance of learning math skills.

Core Knowledge®

ISBN: 979-8-88970-537-6

www.coreknowledge.org