Name _____ Solve

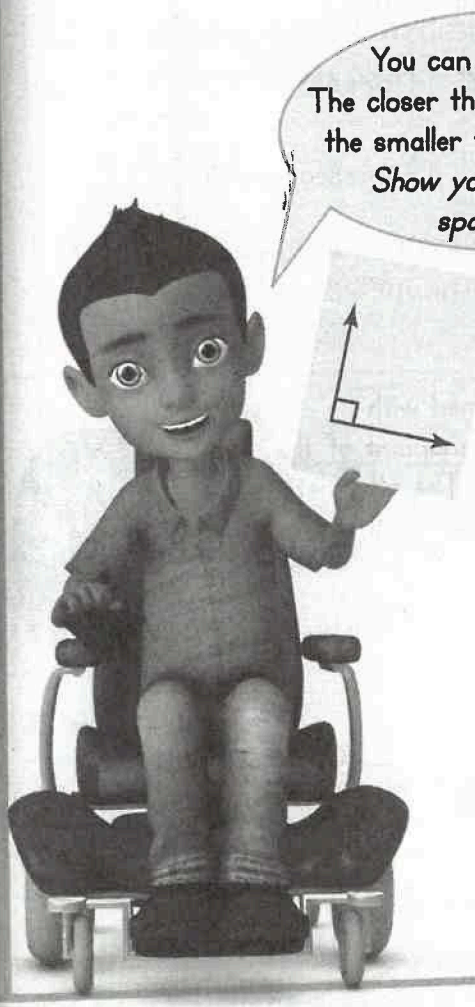
Lesson 15-1
Lines, Rays, and Angles

I can ...
recognize and draw lines, rays, and angles with different measures.

Content Standards 4.MD.C.5, 4.G.A.1
Mathematical Practices MP.2, MP.4, MP.6, MP.7

Solve & Share

A right angle forms a square corner, like the one shown below. Draw two angles that are open less than the right angle. ***Solve this problem any way you choose.***



Look Back! **MP.2 Reasoning** Draw an angle that is open more than a right angle.

Essential Question

What Are Some Common Geometric Terms?

A

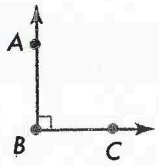
Point, line, line segment, ray, right angle, acute angle, obtuse angle, and straight angle are common geometric terms.

Lines and parts of lines are named for their points. A ray is named with its endpoint first.

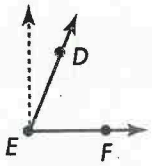
Geometric Term	Example	Label	What You Say
A point is an exact location in space.	Z	Point Z	Point Z
A line is a straight path of points that goes on and on in opposite directions.	A B	$\overleftrightarrow{AB}$	Line AB
A line segment is a part of a line with two endpoints.	G R	$\overline{GR}$	Line Segment GR
A ray is a part of a line that has one endpoint and continues on forever in one direction.	N O	$\overrightarrow{NO}$	Ray NO

B An angle is formed by two rays that have the same endpoint.

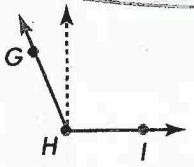
Angles are named with 3 letters. The shared endpoint of the rays is the center letter. The other letters represent points from each ray.



$\angle ABC$ is a right angle. A right angle forms a square corner.



$\angle DEF$ is an acute angle. An acute angle is open less than a right angle.



$\angle GHI$ is an obtuse angle. An obtuse angle is open more than a right angle but less than a straight angle.

$\angle JKL$ is a straight angle. A straight angle forms a straight line.

Convince Me! **MP.7 Look for Relationships** Complete each figure to show the given angle.

Obtuse angle

Straight angle

Acute angle

Right angle

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

1. **MP.6 Be Precise** What geometric term describes a part of a line that has one endpoint? Draw an example.

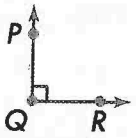
2. What geometric term describes a part of a line that has two endpoints? Draw an example.

3. Which geometric term describes an angle that forms a square corner? Draw an example.

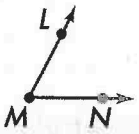
Do You Know How?

For **4–7**, use geometric terms to describe what is shown.

4. 

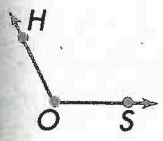
5. 

6. 

7. 

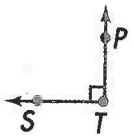
Independent Practice*

For **8–11**, use geometric terms to describe what is shown.

8. 

9. 

10. 

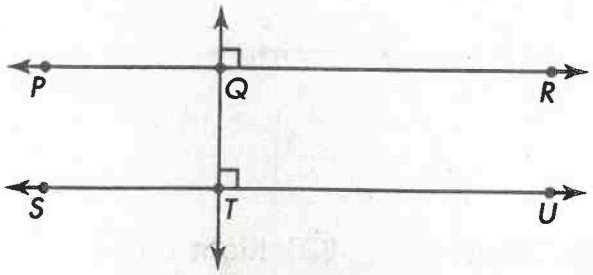
11. 

For **12–14**, use the diagram at the right.

12. Name four line segments.

13. Name four rays.

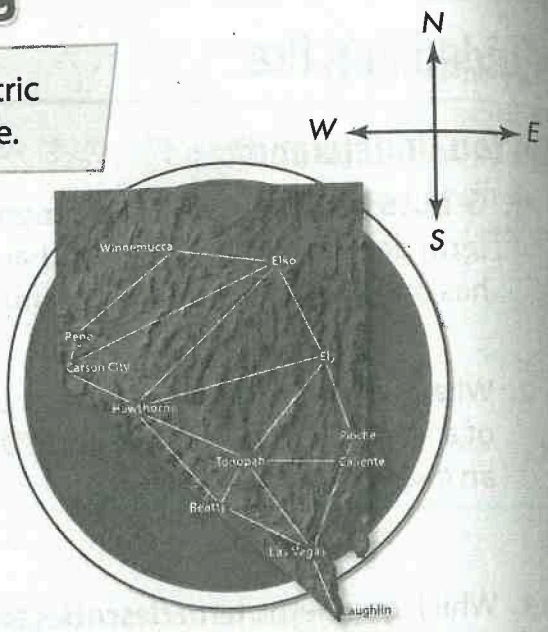
14. Name 2 right angles.



*another example, see Set A on page 809.

Math Practices and Problem Solving

For **15–17**, use the map of Nevada. Write the geometric term that best fits each description. Draw an example.



15. **MP.6 Be Precise** The route between 2 cities.

16. The cities

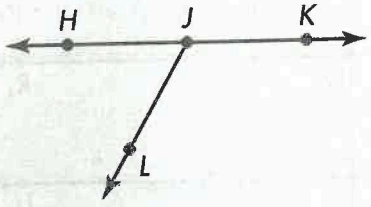
17. Where the north and west borders meet

18. **Vocabulary** Write a definition for *right angle*. Draw a right angle. Give 3 examples of right angles in the classroom.

19. **Higher Order Thinking** Nina says she can make a right angle with an acute angle and an obtuse angle that have a common ray. Is Nina correct? Draw a picture and explain.

Common Core Assessment

20. Which geometric term describes $\angle HJK$?



Ⓐ Acute
Ⓑ Obtuse
Ⓒ Right
Ⓓ Straight

21. Lisa drew 2 rays that share an endpoint. Which of the following is Lisa's drawing?

Ⓐ 

Ⓒ 

Ⓑ 

Ⓓ 

Name _____

Help Practice Buddy Tools Games

Homework & Practice 15-1
Lines, Rays, and Angles

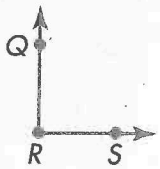
Another Look!

Point
A point is an exact location in space. This is point C.

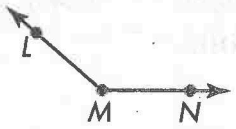
Line
A line is a straight path of points that goes on and on in opposite directions. This is $\overleftrightarrow{AB}$.

Line segment
A line segment is part of a line. It has two endpoints. This is $\overline{XY}$.

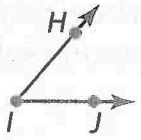
Ray
A ray is part of a line. It has one endpoint and goes on and on in one direction. This is $\overrightarrow{AB}$.



Right angle
A right angle forms a square corner. This is $\angle QRS$.



Obtuse angle
An obtuse angle is greater than a right angle. This is $\angle LMN$.

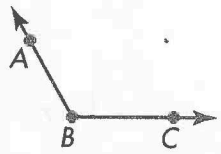


Acute angle
An acute angle is less than a right angle. This is $\angle HIJ$.

Straight angle
A straight angle forms a straight line. This is $\angle STU$.

For **1–3**, use geometric terms to describe what is shown. Be as specific as possible.

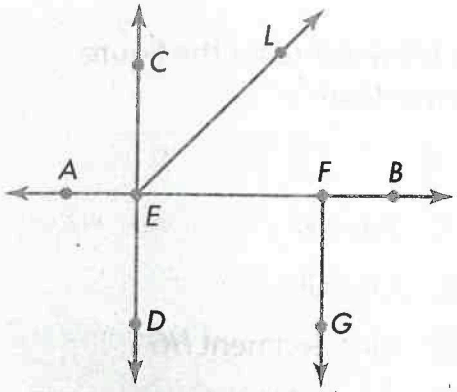
1.



2.

3.

For **4–6**, use the diagram at the right.

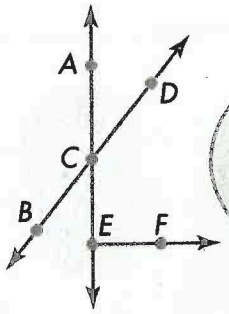


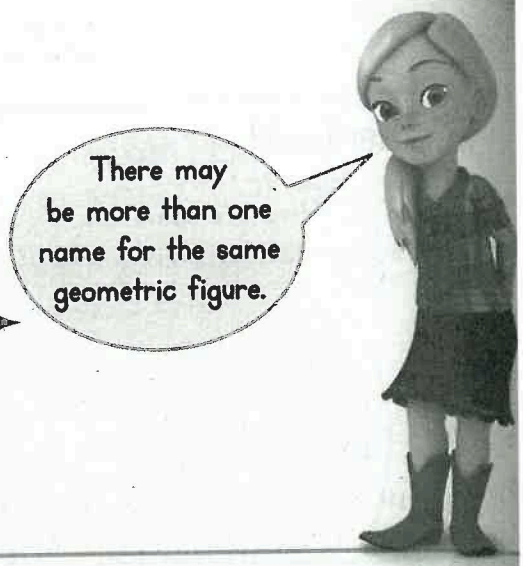
4. Name three different rays.

5. Name two different line segments.

6. Name two different acute angles.

For **7–9**, use the diagram at the right.



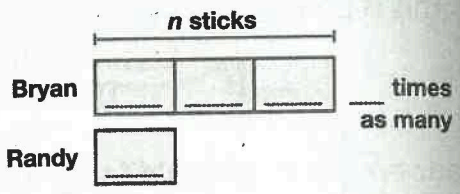


7. Name two lines.

8. Name two obtuse angles.

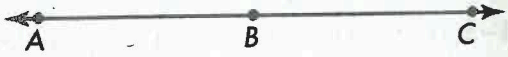
9. Name one point that lies on two lines.

10. **MP.4 Model with Math** Randy used 92 sticks to build a model. Bryan used 3 times as many sticks. Complete the bar diagram to represent how many sticks Bryan used. Then find how many more sticks Bryan used than Randy. Write and solve equations.



11. **Vocabulary** What is the difference between a *line* and a *line segment*? Draw an example of each.

12. **Higher Order Thinking** Name two rays with the same endpoint in the figure below. Do they form an angle? Explain.



Common Core Assessment

13. What is the name for the figure shown below?

Ⓐ Ray *GH*

Ⓑ Line *GH*

Ⓒ Line Segment *HG*

Ⓓ Angle *GH*

14. Mary drew $\overleftrightarrow{XY}$. Which of the following is Mary's drawing?

Ⓐ

Ⓑ 

Ⓒ 

Ⓓ 

Name _____ Solve

Lesson 15-2
Understand Angles and Unit Angles

I can ...
use what I know about fractions to measure angles.

Content Standard 4.MD.C.5a
Mathematical Practices MP.1, MP.2, MP.3, MP.4

Solve & Share

If a clock shows it is 3 o'clock, how could you describe the smaller angle made by the two hands of the clock? ***Solve this problem any way you choose.***

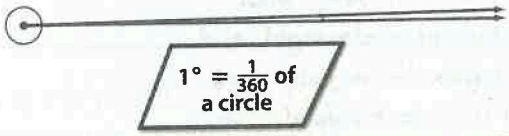
Look Back! **MP.2 Reasoning** What two fractions do the hands divide the clock into?

Essential Question

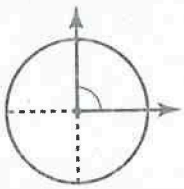
What is the Unit Used to Measure Angles?

A

An angle is measured with units called degrees. An angle that turns through $\frac{1}{360}$ of a circle is called a unit angle. How can you determine the angle measure of a right angle and the angles that turn through $\frac{1}{6}$ and $\frac{2}{6}$ of a circle?



B Divide to find the angle measure of a right angle.

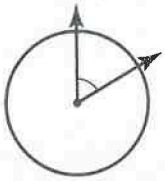


Right angles divide a circle into 4 equal parts.

$$360° \div 4 = 90°$$

The angle measure of a right angle is 90°.

C Multiply to find the measure of an angle that turns through $\frac{1}{6}$ of a circle.

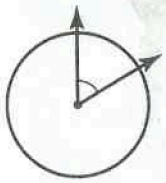


Multiply by $\frac{1}{6}$ to calculate the angle measure.

$$\frac{1}{6} \times 360° = \frac{360°}{6} \text{ or } 60°$$

The angle measure is 60°.

D Add to find the measure of an angle that turns through $\frac{2}{6}$ of a circle.



$\frac{1}{6} = 60°$

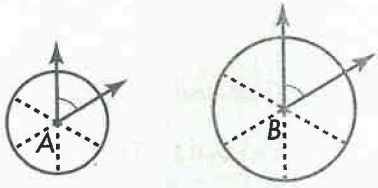
$\frac{2}{6} = ?$

Remember $\frac{2}{6} = \frac{1}{6} + \frac{1}{6}$. Add to calculate the measure of $\frac{2}{6}$ of a circle.

$$60° + 60° = 120°$$

The angle measure of $\frac{2}{6}$ of a circle is 120°.

Convince Me! © **MP.3 Critique Reasoning** Susan thinks the measure of angle *B* is greater than the measure of angle *A*. Do you agree? Explain.



Name _____

Practice Buddy | Tools | Assessment

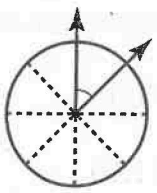
Another Example!

Find the fraction of a circle that an angle with a measure of 45° turns through.

A 45° angle turns through $\frac{45}{360}$ of a circle.

$45° \times 8 = 360°$, so 45° is $\frac{1}{8}$ of 360°.

One 45° angle is $\frac{1}{8}$ of a circle.



45° = $\frac{1}{8}$ of a 360° circle

Guided Practice*

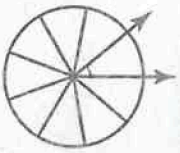
Do You Understand?

1. What fraction of the circle does a 120° angle turn through?

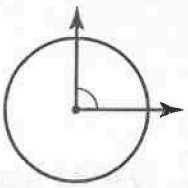
2. **MP.4 Model with Math** Mike cuts a pie into 4 equal pieces. What is the angle measure of each piece? Write and solve an equation.

Do You Know How?

3. A circle is divided into 9 equal parts. What is the angle measure of one of those parts?



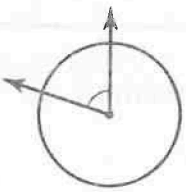
4. An angle turns through $\frac{2}{8}$ of the circle. What is the measure of this angle?



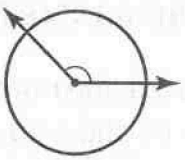
Independent Practice

For **5–8**, find the measure of each angle.

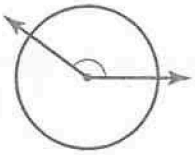
5. The angle turns through $\frac{1}{5}$ of the circle.



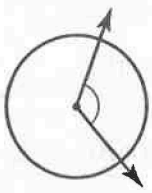
6. The angle turns through $\frac{3}{8}$ of the circle.



7. The angle turns through $\frac{2}{5}$ of the circle.



8. The angle turns through $\frac{2}{6}$ of the circle.



*For another example, see Set B on page 809.

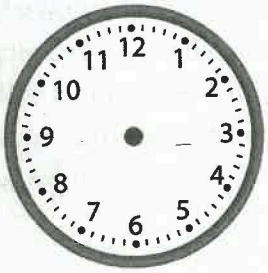
Math Practices and Problem Solving

9. MP.2 Reasoning Use the clock to find the measure of the smaller angle formed by the hands at each time.

a. 3:00

b. 11:00

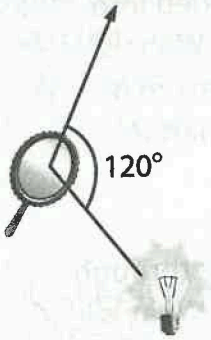
c. 2:00



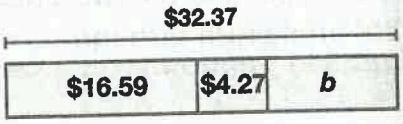
10. Algebra Jacey wrote an equation to find an angle measure. What do the variables a and b represent in Jacey's equation?

$360° \div a = b$

11. Math and Science A mirror can be used to reflect a beam of light at an angle. What fraction of a circle would the angle shown turn through?



12. Malik paid $32.37 for three books. One book cost $16.59. The second book cost $4.27. How much did the third book cost? Use bills and coins to solve.



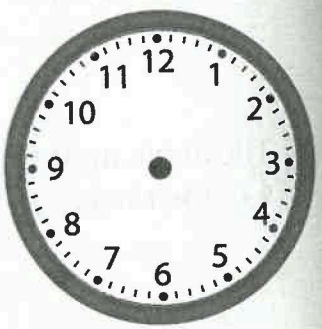
13. MP.1 Make Sense and Persevere A pie was cut into equal parts. Four pieces of the pie were eaten. The 5 pieces that remained created an angle that measured 200°. What was the angle measure of one piece of pie?

14. Higher Order Thinking Jake cut a round gelatin dessert into 8 equal pieces. Five of the pieces were eaten. What is the angle measure of the dessert that was left?

Common Core Assessment

15. Draw a line from the time to the smaller angle the time would show on a clock. Use the clock to help.

3:00	180°
10:00	60°
6:00	120°
4:00	90°



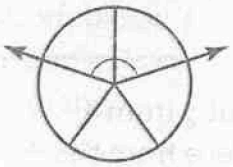
Name _____

Help Practice Buddy Tools Games

Homework & Practice 15-2
Understand Angles and Unit Angles

Another Look!

You can find the measure of an angle using fractions of a circle.



The angle shown is $\frac{2}{5}$ of a circle.

What is the measure of this angle?

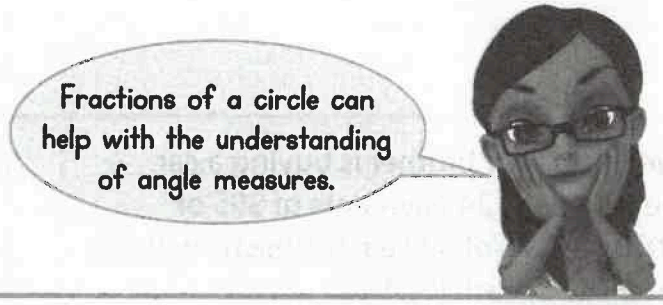
Remember that $\frac{2}{5} = \frac{1}{5} + \frac{1}{5}$.
Divide to find the angle measure of $\frac{1}{5}$ of a circle.

$360° \div 5 = 72°$

An angle that turns through $\frac{1}{5}$ of a circle measures 72°.

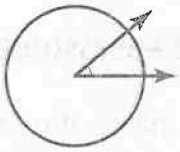
$72° + 72° = 144°$

The measure of this angle is 144°.



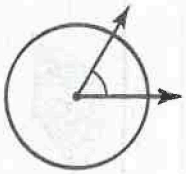
For **1–4**, find the measure of each angle.

1. The angle turns through $\frac{1}{9}$ of the circle.



2. A circle is divided into 6 equal parts. What is the total angle measure of 1 part?

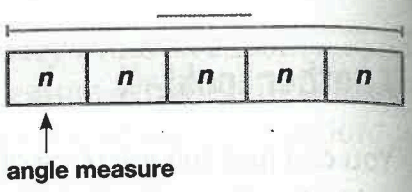
$\frac{1}{6} \times$ _____ = _____



3. A circle is divided into 5 equal parts. What is the total angle measure of 4 parts?

4. A circle is divided into 8 equal parts. What is the total angle measure of 4 parts?

5. **MP.2 Reasoning** Noah used a bar diagram to find the measure of an angle that turns through $\frac{1}{5}$ of a circle. Write an equation to find the measure of the angle.



6. **Number Sense** Miguel cut $\frac{1}{4}$ from a round pie. Mariah cut a piece from the same pie with an angle measure of 60°. Who cut the larger piece? Explain.

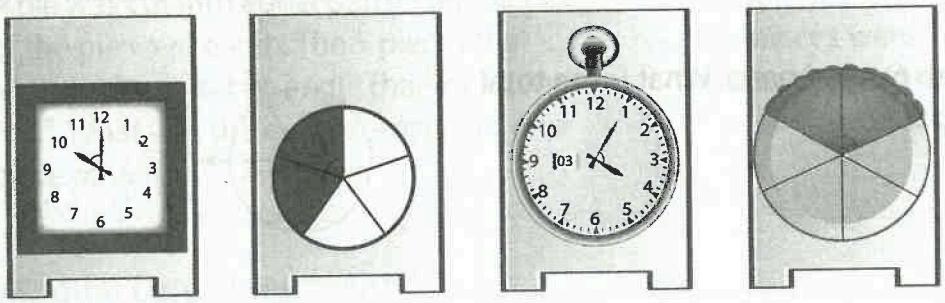
7. **MP.3 Construct Arguments** Janie served 4 same-size pizzas at the class party. Explain how to find how many slices of pizza Janie served if the angle for each slice turns through a right angle.

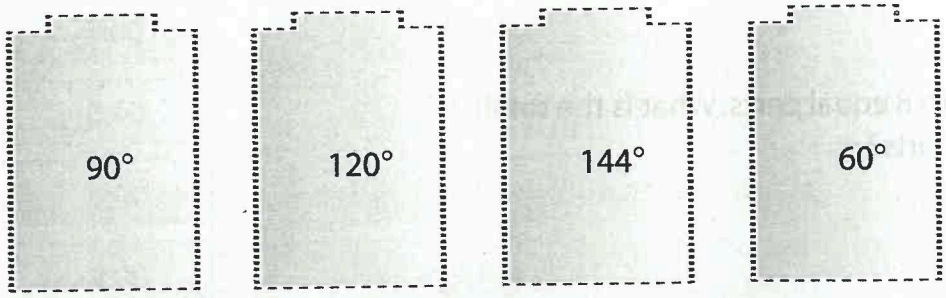
8. Wendy's older brother is buying a car. He can make 24 payments of $95 or 30 payments of $80 each. Which costs less? How much less?

9. **Higher Order Thinking** A circle is divided into 18 equal parts. How many degrees is the angle measure for each part? How many degrees is the angle measure for 5 of those parts? Break apart 18 to solve. Explain.

Common Core Assessment

10. Draw a line to match the angle in the circle with its angle measure.





Name _____ Solve

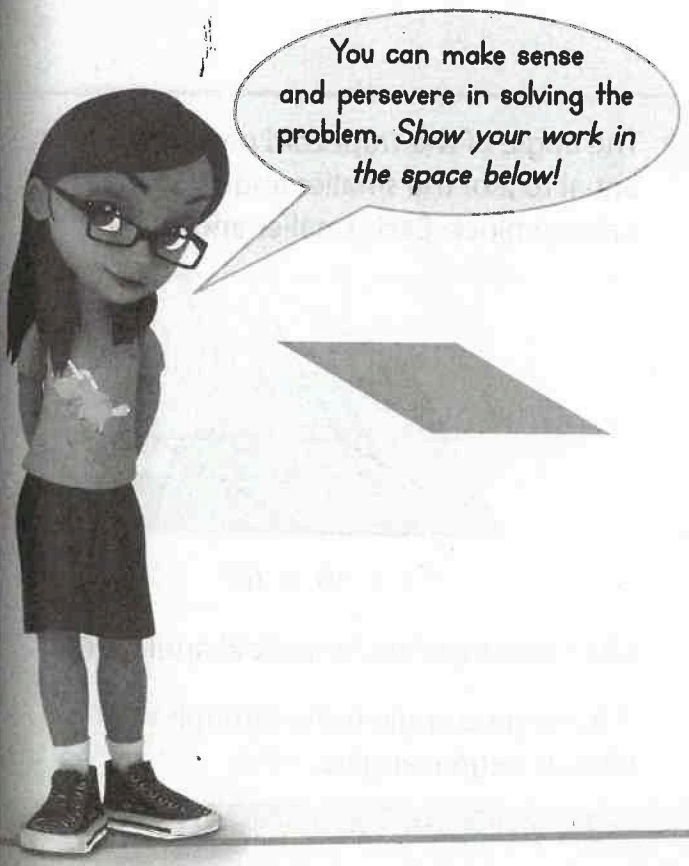
Lesson 15-3
Measure with Unit Angles

I can ...
use angles I know to measure angles I do not know.

© **Content Standards** 4.MD.C.5a, 4.MD.C.5b
Mathematical Practices MP.1, MP.3, MP.4, MP.5, MP.8

Solve & Share

The smaller angles on the tan pattern block shown each measure 30°. How can you use the angles on the pattern block to determine the measure of the angle below? ***Solve this problem any way you choose.***



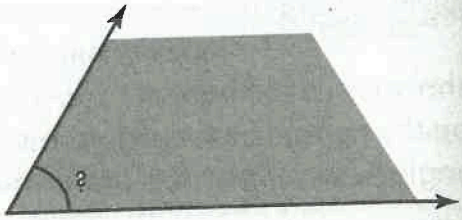
Look Back! © **MP.1 Make Sense and Persevere** Two right angles make a straight angle. How many 45° angles form a straight angle? Explain.

Essential Question

How Can You Measure Angles?

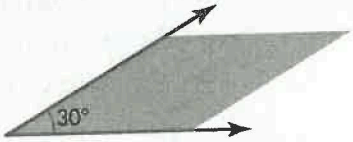
A

Holly traced around a trapezoid pattern block. She wants to find the measure of the angle formed shown to the right. What can Holly use to measure the angle?



The measure of a unit angle is 1 degree.

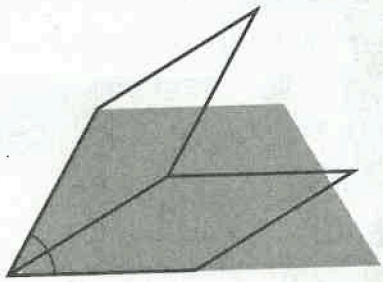
B Use an angle you know to find the measure of another angle.



The smaller angle of the tan pattern block measures 30°.

A 30-degree angle turns through 30 one-degree angles.

C The angle of the trapezoid pattern block is equal to 2 of the smaller angles of the tan pattern block. Each smaller angle is 30°.



$2 \times 30° = 60°$

The measure of the trapezoid angle is 60°.

A 60-degree angle turns through 60 one-degree angles.

Convince Me! **MP.8 Generalize** What do you notice about the number of one-degree angles in an angle measure?

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

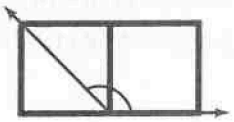
1. How many 30° degree angles are in a 180° angle? Explain.

2. **MP.1 Make Sense and Persevere** How many 15° angles are in a 180° angle? Use your answer to Exercise 1 to explain.

Do You Know How?

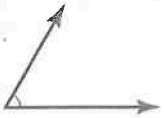
For **3–4**, use angles you know to find the measure of each angle. Explain how the angles in the square can help.

3. 

4. 

Independent Practice

For **5–13**, find the measure of each angle. Use pattern blocks to help.

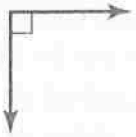
5. 

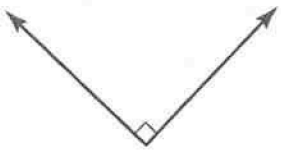
6. 

7. 

8. 

9. 

10. 

11. 

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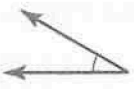
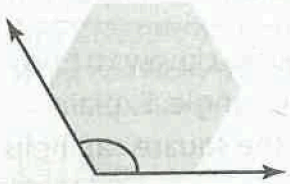
13. 

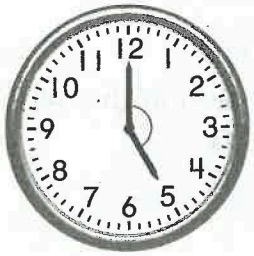
*For another example, see Set C on page 809.

Math Practices and Problem Solving

14. **MP.5 Use Appropriate Tools** What is the measure of the angle of the yellow hexagon pattern block?



15. What is the measure of the smaller angle formed by the clock hands when it is 5:00?



16. **MP.4 Model with Math** How many 30° angles are in a circle? Write and solve a multiplication equation to explain.

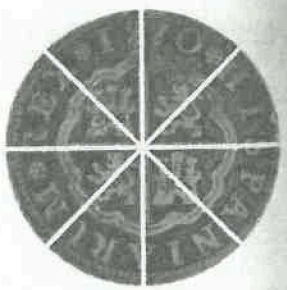
17. **MP.1 Make Sense and Persevere** How many unit angles make up the smaller angle formed by the hands of a clock when it is 3:00? Explain.

18. Veronica purchases a rug with a length of 16 feet and a width of 4 feet. One fourth of the rug is purple and the rest is blue. What is the area of the blue part of the rug?

19. **Higher Order Thinking** The hands of a clock form a 120° angle. Name two different times it could be.

Common Core Assessment

20. Before creating their own dollar, American colonists used a circular coin called an "eight reales" that could be divided into 8 equal pieces. Select all of the true statements about the pieces of an eight reales.



- ☐ Each piece has an angle measure of 60°.
- ☐ Three pieces have a total angle measure of 135°.
- ☐ Five pieces turn through 225 one-degree angles.
- ☐ Three 30° angles can fit into 2 pieces of an eight reales.
- ☐ Half of an eight reales has an angle measure of 90°.

Name _____

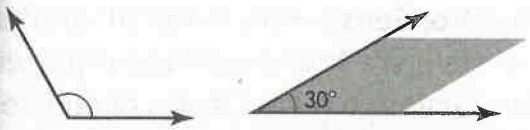
Help | Practice Buddy | Tools | Games

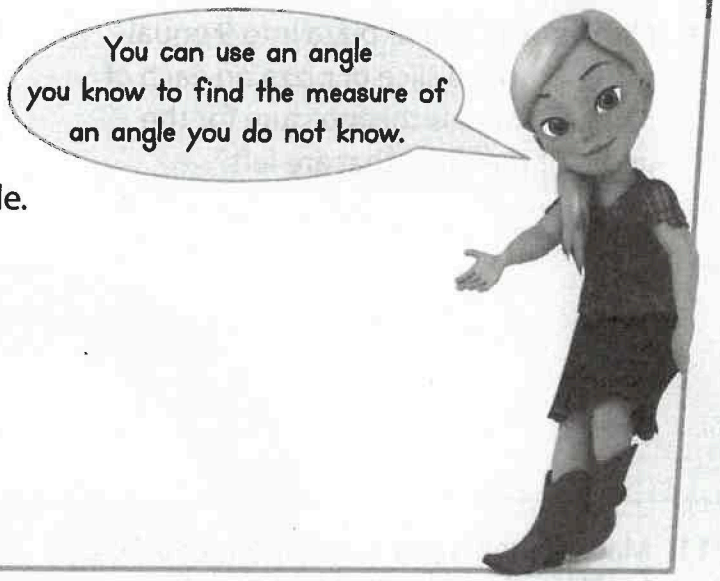
Homework & Practice 15-3
Measure with Unit Angles

Another Look!

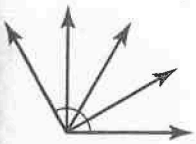
The smaller angle of the tan pattern block measures 30°.

Use the tan pattern block to find the measure of the angle below.





Four of the 30° angles will fit into the angle.

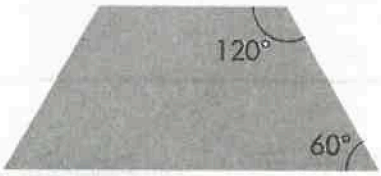


$30° + 30° + 30° + 30° = 120°$

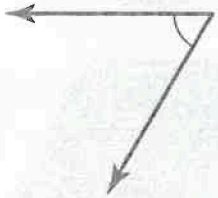
The measure of this angle is 120°.

It turns through 120 one-degree angles.

For **1–6**, find the measure of each angle.
Use pattern blocks to help.



1.



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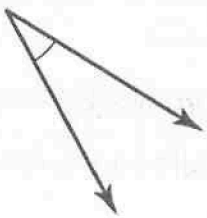

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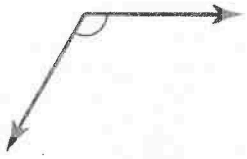

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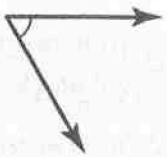


7. **MP.3 Construct Arguments** A round classroom table is made from 5 identical wedges. What is the measure of each angle formed at the center of the classroom table? Explain.

8. **MP.8 Generalize** How many unit angles does the smaller angle of a tan pattern block turn through? Explain.

9. Mario cut a circular pizza into 9 equal slices. He put a slice of pizza on each of 5 plates. What is the measure for the angle of the slices that are left?

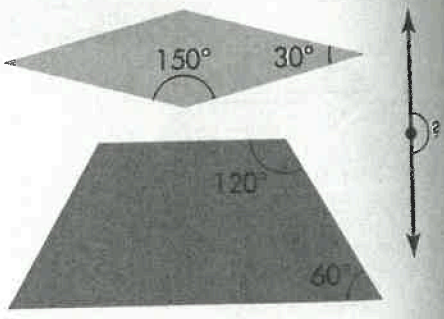
10. **Number Sense** How many 30° angles are there in a 150° angle? Use repeated subtraction to solve. Draw a picture to justify your solution.

11. Matt's parents pay him $5.50 for each half hour he babysits his sister, plus a two dollar tip. If Matt made $18.50, for how long did he babysit?

12. **Higher Order Thinking** If a clock face reads 1:00, how many hours must pass for the hands to form a straight angle?

Common Core Assessment

13. Shirley uses pattern blocks to measure the straight angle. Select all the combinations of pattern block angles that Shirley could use to measure the angle.



- ☐ 6 small angles on the tan pattern block
- ☐ 1 large angle and one small angle on the red pattern block
- ☐ 1 large angle on the red pattern block and 3 small angles on the tan pattern block
- ☐ 4 small angles on the tan pattern block and one small angle on the red pattern block
- ☐ 2 large angles on the red pattern block

Home Letter

Dear Family,

This week, we'll ask the question "How can animal behavior be like human behavior?" In the narrative nonfiction selection **Owen & Mzee,** we'll learn how environmental changes led to an unusual bond between two very different animals. We'll also read the informational text **Sea Sanctuary,** about what we are doing to protect endangered underwater habitats.

This week's...

Target Vocabulary: bond, suffered, intruder, companion, enclosure, inseparable, charged, chief, exhausted, affection

Vocabulary Strategy: Suffixes *-ed, -ly*

Comprehension Skill: Compare and contrast—examine how elements of a text are similar or different

Comprehension Strategy: Analyze/evaluate—think about and form opinions about the text

Writing Focus: Informative writing—prewrite: research report

Activities to Do Together

Vocabulary
Act out words from this week's **Target Vocabulary** with your child. Take turns trying to guess the word from the other's actions.

Wild Animals
Talk with your child about wild animals you've seen. What impressions did you get about the animal? Encourage your child to share his or her thoughts about wild animals.

How People Change the World
Discuss the ways people change the environment. Help your child choose a specific change that people cause in the environment. Have your child write a list of questions he or she would like to research about the change.

Go Digital Go to the *eBook* to read and listen to this week's selection.

Name _____ Date _____

Weekly To-Do List

Put an X in each box when you finish the activity.

Must Do

- ☐ Practice pages _____
- ☐  Comprehension and Fluency Literacy Center
- ☐  Word Study Literacy Center
- ☐  Think and Write Literacy Center
- ☐ Daily Independent Reading
- ☐ Other _____
  _____
  _____

May Do

- ☐ Reading Log
- ☐ Vocabulary in Context Cards
- ☐ Practice Spelling Words
- ☐ Work on Writing Assignment
- ☐ Other _____
  _____
  _____

Daily Independent Reading

☐ Monday	
☐ Tuesday	
☐ Wednesday	
☐ Thursday	
☐ Friday	

Lesson

24

LANGUAGE DETECTIVE

Talk About the Writer's Words

A verb's tense tells if something happened in the past, is happening now, or will happen in the future. Work with a partner. Find the Vocabulary words that are verbs. Then say the sentence again with the verb in a different tense.

Vocabulary in Context

1 bond

Many people feel a very strong bond, or connection, with animals.

2 suffered

A veterinarian treats animals who have suffered injury or illness.

3 intruder

Animals are cautious when an intruder invades their territory.

4 companion

A pet is usually a companion of its owner. They spend a lot of time together.

 ELA SL.4.1a, L.4.6

- Study each Context Card.
- Use a dictionary to help you understand the meanings of these words.

5 enclosure

This ranch worker checks to be sure that an animal's enclosure is secure and safe.

6 inseparable

People and their service animals often become inseparable. They are never apart.

7 charged

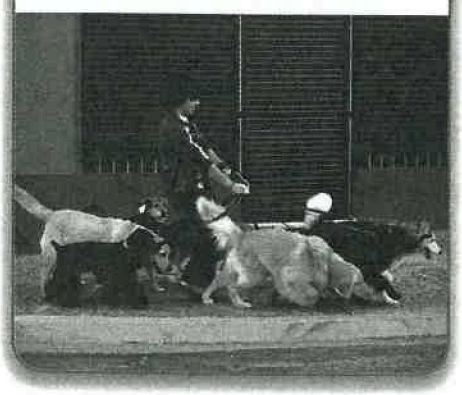
This dog has charged, or rushed at, the ball that its owner has tossed.

8 chief

One of the chief jobs of an aquarium biologist is to educate visitors about sea life.

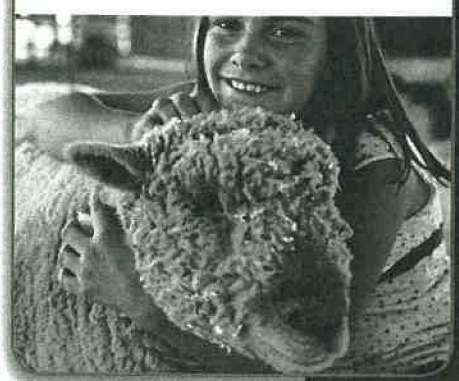
9 exhausted

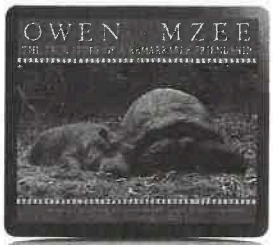
This dog walker loves his job, but he will be exhausted, or worn out, by the day's end.



10 affection

This girl feels affection, or fondness, for the sheep on her family's farm.

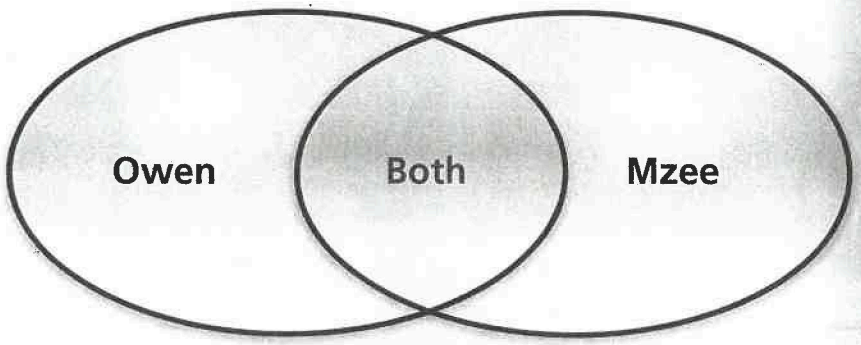




Read and Comprehend

☑ TARGET SKILL

Compare and Contrast The next selection is about two very different animals who find a common bond. As you read "Owen and Mzee," look for ways in which the authors organize information to show how the two animals are **alike** and **different.** Think about each animal's size, age, and situation. Use a graphic organizer like the one below to help you note their similarities and differences.



☑ TARGET STRATEGY

Analyze/Evaluate When you **analyze** and **evaluate** a text, you think carefully about what you have read. You use text evidence to form your own opinion about the topic.

 ELA RI.4.1, RI.4.5, SL.4.1b, SL.4.1c, SL.4.1d

PREVIEW THE TOPIC

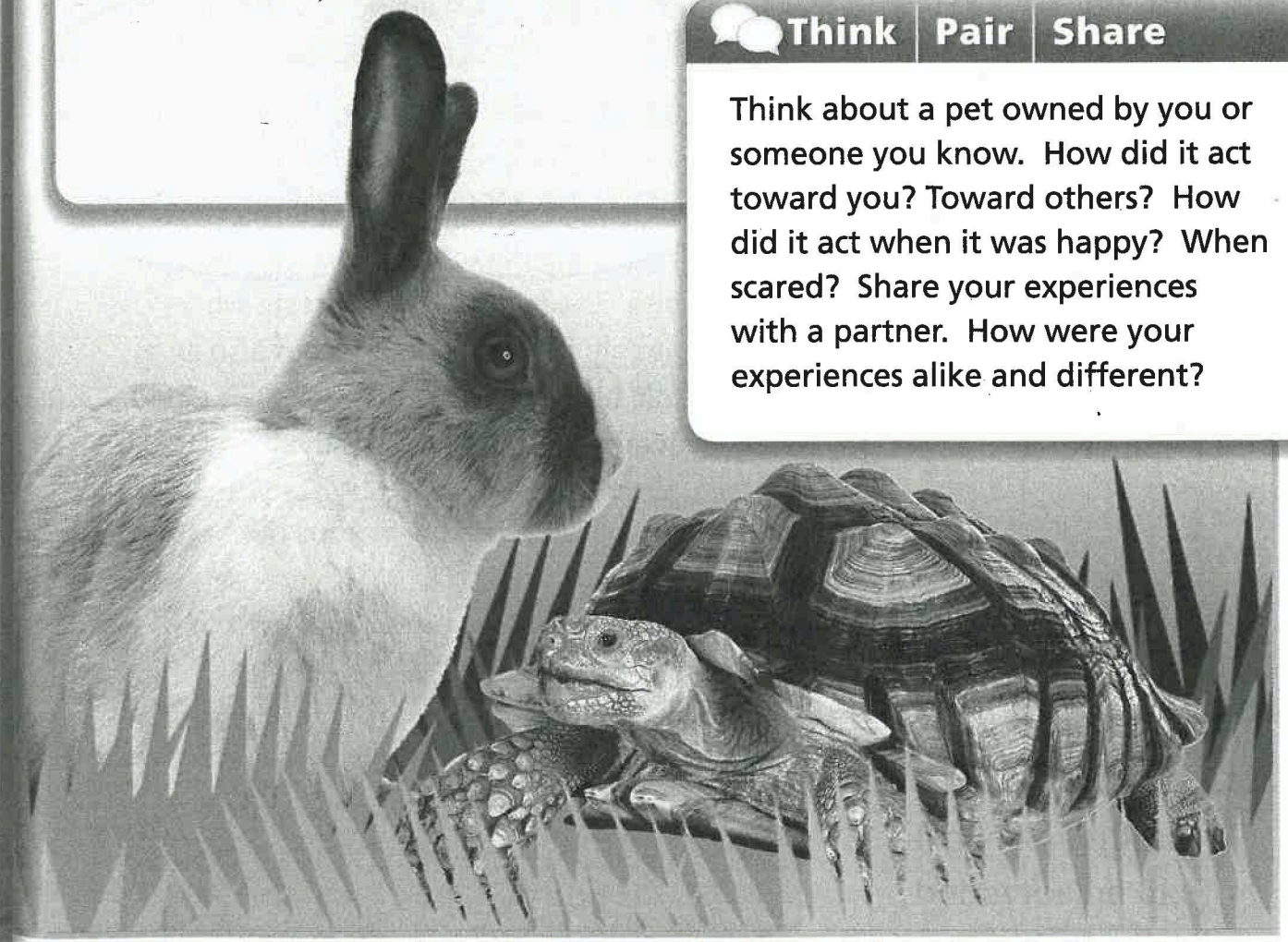
Animal Behavior

What do you think scientists are trying to find out by studying animal behavior? One thing they are trying to learn more about is how animals form social bonds, or close ties with each other. Most of the time, the bonds that form between animals are easy to predict. Sometimes, though, animals form bonds that shock even the experts.

"Owen and Mzee" is a true story about a baby hippo and an old tortoise that meet at an animal-rescue center. As you read, you'll find out why these two animals made headlines all over the world.

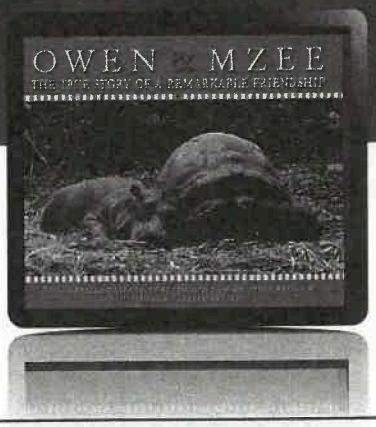
Think | Pair | Share

Think about a pet owned by you or someone you know. How did it act toward you? Toward others? How did it act when it was happy? When scared? Share your experiences with a partner. How were your experiences alike and different?



Lesson 24

ANCHOR TEXT



GENRE

Narrative nonfiction tells about people, things, events, or places that are real. As you read, look for:

- factual information that tells a story
- text features such as photographs and captions

MEET THE AUTHORS

Isabella Hatkoff

Craig Hatkoff

Dr. Paula Kahumbu

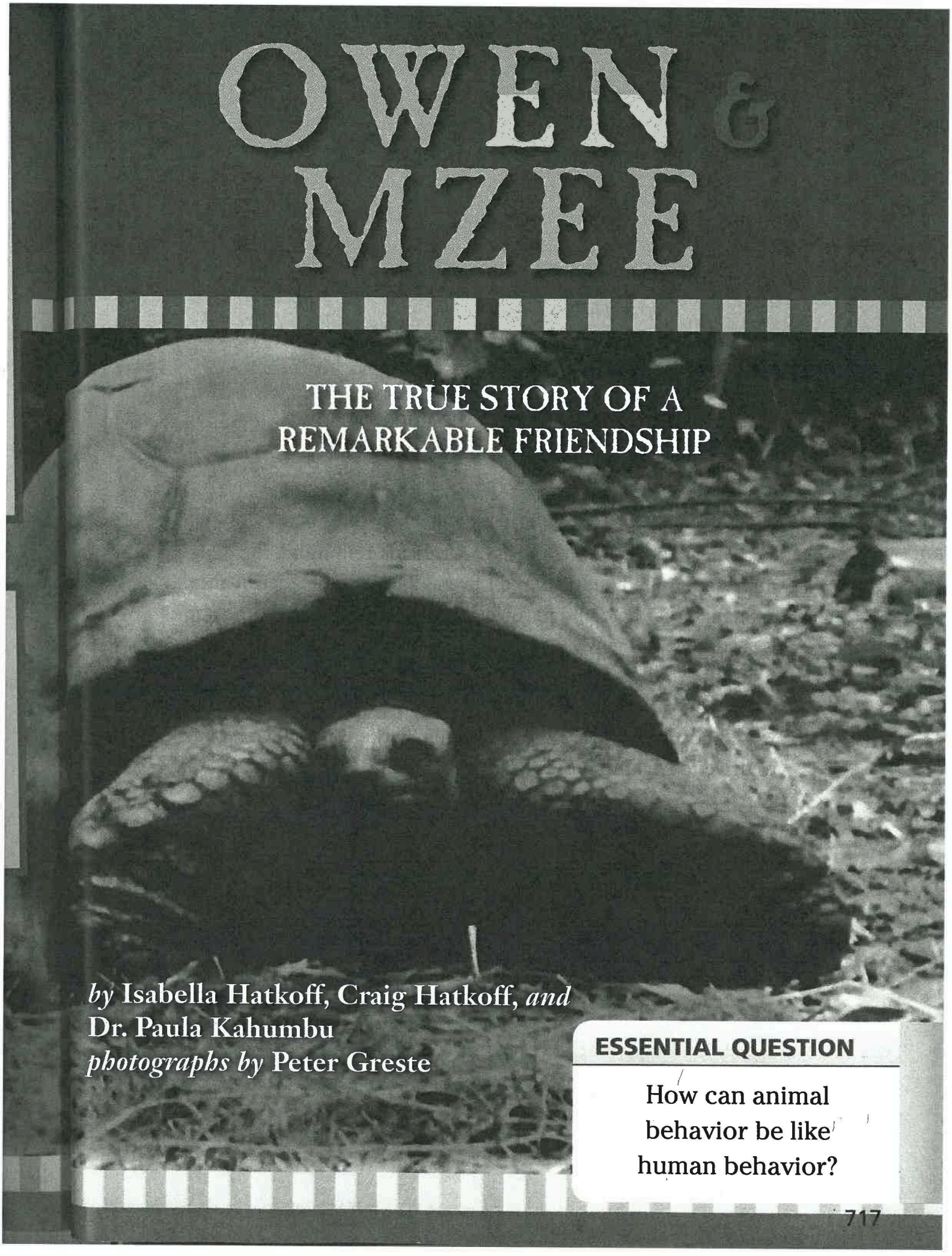
Isabella Hatkoff was six years old when she saw a photo of Owen and Mzee in the newspaper. She decided to write about them with the help of her father, Craig. Dr. Paula Kahumbu is an ecologist in Kenya. She's responsible for the health and safety of Owen and Mzee.

MEET THE PHOTOGRAPHER

Peter Greste

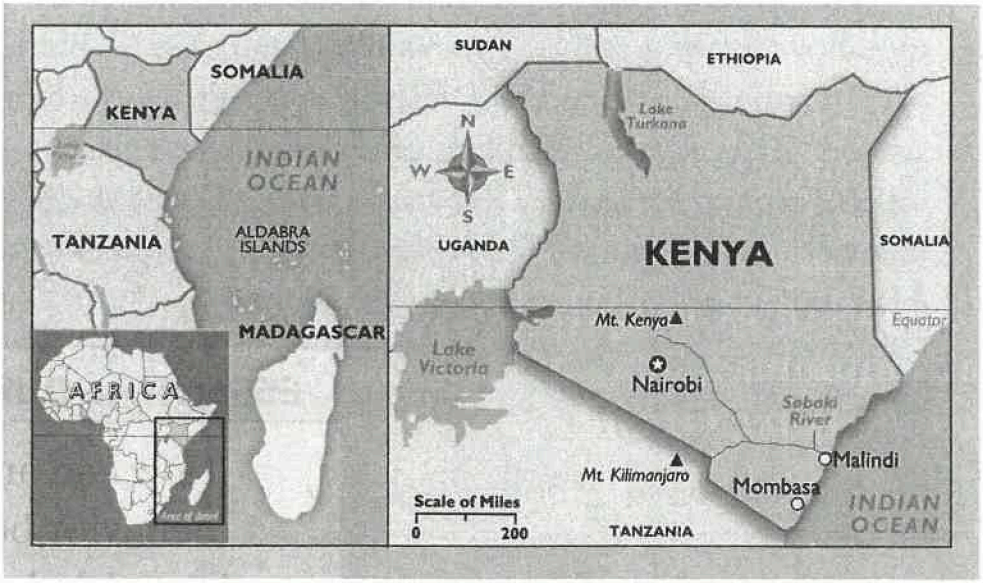
Peter Greste took the newspaper photo that led the Hatkoffs and Dr. Kahumbu to write "Owen and Mzee." Greste works not only as a photographer but also as a radio news reporter. He travels the world covering important events.

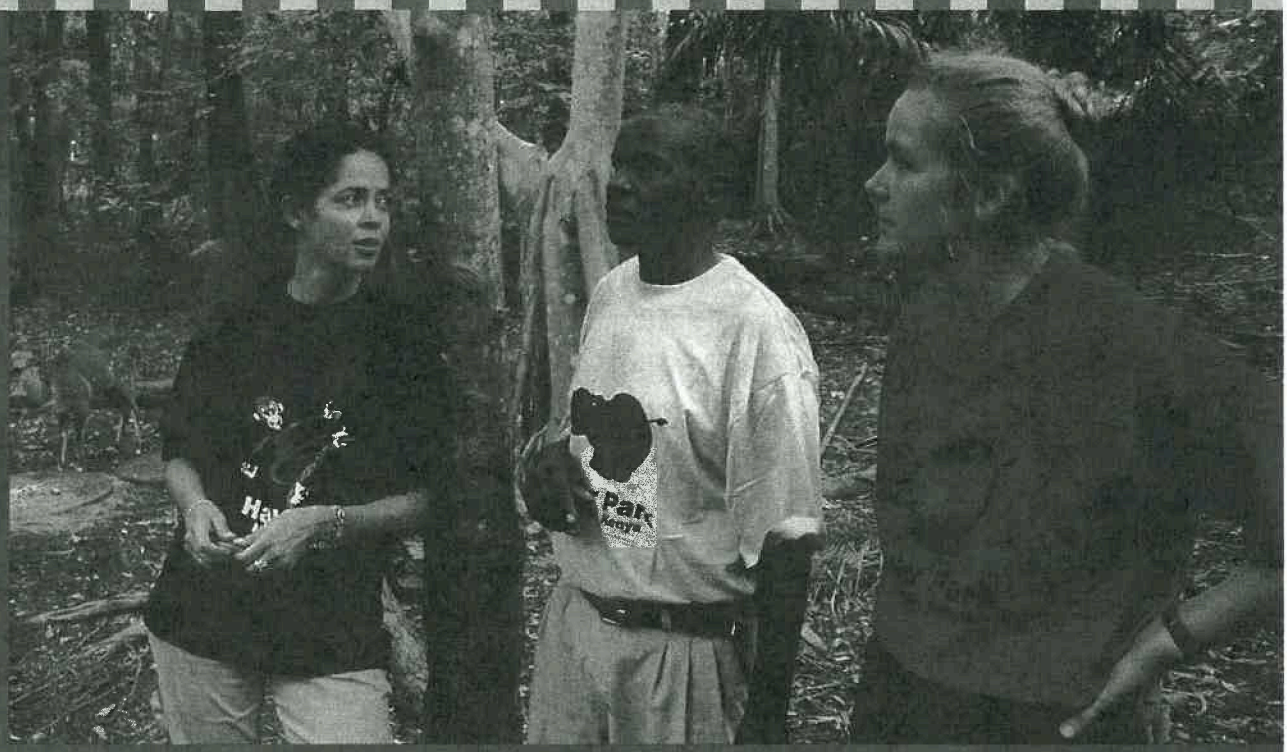
ELA RI.4.5, RI.4.8, RI.4.10, RF.4.4a, RF.4.4b, L.4.3a


OWEN & MZEE
THE TRUE STORY OF A REMARKABLE FRIENDSHIP
by Isabella Hatkoff, Craig Hatkoff, and Dr. Paula Kahumbu
photographs by Peter Greste
ESSENTIAL QUESTION
How can animal behavior be like human behavior?

This story began in Malindi, Kenya, on the east coast of Africa, in December 2004. A pod of hippopotamuses was grazing along the shore of the Indian Ocean. Suddenly, giant, surging waves from a tsunami (tsu NAH mee) rushed high onto the beach. The powerful waves caused destruction for miles around. After the water went down, only one hippo remained, and it was stranded on a reef. Hundreds of villagers worked for hours to rescue the six-hundred-pound baby. Finally, a man named Owen caught the animal, which was later named after him. The rescuers wrapped the hippo in a net and placed him in a pickup truck.

People weren't sure where Owen should be taken next. They called Haller Park, an animal sanctuary about fifty miles away, near the city of Mombasa. Dr. Paula Kahumbu, the manager, immediately offered Owen a place to live there. She explained that he could never be returned to the wild. Since he was still a baby, he wouldn't have learned yet how to fend for himself. And he would never be welcomed into another hippo pod—he would be seen as an intruder and attacked. But they would take good care of him in Haller Park. Dr. Paula offered to drive to Malindi herself to bring Owen to his new home.



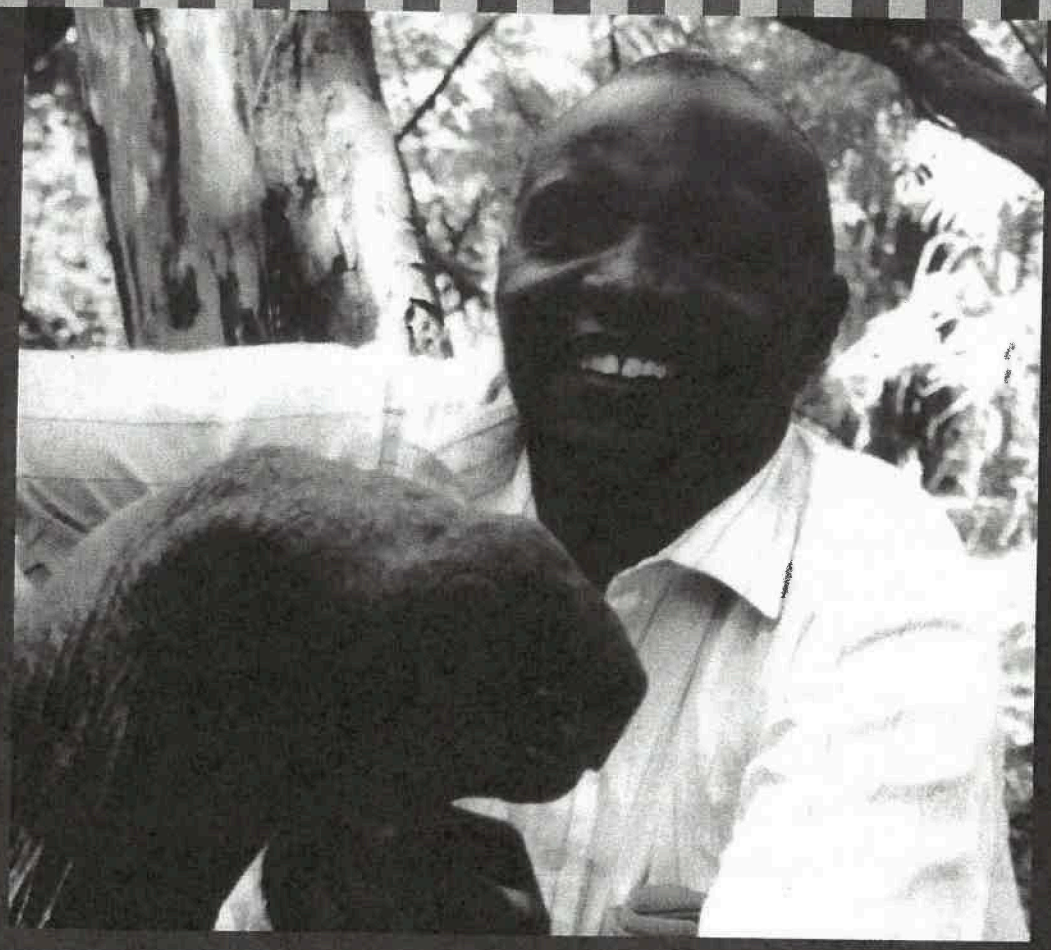


Dr. Paula, Stephen, and Sabine were eager to help the orphaned hippo.

Dr. Paula knew she would need help. She asked the chief animal caretaker, Stephen Tuei, to come along with her. She knew that Stephen had a special way with animals. Some people said he could even talk to them. Dr. Paula and Stephen quickly set off in her small truck to Malindi.

Meanwhile, ecologist Sabine Baer got to work with others at Haller Park to prepare for Owen's arrival.

When Dr. Paula and Stephen arrived in Malindi, they helped to remove the nets and lead Owen out of the pickup. But Owen became angrier than ever and charged at the people gathered around. They tried to help him calm down by wrapping a blanket around his head. That way, he wouldn't see the things that were upsetting him. But Owen was angry about that, too. After many hours, about a dozen rescuers managed to move Owen from the pickup into Dr. Paula's truck, tying him so that he would be safe during the long drive to Haller Park.



Stephen tickles Mzee.

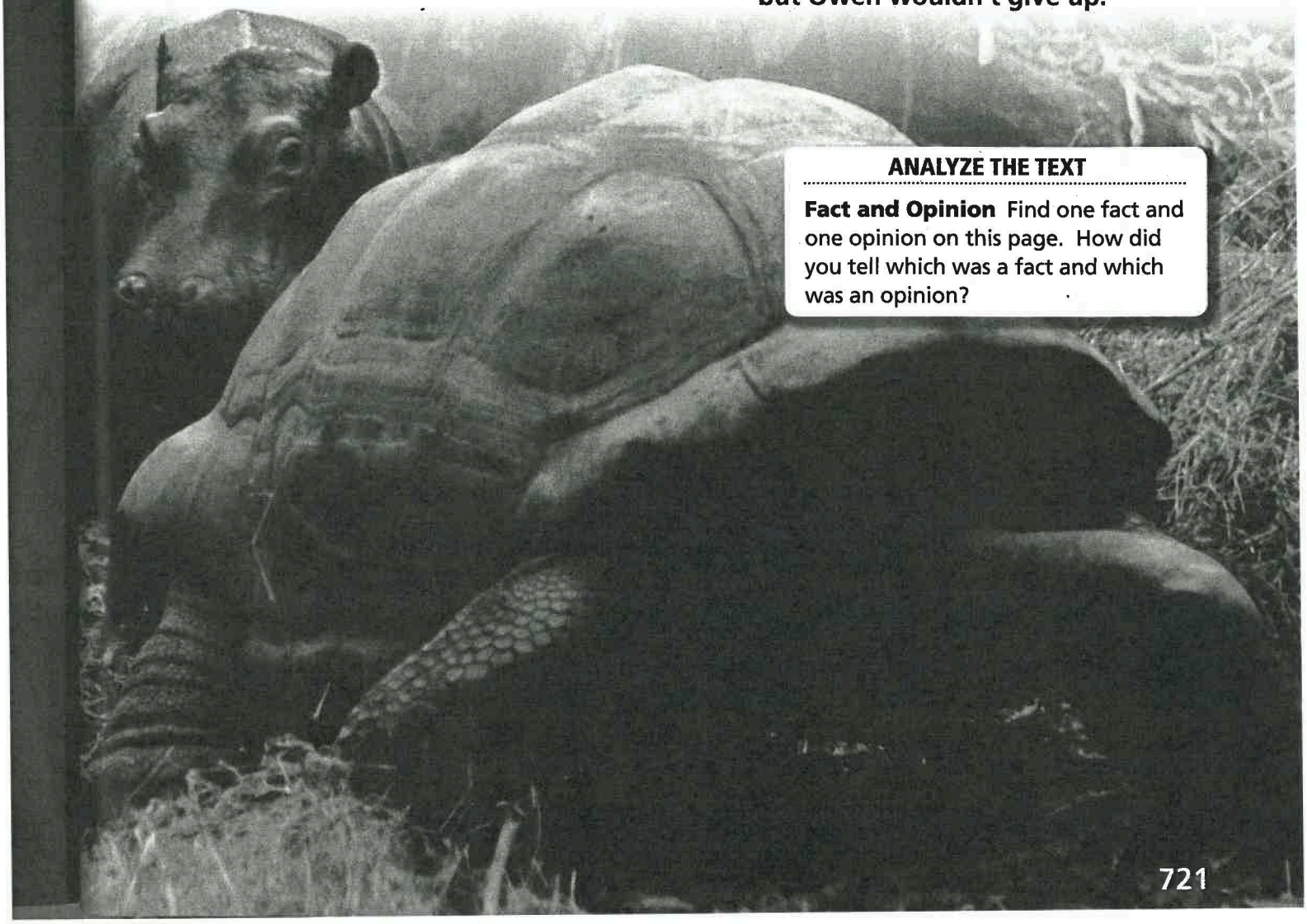
Meanwhile, Sabine and other workers prepared a large enclosure for Owen. They chose a part of the park that had a pond and a mud wallow, as well as tall trees and brush—everything a hippo could want. The area was already home to a number of bushbucks, vervet monkeys, and a giant Aldabra tortoise called Mzee (mzay).

Mzee, whose name means "wise old man" in the Swahili (swah HEE lee) language, was the oldest creature in the park. At about 130 years of age, he had been alive since before Stephen's great-grandmother was born. He wasn't very friendly, except to Stephen, who seemed to know just what he liked, such as getting tickled under the chin. Otherwise, Mzee kept to himself.

No one could have guessed how Mzee's life was about to change.

Finally, Dr. Paula and Stephen arrived with Owen, who was now weak and exhausted. As soon as the ropes that held him were untied, Owen scrambled from the truck directly to Mzee, resting in a corner of the enclosure. Owen crouched behind Mzee, the way baby hippos often hide behind their mothers for protection. At first, Mzee wasn't happy about this attention. He hissed at Owen and crawled away. But Owen, who could easily keep up with the old tortoise, did not give up. Slowly, as the night went on, Mzee began to accept his new companion. When the park workers checked on them in the morning, Owen was snuggled up against Mzee. And Mzee didn't seem to mind at all.

At first, Mzee crawled away, but Owen wouldn't give up.

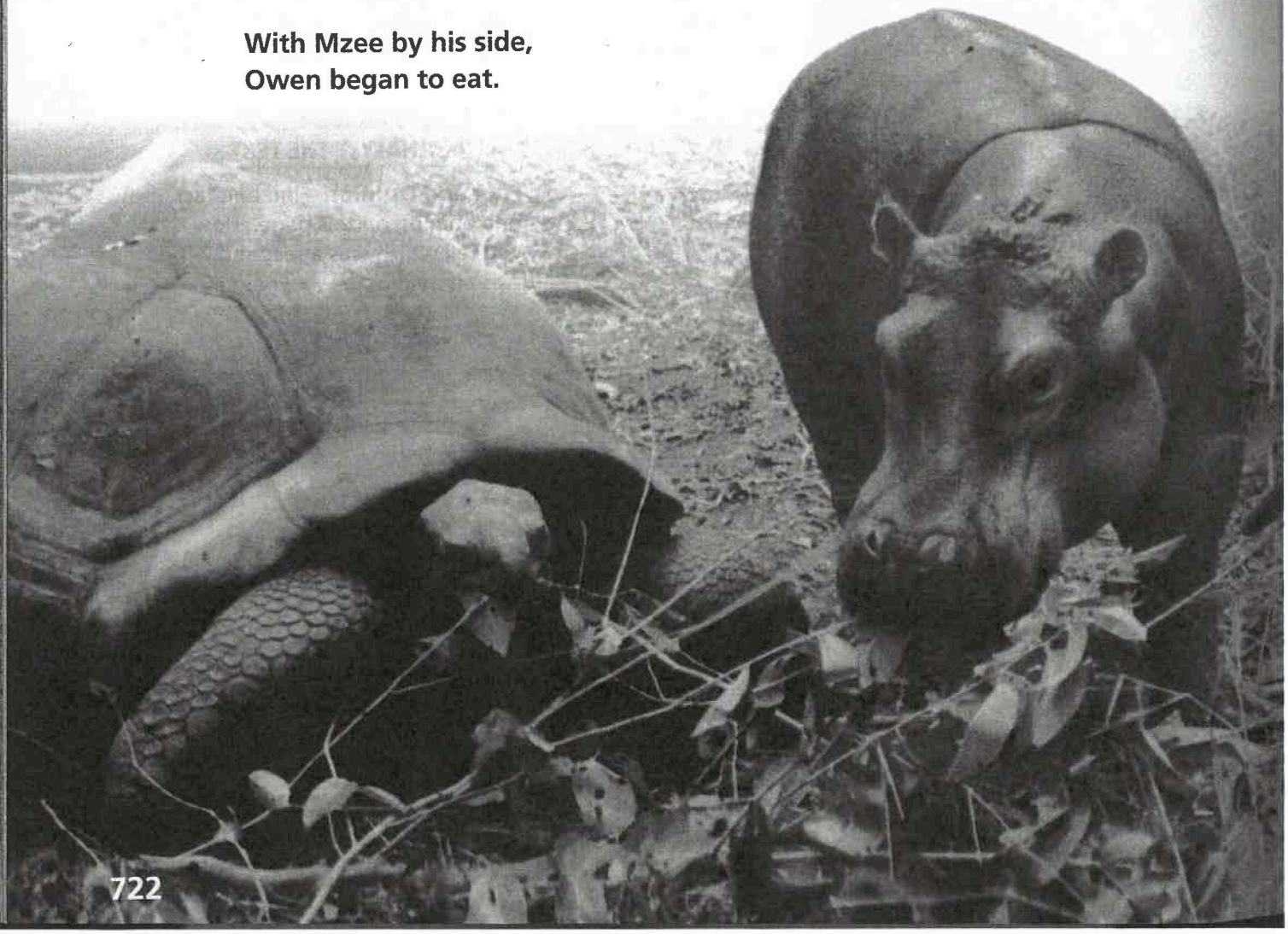


ANALYZE THE TEXT

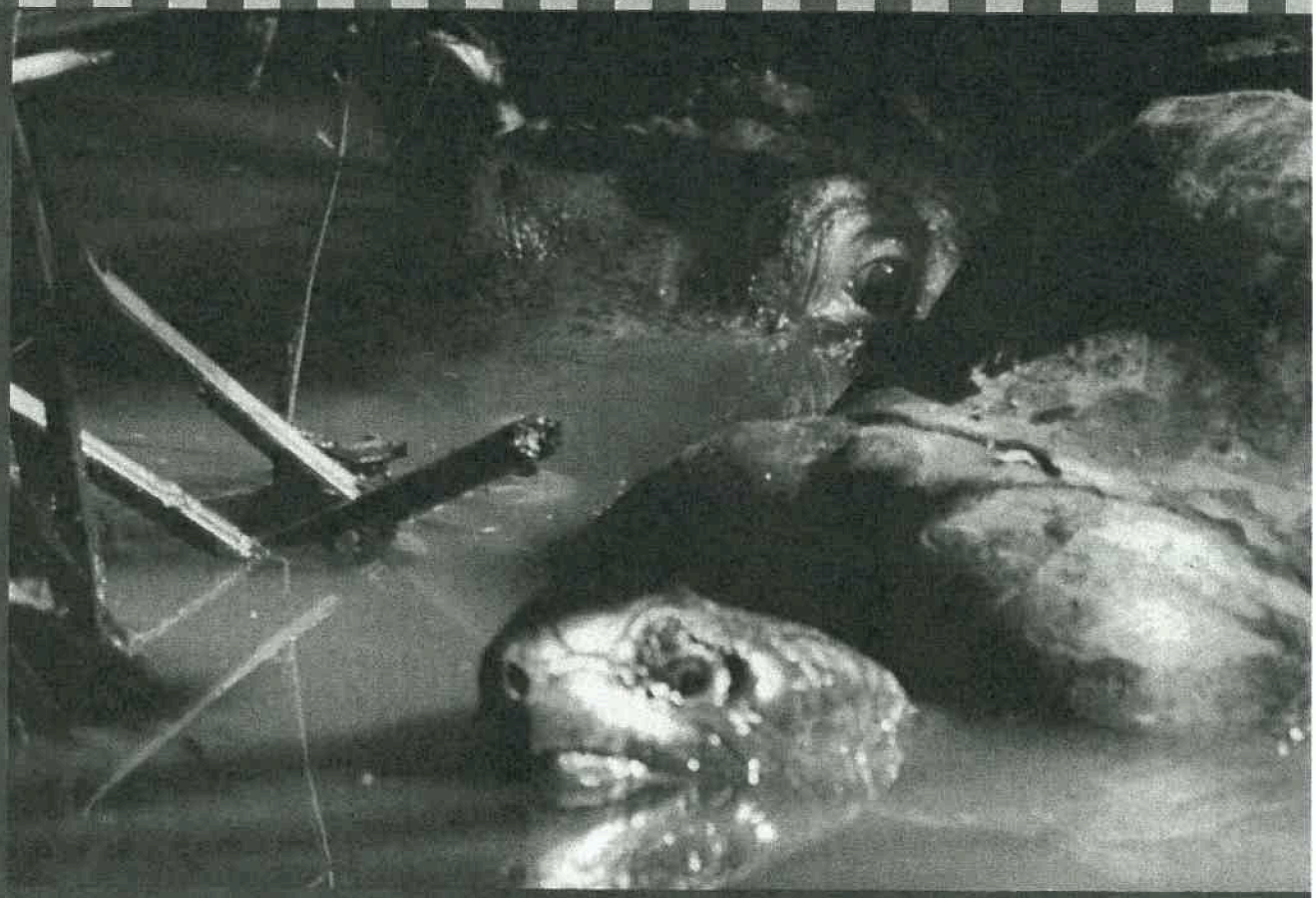
Fact and Opinion Find one fact and one opinion on this page. How did you tell which was a fact and which was an opinion?

Over the next few days, Mzee continued to crawl away, and Owen continued to follow him. But sometimes it was Owen who would walk away from Mzee, and Mzee who would follow. Bit by bit, Mzee grew friendlier.

At first, Owen wouldn't eat any of the leaves left out for him. Stephen and the other caretakers were worried that he would weaken even more. Then they noticed Owen feeding right beside Mzee, as if Mzee were showing him how to eat. Or perhaps it was Mzee's protective presence that helped Owen feel calm enough to eat. No one will ever know. But it was clear that the bond between Owen and Mzee was helping the baby hippo to recover from being separated from his mother and stranded in the sea.



With Mzee by his side, Owen began to eat.



Both hippos and tortoises love the water.

As the weeks went on, Owen and Mzee spent more and more time together. Soon, they were inseparable. Their bond remains very strong to this day. They swim together, eat together, drink together, and sleep next to each other. They rub noses. Owen leads the way to different parts of the enclosure, then Mzee leads the way. Owen playfully nuzzles Mzee's neck, and Mzee stretches his neck forward asking for more, just as he does when Stephen tickles him under the chin. Though both animals could easily injure each other, they are gentle with one another. A sense of trust has grown between them.

ANALYZE THE TEXT

Author's Word Choice The authors use careful word choice to shape your opinion about Owen and Mzee's friendship. How do words such as *snuggled* and *inseparable* shape your opinion of the pair?

Owen nuzzles Mzee's ticklish neck.

Wildlife experts are still puzzled about how this unlikely friendship came to be. Most have never heard of a mammal, such as Owen, and a reptile, such as Mzee, forming such a strong bond.

Perhaps for Owen, it happened this way: Young hippos like Owen need their mothers in order to survive. An old, slow tortoise like Mzee can never protect Owen the way a fierce mother hippo could. But since Mzee's coloring and rounded shape are similar to a hippo's, it's possible that to Owen, Mzee looks like the hippo mother he needs.

Harder to explain is the affection that Mzee seems to show for Owen. Like most Aldabra tortoises, Mzee had always preferred to be alone. But sometimes these tortoises live in groups, and perhaps Mzee sees Owen as a fellow tortoise, the first tortoise he is willing to spend time with. Or perhaps Mzee knows that Owen isn't a tortoise, but likes him anyway.

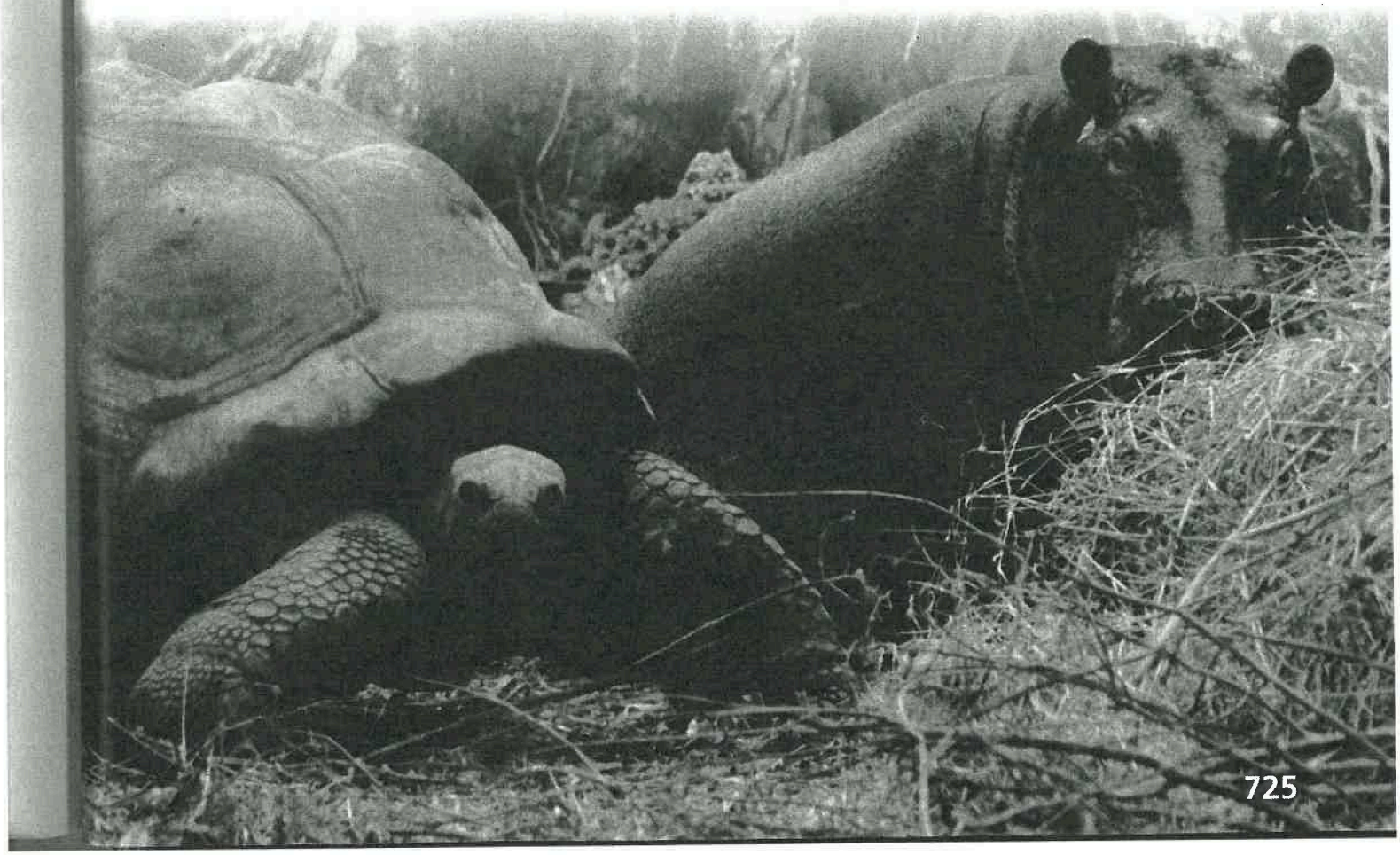
The reasons are unclear. But science can't always explain what the heart already knows: Our most important friends are sometimes those we least expected.

News of Owen and Mzee's friendship quickly spread around the world. People all over have come to love Owen, who endured so much, yet never gave up, and Mzee, who became Owen's friend when he needed one most. Their photographs have appeared in countless newspaper and magazine articles. Television programs and even a film documentary have been made about them. Visitors come to Haller Park every day to meet the famous friends.

ANALYZE THE TEXT

Compare and Contrast How are Owen and Mzee alike? How are they different? Use details from the text to explain these similarities and differences.

Owen and Mzee look out for each other.



Owen's future is bright.

Owen suffered a great loss. But with the help of many caring people, and through his own extraordinary (ihk STROHR dn ehr ee) resilience, Owen has begun a new, happy life. Most remarkable is the role that Mzee has played. We'll never know for sure whether Owen sees Mzee as a mother, a father, or a very good friend. But it really doesn't matter. What matters is that Owen isn't alone—and neither is Mzee.

And that is the true story of Owen and Mzee, two great friends.

Background National Marine Sanctuaries were first created in 1972 to protect unique areas in the sea and in the Great Lakes. But these protected areas are open to everyone. They provide important places for scientists to do research. They are also popular places for people to visit.

Setting a Purpose Read the text to learn how plants and animals in a sea sanctuary depend on each other.

Sea Sanctuary

Informational Text by Rob Hale

1 Read As you read, collect and cite text evidence.

- Underline text that describes how all the parts of an ecosystem work together.
- Circle text that describes why so many species are found in Monterey Bay.

sanctuary:

We often think of a wildlife **sanctuary** as a jewel of land that has been set aside to keep safe. But there are ocean sanctuaries, too. The United States government has preserved thirteen important areas as marine, or sea, sanctuaries. The largest of them is California's Monterey Bay National Marine Sanctuary.

This sanctuary is an ecosystem. It is an environment whose nonliving parts, such as water and earth, work with its living parts. Each part is like a **companion** to another part. "Upwelling" is one example of this. Wind causes cold water to rise to the surface of the ocean. This cold water causes new plants to grow. Then, animals come to eat these plants. This food source is the chief reason why so many species are drawn to Monterey Bay. No enclosure, or closed space, keeps them there. The food does!

companion:

A sea otter finds plenty of shellfish to eat in Monterey Bay. These animals suffered a drop in numbers because of being hunted for their fur in the early 1900s. Now, they are slowly starting to return to the area.

2 Reread Reread lines 8–16. Summarize the way in which the living and nonliving parts of Monterey Bay work together.

3 Read As you read, collect and cite text evidence.

- Underline text that describes what a food chain is.
- Circle the kinds of animals that might be found in Flower Garden Banks.

Orcas eat
sea lions.

Sea lions
eat rockfish.

Rockfish
eat krill.

Krill eat tiny
plankton.

Predators and Prey A healthy environment keeps each member of the food chain well fed. Orcas eat sea lions, sea lions eat rockfish, and so on down to tiny plankton.

Seafood Chain

Each plant and animal in a sanctary is part of a food chain. A necessary bond connects each hunter to its prey. The need for food is why a hungry orca might charge at a sea lion. It is the same reason a sea lion might leave a rockfish exhausted after a chase. One animal depends on another for life.

Flower Garden Banks

Coral reefs and ocean waters are inseparable. Coral reefs can be found 110 miles off the Texas and Louisiana coasts. They are protected by the Flower Garden Banks, a 36,000-acre marine sanctuary.

coral reefs:

The coral reefs lie on top of two salt domes, old underwater mountains. Today Flower Garden Banks Sanctuary is home to twenty-three types of coral. Anyone with affection for marine creatures will find many animals there. One might see turtles, manta rays, or the odd intruder, such as the huge whale shark.

4 Reread and Discuss Reread lines 17–22. How does the diagram on page 110 support the ideas in this text? Cite specific details in your discussion.

SHORT RESPONSE

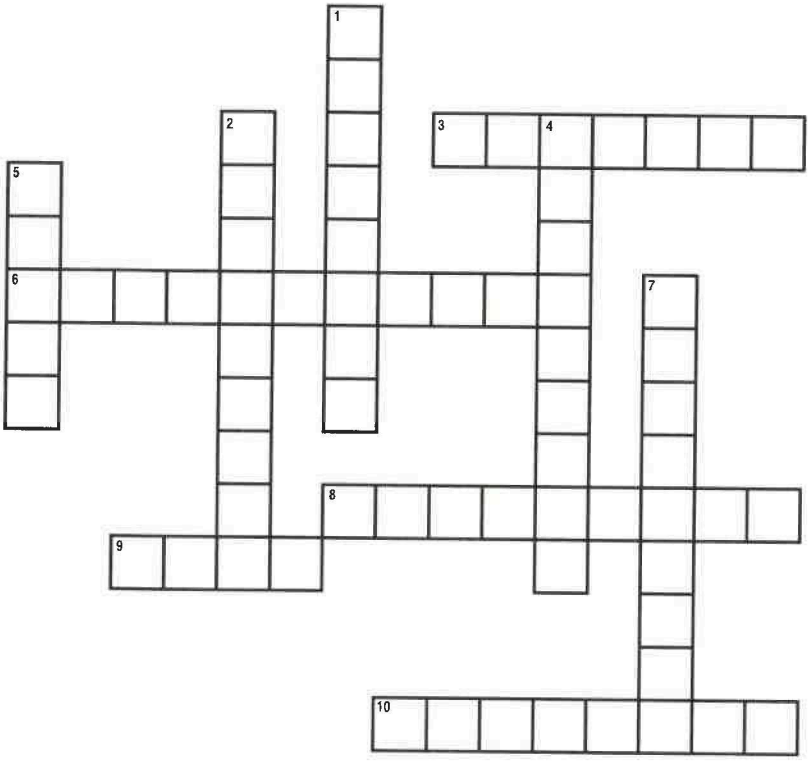
Cite Text Evidence Why might Flower Garden Banks have become a marine sanctuary? Cite evidence from the text in your response.

Name _____ Date _____

Dangerous Waves
Target Vocabulary

Target Vocabulary

Complete the Crossword Puzzle using the Target Vocabulary words and clues below.



Vocabulary

intruder
chief
charged
companion
bond
inseparable
affection
enclosure
exhausted
suffered

Across

3. moved forward quickly

6. not able to be taken apart

8. an area that is closed off

9. close relationship

10. someone who goes into a place where he or she does not belong

Down

1. felt pain

2. someone who goes with someone else

4. friendly feeling

5. most important

7. very tired

Name _____ Date _____

Suffixes *-ed, -ly*

Read the meaning of each suffix. Then use the sentences below to help you write the definition of the underlined word in each sentence. The first one has been done for you.

Suffix	Meaning	Example
-ed	state or quality of, having or showing	**surprise + ed = surprised** A state of surprise. She had a *surprised* look on her face.
-ly	like, resembling, similar to	**brother + ly = brotherly** Similar to a brother. Jane's best friend acted *brotherly* with her.
	happening at a specific period of time	**hour + ly = hourly** Happening every hour. Samantha visits the water fountain *hourly*.

1. The interested students looked for more information about the museum.

   Interested means showing interest _____.

2. Cross the street quickly; a car is coming. *Quickly* means

   _____.

3. My mother does our laundry weekly. *Weekly* means

   _____.

4. Meghan was relieved when her busy week was over. *Relieved* means

   _____.

Now use what you have learned to write your own sentence using a word with one of the suffixes above.

5. _____

Name _____ Date _____

Owen & Mzee
Vocabulary Strategies:
Suffixes *-ed, -ly*

Suffixes *-ed, -ly*

Write the meaning of each italicized word below. Then write another sentence using the word.

Suffix	Meaning	Example
-ed	state or quality of, having or showing	**surprise + ed = surprised** A state of surprise. She had a *surprised* look on her face.
-ly	like, resembling, similar to happening at a specific period of time	**brother + ly = brotherly** Similar to a brother. Jane's best friend acted *brotherly* with her. **hour + ly = hourly** Happening every hour. Samantha visits the water fountain *hourly*.

1. *Interested* means _____.

_____

2. *Weekly* means _____.

_____

3. *Relieved* means _____.

_____

4. *Frustrated* means _____.

_____

5. *Sickly* means _____.

_____

Name _____ Date _____

Comprehension

Answer Numbers 1 through 10. Base your answers on the article "Owen & Mzee."

1. According to Dr. Paula, how would wild hippos treat Owen DIFFERENTLY from another wild hippo?

   Ⓐ They would welcome him because he is strong.

   Ⓑ They would care for him because he is young and helpless.

   Ⓒ They would ignore him because he is friends with a tortoise.

   Ⓓ They would attack him because they would think he is an intruder.

2. How is Owen's enclosure at Haller Park similar to a hippo's natural habitat?

   Ⓕ They both have mud.

   Ⓖ They both have waves.

   Ⓗ They both have tortoises.

   Ⓘ They both have caregivers.

3. What does the word *scrambled* bring to mind in the text below?

   As soon as the ropes that held him were untied, Owen scrambled from the truck . . .

   Ⓐ regret and sorrow

   Ⓑ speed and urgency

   Ⓒ calm and happiness

   Ⓓ grace and friendliness

4. Before Owen came to Haller Park, how were he and Mzee ALIKE?

   Ⓕ Both were alone.

   Ⓖ Both were friendly.

   Ⓗ Both were stranded.

   Ⓘ Both were raised by people.

5. What does the word *hissed* mean in the sentence below?

   He hissed at Owen and crawled away.

   Ⓐ feared

   Ⓑ surprised

   Ⓒ ran quickly toward

   Ⓓ made a warning sound

6. Which text from the article is a fact?

   Ⓕ "Harder to explain is the affection that Mzee seems to show for Owen. "

   Ⓖ "Or perhaps it was Mzee's protective presence that helped Owen feel calm."

   Ⓗ "As the weeks went on, Owen and Mzee spent more and more time together."

   Ⓘ "But it was clear that the bond between Owen and Mzee was helping the baby Hippo . . . "

Name _____ Date _____

7 What does the word *snuggled* mean in the sentence below?

When the park workers checked on them in the morning, Owen was snuggled up against Mzee.

Ⓐ cuddled

Ⓑ distrusted

Ⓒ forced

Ⓓ noticed

8 Which sentence below is an opinion?

Ⓕ Owen and Mzee trust each other.

Ⓖ Mzee means "wise old man" in Swahili.

Ⓗ Dr. Paula Kahumbu is the manager of Haller Park.

Ⓘ Bushbucks and vervet monkeys live in Owen's enclosure.

9 How did the author organize the ideas in the sentences below?

An old, slow tortoise like Mzee can never protect Owen the way a fierce mother hippo could. But since Mzee's color and rounded shape are similar to a hippo's, it's possible that to Owen, Mzee looks like the hippo mother he needs.

Ⓐ by comparison and contrast

Ⓑ by order of importance

Ⓒ in time order

Ⓓ by location

10 At the end of the article, how is Owen DIFFERENT than he was at the beginning?

Ⓕ He is less trusting of other hippos.

Ⓖ He is more like a tortoise.

Ⓗ He seems smarter.

Ⓘ He seems happier.

Mark Student Reading Level:

____ Independent ____ Instructional ____ Listening

STOP

Owen & Mzee
Oral Language Dialogue

A Special Bond

Joon and Teresa are at the zoo. They are discussing the story of Owen and Mzee. Read the roles with a partner. Then switch roles and read the dialogue again.

Joon: These hippos remind me of Owen the hippopotamus and Mzee the tortoise. Their story is so sweet.
Teresa: What is their story?
Joon: Owen's mother died when Owen was a baby. He was stranded, or left alone, on a reef.
Teresa: Owen must have **suffered.** He had probably never been separated from her.
Joon: Some kind people recovered him. They brought him to live in a sanctuary.
Teresa: I see. Mzee the tortoise was living in that sanctuary. Right?
Joon: Yes. And Mzee became Owen's **companion.** They live in the same **enclosure**. The **affection** they show each other is so unusual.
Teresa: I guess they have a very strong **bond.**
Joon: Yes, they are **inseparable.**
Teresa: That *is* a sweet story!