AnimalWatch Vi: Building Graphics Literacy

Curriculum for Teachers

Table of Contents

Welcome Teacher!

The purpose of the **AnimalWatch Vi: Building Graphics Literacy** project is to increase students' proficiency to access and interpret data presented in graphs (e.g., bar graphs, line graphs) and other data sources (e.g., box plots, Venn diagrams, maps). The introduction provides you an overview of the iPad app, materials, and study procedures.

In this guidebook, for the introductory unit about the Sea Turtle and the 10 instructional units, you will find pages that contain the content of the material presented in the unit along with print and simbraille copies of the graphs or data sources for the unit.

All of the graphics or maps used in a unit are displayed in the app in the appropriate place. Throughout the session, the student may use the app or the print/braille copy as desired. The student will respond to questions in the app, sometimes using the built-in microphone to record her answers and sometimes choosing the answer presented in a multiple-choice format.

The set of tactile graphs and diagrams is available for purchase through the San Francisco Lighthouse. Visit their online store at adaptations.org for the graphics collection, copies of this guidebook, and many other tools and resources for daily living and education.

Student Learning Objectives

Below are examples of objectives you may wish to use for the 10 instructional units. The **Tasmanian Devil** unit about single category bar graphs is used as an example:

- By the end of today's session, the student will correctly answer 9 out of 10 questions by accurately interpreting two one-category bar graphs.

- By the end of today's session when answering multiple choice questions, the student will increase efficiency in locating information in single category bar graphs by using two new strategies (e.g., reading the graph label, using gridlines).

Materials for the 10 Instructional Units

- Four sheets in print or braille based on your student's learning media (Each sheet has a 2 letter label and a number, for example CT3 for Cane Toad sheet 3.)
- The **AnimalWatch Vi: Building Graphics Literacy** app on an iPad
- Student-specific accommodations (e.g., optical aids, abacus, accessible graphing board)

Unit Vocabulary

Through the 10 warmup questions in the app, students are introduced to the vocabulary for the unit. To familiarize you with the vocabulary, terms and definitions are provided for each unit. It is important to use the correct vocabulary terms when working with the student.

Selecting a Unit and Settings

Below is a walkthrough using the **Tasmanian Devil** unit; it will show you the full progression and all the tasks of the unit in order. The other nine instructional units have an identical layout. The **Sea Turtle** unit, discussed below, is much briefer and should be used as an orientation to the app for students.

When you select the app from the home screen of the iPad, the **Main Page** comes up.

Main Page

The **Main Page** contains the list of the units available to the student. Although this section of the guidebook is going to detail the **Tasmanian Devil** unit for you, please have the student complete the **Sea Turtle: Introduction** unit first. After that, you may have the student complete the units in any order you wish. We do recommend that **Bar Graphs 1** be completed before **Bar Graphs 2** and the same for **Coordinate Planes 1** and **Coordinate Planes 2**.

Image 1 shows the Main Page, with four units not started and two units in process.

At times a student may need to stop in the middle of a unit. The next time the student returns to the app a "Men Working" sign will be shown on the **Main Page** to indicate the unit is in progress. When a unit is completed, a check mark will be shown.
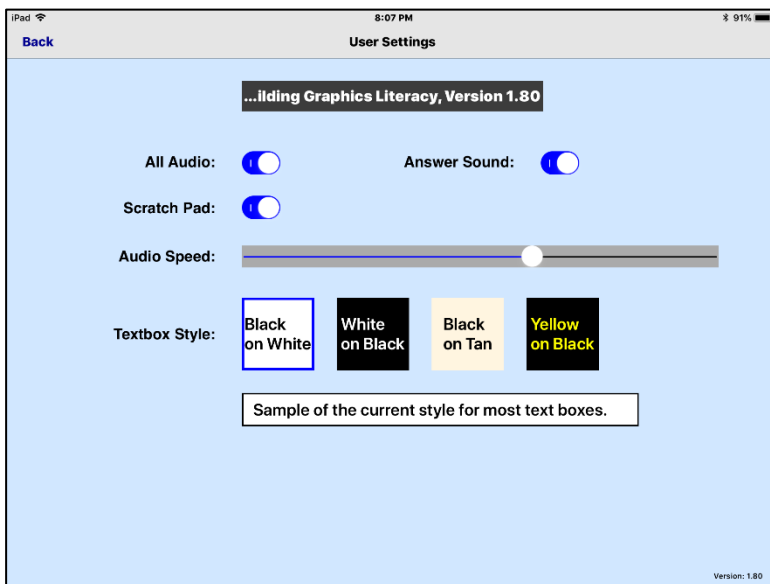

Image 2 shows the Settings Page.

Settings Page

The **User Settings** page allows the user to toggle all audio, scratch pad, and answer sound on and off. Users who are using the internal app speech that emulates VoiceOver, can adjust the audio speed with the slider. Users may choose from four textbox style combinations. The selected choice will be carried throughout the app.

Meet the Animal

Have the student read and/or listen to the page **Meet the Tasmanian Devil**. Answer student questions about the science content as time allows. Encourage the student to listen to the Animal Sound by tapping the button on the bottom toolbar. (Note that there is not a sound recording for every animal.)
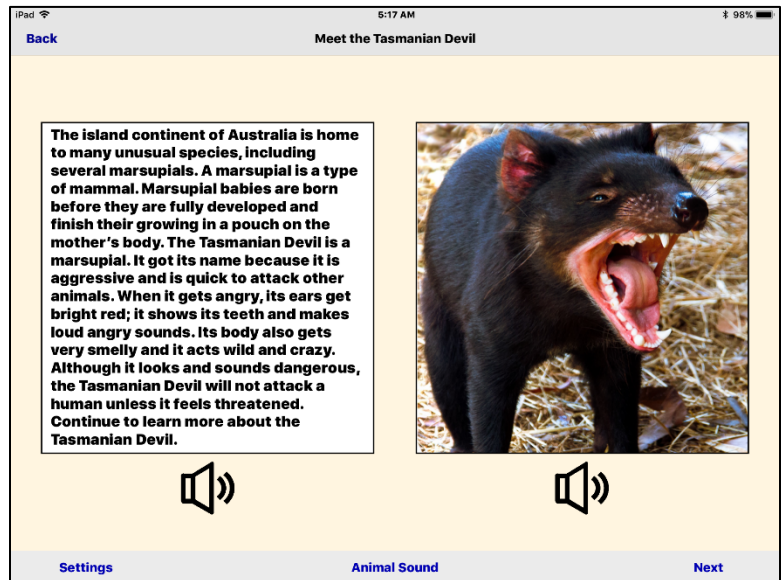
Image 3 shows the Meet the Tasmanian Devil screen.

Image 4 shows the Getting Started 1 screen

Getting Started

For the **Getting Started** pages, the student will use sheet 1 (e.g., TD1). The student will view an introductory screen followed by two screens with open-ended questions. The student will use the data on the sheet to answer the two questions and record her answers in the app using the built-in microphone. **The student is to work independently.**

Warm Up

The student will use the first two sheets (e.g., TD1 and TD2) when completing the 10 **Warm Up** questions. Ensure the student pays attention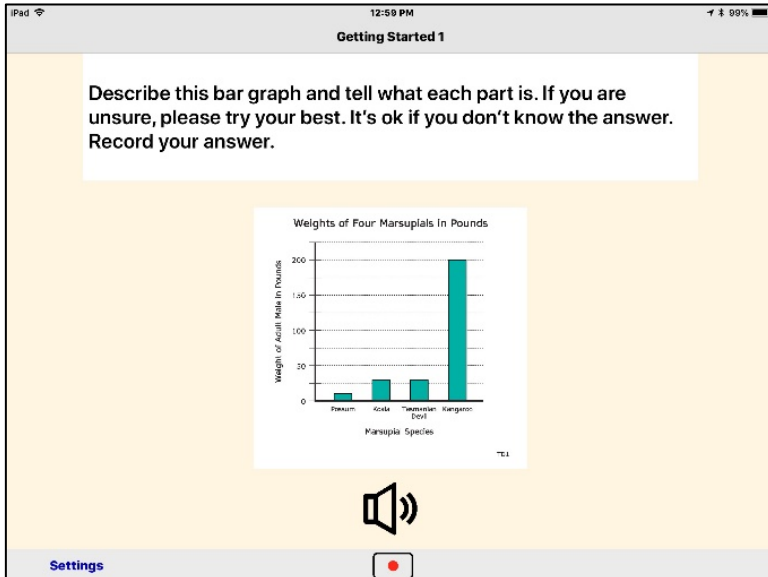 to which sheet(s) she needs to answer the question. If only one sheet is needed, the image of that sheet is shown on the app screen. However, the sheet is not described. If the student needs to reference both sheets to answer the question, then either one of the sheets or a picture is shown on the screen.

The student needs to answer each question in order to move to the next screen. Once the student makes a selection from the three choices, the Check Answer button becomes available on the bottom toolbar. Encourage the student to check her answer. The student can try again if the answer is incorrect.
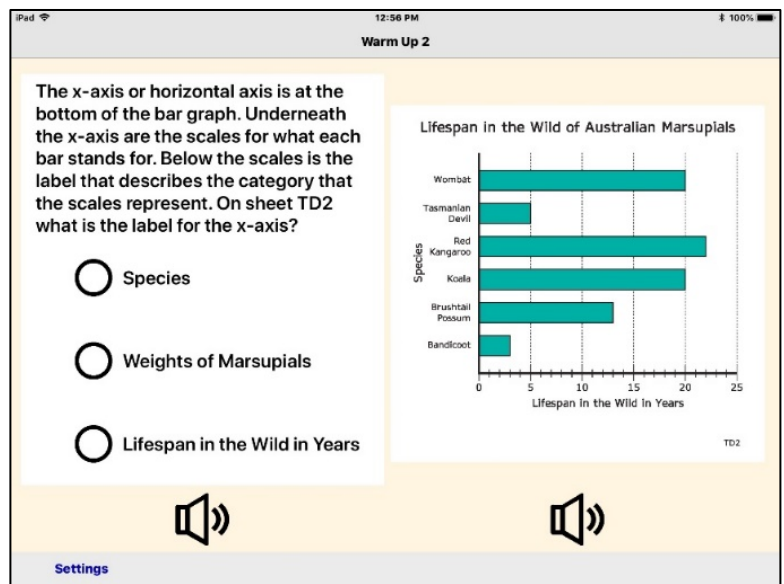
Image 5 shows the Warm Up 2 screen.

Your Role	When the student is completing the **Warm Up** questions you can provide as much assistance as needed. Focus on supporting the student to understand the vocabulary and concepts.
	For the two **Getting Started** questions, it is recommended that you not assist the student to answer the questions. It is fine if the student does not know the answers. Encourage the student to do her best on these questions, even if she records "I don't know the answer."

Select Difficulty

Have the student self-rate his skills using the **Select Difficulty** screen. Guide the student in selecting the type of learner he is for this content.

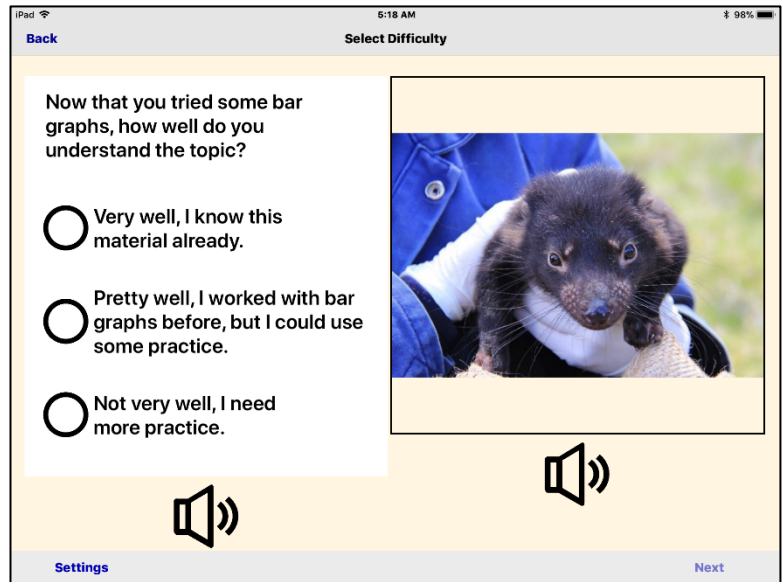| Your Role |
| --- |
| Based on the student's answer to the **Select Difficulty** screen, the app will select questions for the student to complete for questions A5, A6, B5 and B6. Help the student make an accurate self-assessment; for example, ask the student if he has ever done work like this in math class. |

Image 6 shows the Select Difficulty screen.

Skills Application

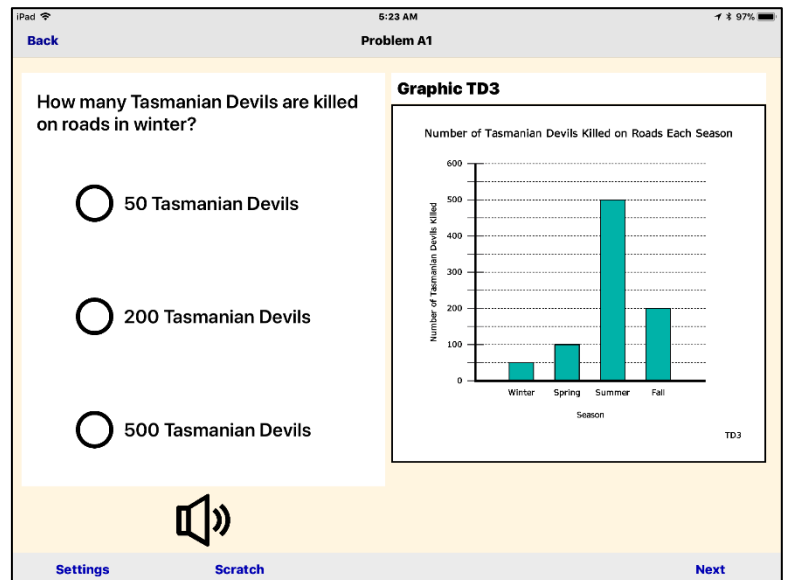For problems A1-A6 and B1-B6 the student uses the third and fourth sheets (e.g. TD3 and TD4).

Image 7 shows the Problem A1 screen.

There are five multiple choice and one open-ended question in Problem Set A and Problem Set B. The student is to move through the screens answering each question.

The student can use the image of the sheet on the iPad screen or the hard copy print or braille version of the sheet. The student will use the third sheet (e.g., TD3) for questions A1-A6 and the fourth sheet (e.g., TD4) for questions B1-B6.
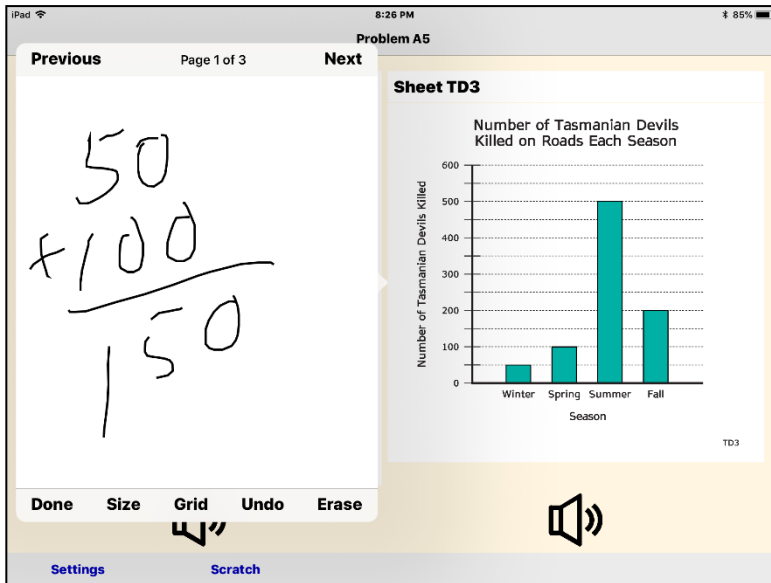
Scratch Pad

For the multiple-choice questions, the student has a scratch pad available. By tapping the Scratch button on the bottom toolbar, the student can bring up the scratch pad. Each tap moves the scratch pad from right, to left, to hidden. The student has three pages available in the scratch pad, can adjust the thickness of the line, erase, and bring up a grid to assist in lining up numbers.

Image 8 shows the Scratch Pad open on the left half of the screen. Numbers have been written in it by hand.

Check In

After completing the last problem, the student will move to the ***Check In*** screen. As with the ***Select Difficulty*** screen, allow the student to give his honest appraisal of his skills with the content of the unit.

Image 9 shows the Check In screen.

What I Learned

Have the student complete the **What I Learned** screen. Some students may feel they have not learned a new strategy during their work on the unit. It is ok if they record that they did not learn new information.
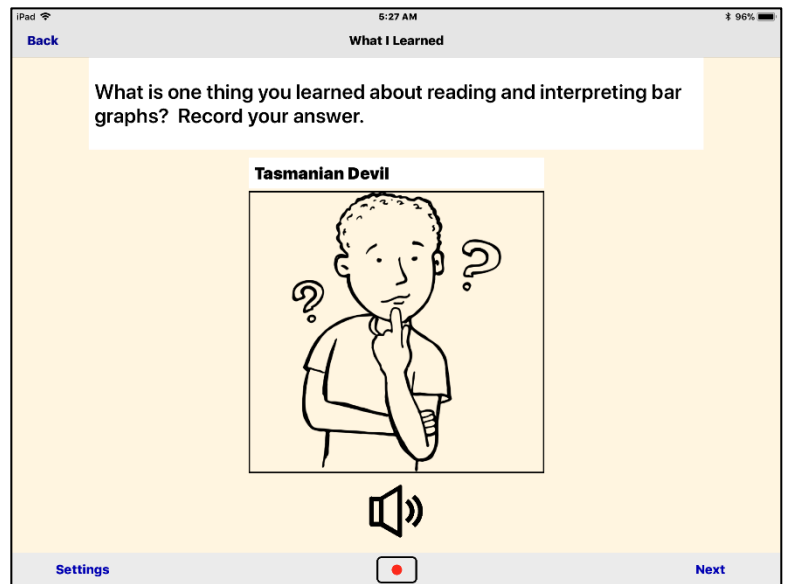
Image 10 shows the What I learned screen.

Conclusion

Have the student review the **Conclusion** screen.
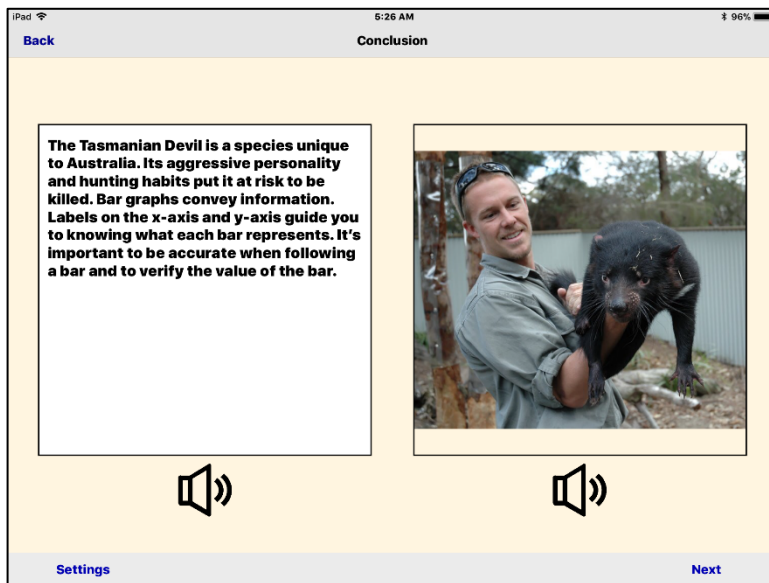
Image 11 shows the Conclusion screen.

Score Report

The score report provides data on the number of multiple-choice questions the student answered correctly on the first and the second tries. If the student has not mastered locating and interpreting information in the graph or map that is the focus of the unit, you may wish to review the concepts in this unit using materials you have available at the school site.
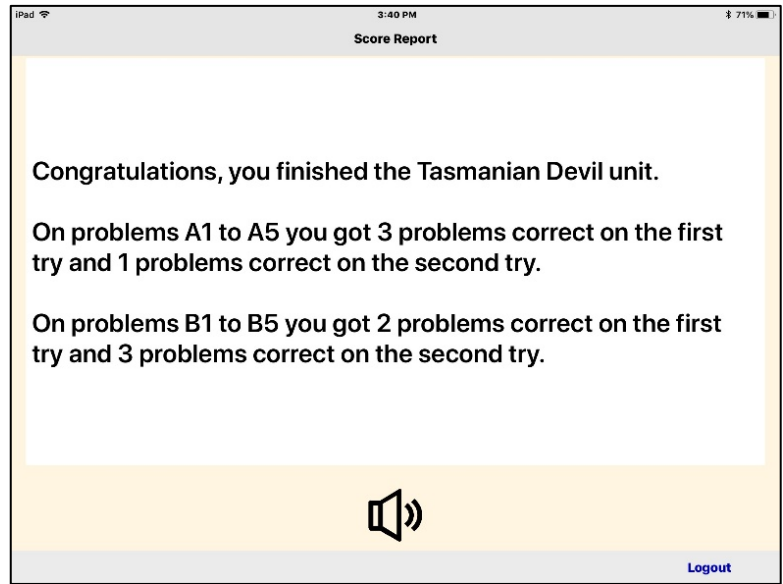
Image 12 shows the Score Report screen.

Follow-Up Activities

We provide some possible follow-up activity ideas you may wish to do with your student to reinforce the concepts in the unit. These are the sample optional follow-up activities for the **Tasmanian Devil** unit.

- Have the student construct a bar graph with data found either on the internet or in a book or data you or the student make up.
- Have the student research the Tasmanian Devil to learn additional facts about this endangered species.
- Have the student locate Australia on a map or globe. The student can calculate the travel distance from the United States to Australia.

Sea Turtle

How to Use the App 1

Welcome to Animal Watch Vi: Building Graphics Literacy app. When you use this app, you'll build your skills with understanding graphs and maps while learning about endangered and invasive species.

This page has a toolbar at the bottom that has a **Settings** button on the left. Tap the button and explore the settings options. If you are a print reader, you have 4 choices for background and font colors. You can adjust the speed of the audio that plays when you tap the read aloud button at the bottom of each page.

Tap the **Next** button on the bottom toolbar when you're ready to move to the next page.

How to Use the App 2

On the next page you'll have a text box on the left and a picture of a sea turtle on the right.

Use a one finger double tap to have the text or the image fill the entire screen. When the text or image is large, use pinch zoom to make it even larger. Use a one finger double tap to go back to the previous screen view.

If you want to hear the text and description click on the read aloud button under each box.

VoiceOver Users: If you're using VoiceOver you can hear the text and read it on a refreshable braille display if available. You also can listen to the description of the picture.

The page has a button on the bottom toolbar labeled **Animal Sound**. Tap this button to hear the sound the animal makes. Tap it a second time to turn off the sound.

Tap **Next** to try out these features on the next page.

Animal Description

Sea turtles are large turtles that spend most of their lives in the ocean. Most adults weigh several hundred pounds and the largest type, the leatherback, can be almost as big as a small car! Their food is mostly seaweed, jellyfish, small crabs and algae that grows on rocks and coral reefs. Like other reptiles, sea turtles reproduce by laying eggs. The females drag themselves onto the beach and dig a hole in the sand for the eggs. When the eggs hatch, the baby turtles return to the sea.

How to Use the App 3

Some of the problems in the app ask you to record your answer to a question.

The **Record** button is on the bottom toolbar. When you tap the **Record** button, you'll hear a beep. Record your answer. Tap the **Stop** button when you are done recording.

Tap the **Play** button to hear your recording. If you don't like your recording, you can make a new one by tapping the **Record** button.

Go to the next page to give recording a try.

Recording Practice

Look at graphic ST1. It is in the box below and a hard copy is in your notebook. Practice using the **Record**, **Stop**, and **Play** buttons to answer this question. How many sea turtles are shown on the graphic?

Sea Turtles with and without Tumors

A ⬤ on the head of a turtle indicates a tumor.
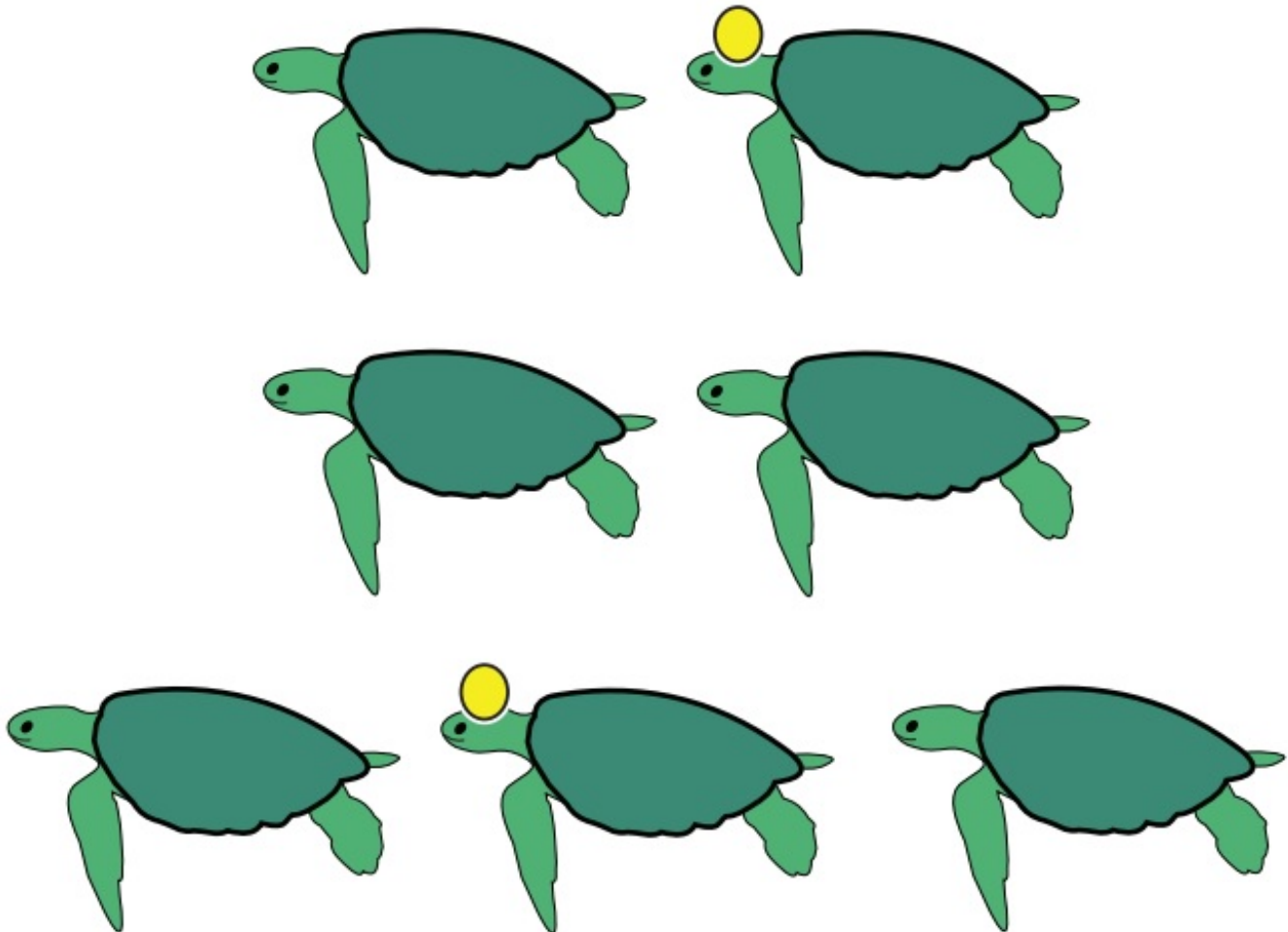
ST1
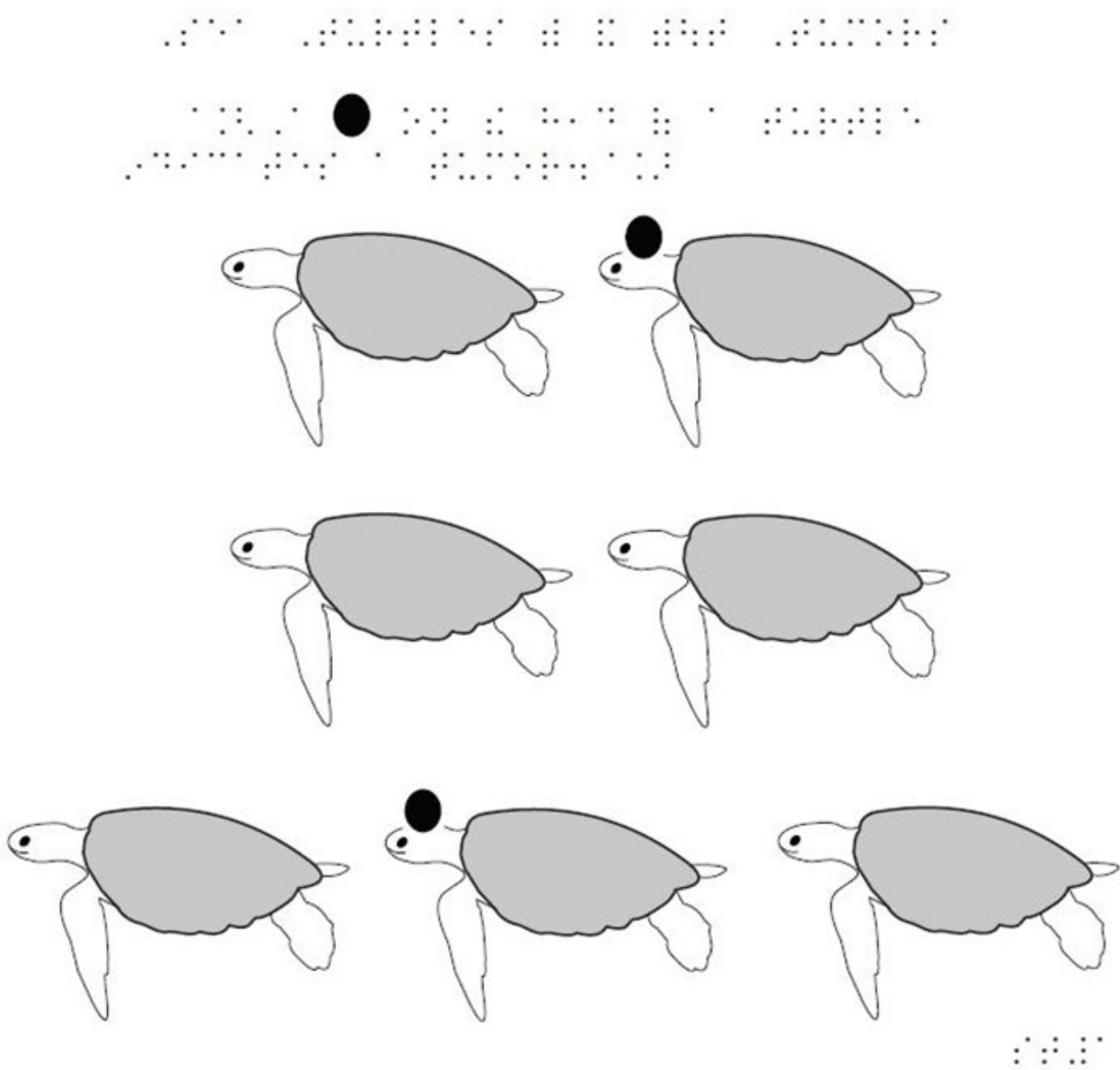
How to Use the App 4

Some of the problems in the app are multiple choice questions. Each question uses the graphic that is in the box to the right and in hard copy in your notebook.

Sometimes you may want scratch paper. Tap the **Scratch** button on the bottom toolbar to use our built-in scratch pad. Tap the **Scratch** button to toggle the scratch pad from off, to left, to right, to off.

Tap your answer choice and then tap the **Check Answer** button on the bottom toolbar to see if your answer is correct. If you didn't get the correct answer, you can try again.

Your first answer on multiple choice questions will be recorded and reported in the score report at the end of the unit. We ask that you read the question carefully and work hard to get the right answer on the first try.

Tap the **Next** button to practice answering a multiple-choice question.

Multiple Choice Practice

How many sea turtles have a tumor?

- a. 1
- b. 2
- c. 3

Correct Answer: 2

Conclusion

Congratulations! You're ready to complete your first unit with the AnimalWatch Vi: Building Graphics Literacy app!

Tasmanian Devil

Vocabulary

Columns: Columns are a vertical arrangement of items.

Estimate: To estimate means to find the approximate value of something. For example, on a bar graph, a bar may end between two values on the y-axis and the reader will need to estimate the value of the data point.

Gridlines: Gridlines are faint horizontal or vertical lines that help readers keep their place when moving up, down, left or right on the bar graph.

Range of Values: The range of values is the lowest to the highest values shown on the bar graph.

Scale: The scale is the distance between units shown on the bar graph.

X-axis: The x-axis or horizontal axis is the horizontal line on the bottom of the bar graph.

Y-axis: The y-axis or vertical axis is the vertical line on the left side of the bar graph.

Meet the Tasmanian Devil

The island continent of Australia is home to many unusual species, including several marsupials. A marsupial is a type of mammal. Marsupial babies are born before they are fully developed and finish growing in a pouch on the mother's body. The Tasmanian Devil is a marsupial that is endangered. It got its name because it is aggressive and is quick to attack other animals. When it gets angry its ears get bright red, it shows its teeth and makes loud angry sounds. Its body also gets very smelly and it acts wild and crazy. Although it looks and sounds dangerous, the Tasmanian Devil will not attack a human unless it feels threatened. Tap the Next button to continue.

Graphic TD1 is on the following 2 pages in print and simbraille.

Get Ready for Some Questions

Get sheet TD1 out from your notebook. First, scan the entire bar graph to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use Sheet TD1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the bar graph on sheet TD1 tap the next button.

Getting Started 1

Describe this bar graph and tell what each part is. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the Tasmanian Devil from this bar graph? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Weights of Four Marsupials in Pounds
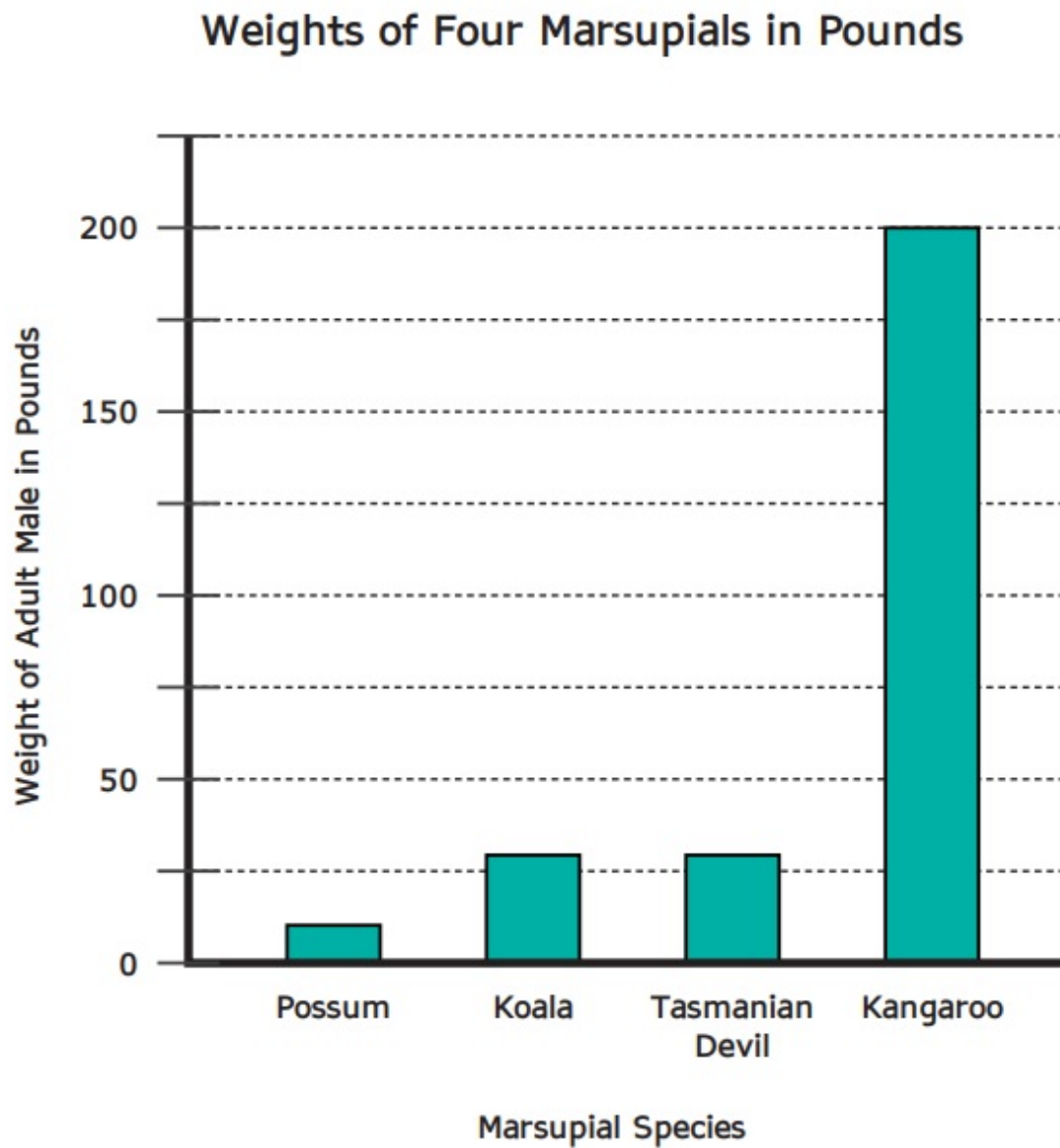
TD1

Graphic TD2 is on the following 2 pages in print and simbraille.

Get Ready for the Warm Up

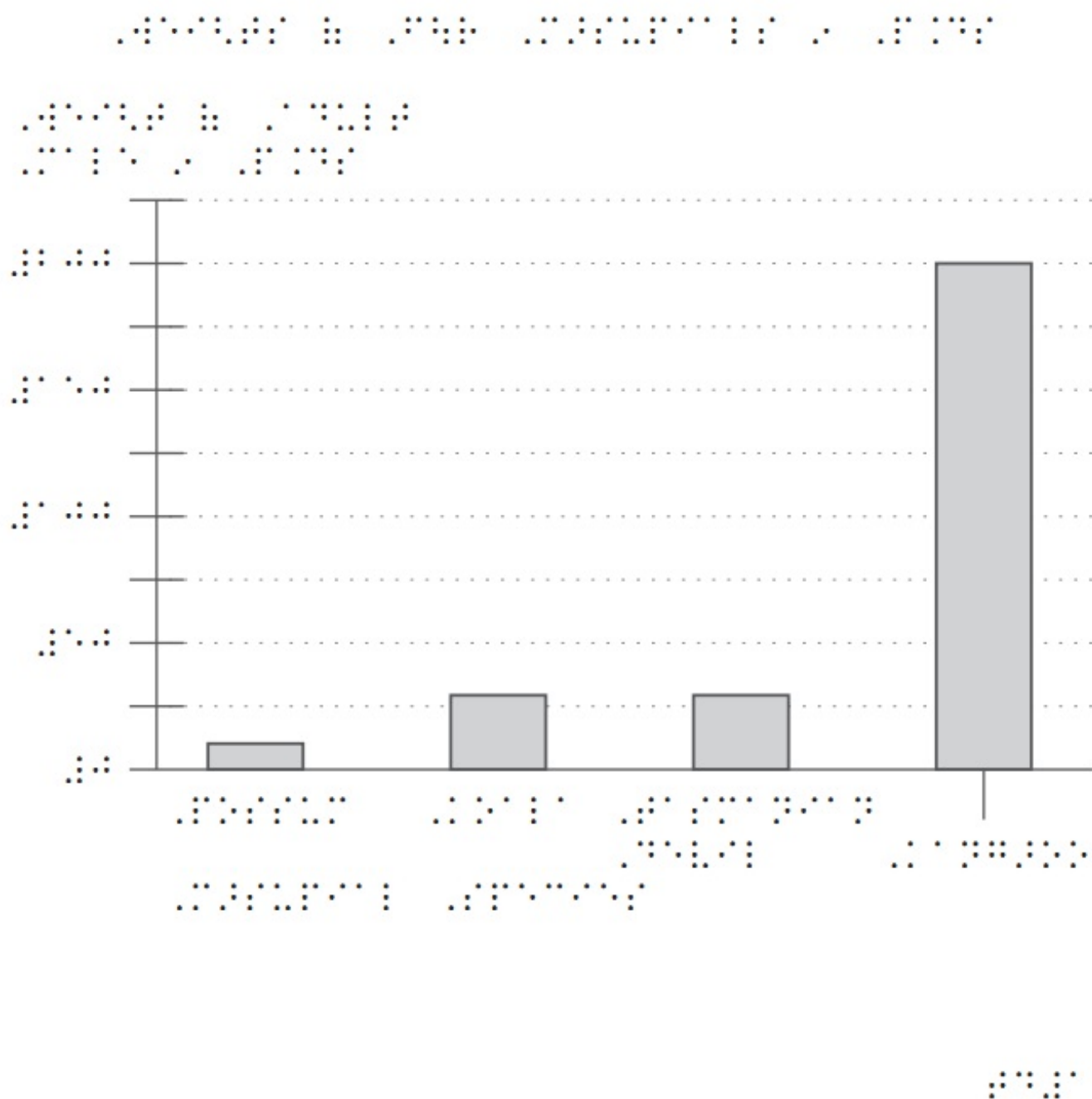You are going to use sheets TD1 and TD2 to build your skills with bar graphs. Get both sheets out of your notebook. Be sure to check your answer to each question about bar graphs. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about Tasmanian Devils comes from research done by scientists. The Tasmanian Devil is one species of marsupials which also include possums, koalas, and kangaroos. Some marsupial species live longer in the wild than other marsupial species. Most marsupials live longer in captivity where they are provided with food and medical care. In the wild, they face danger from predators, injury, and lack of food. Tap the next button to continue.

Warm Up 1

A title is usually at the top of a bar graph. The title helps you understand what the bar graph is about. If you have more than one bar graph to look at, the title helps you know which bar graph you have. On sheets TD1 and TD2 read the titles of the bar graphs. Which bar graph is about the weights of marsupials?

A = Both the bar graphs on sheets TD1 and TD2

B = The bar graph on sheet TD1

C = The bar graph on sheet TD2

Correct Answer: The bar graph on sheet TD1

Warm Up 2

The x-axis or horizontal axis is at the bottom of the bar graph. Underneath the x-axis are the scales for what each bar stands for. Below the scales is the label that describes the category that the scales represent. On sheet TD2 what is the label for the x-axis?
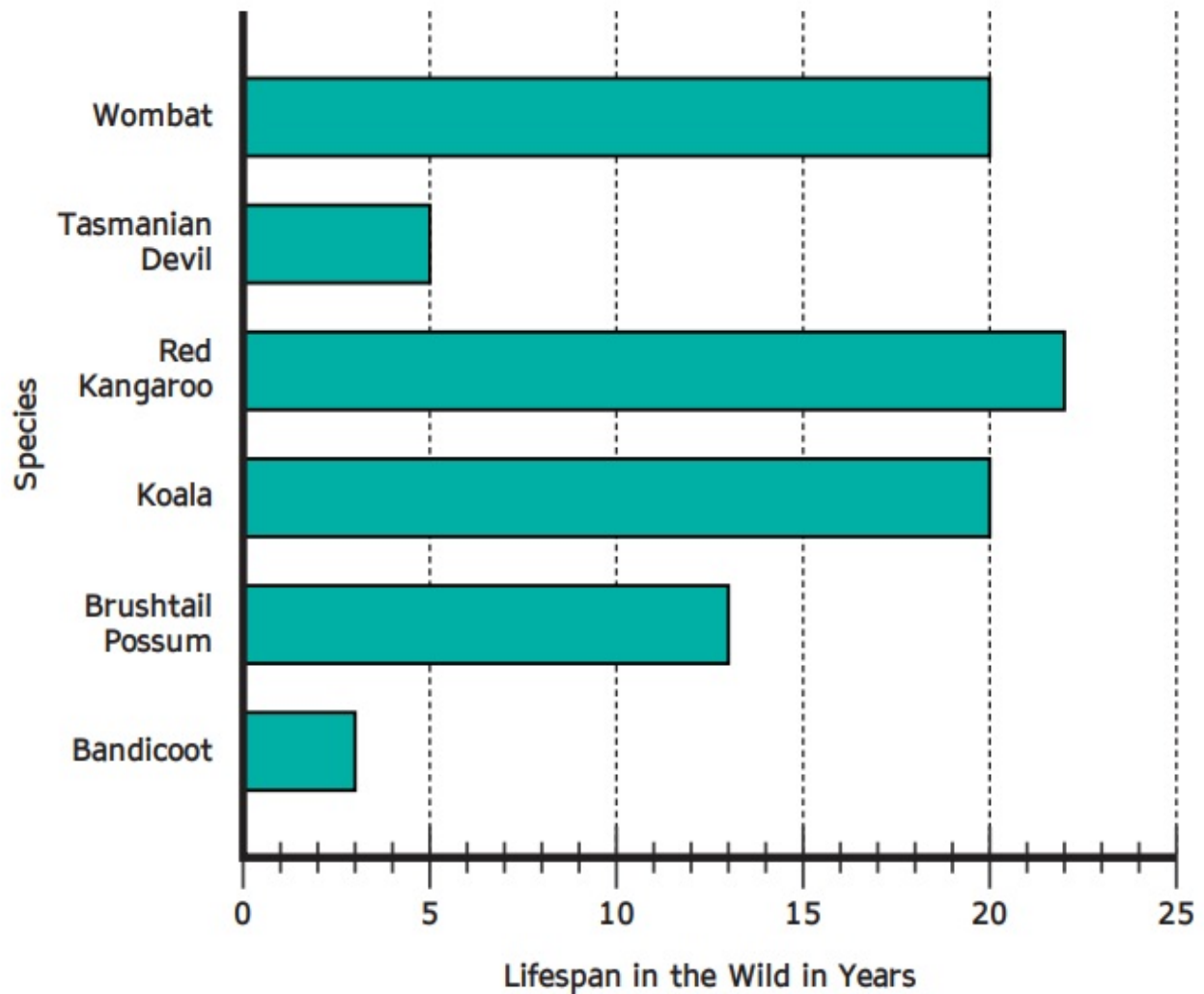
A = Species

B = Weights of Marsupials

C = Lifespan in the Wild in Years

Correct Answer: Lifespan in the Wild in Years

Lifespan in the Wild of Australian Marsupials

TD2
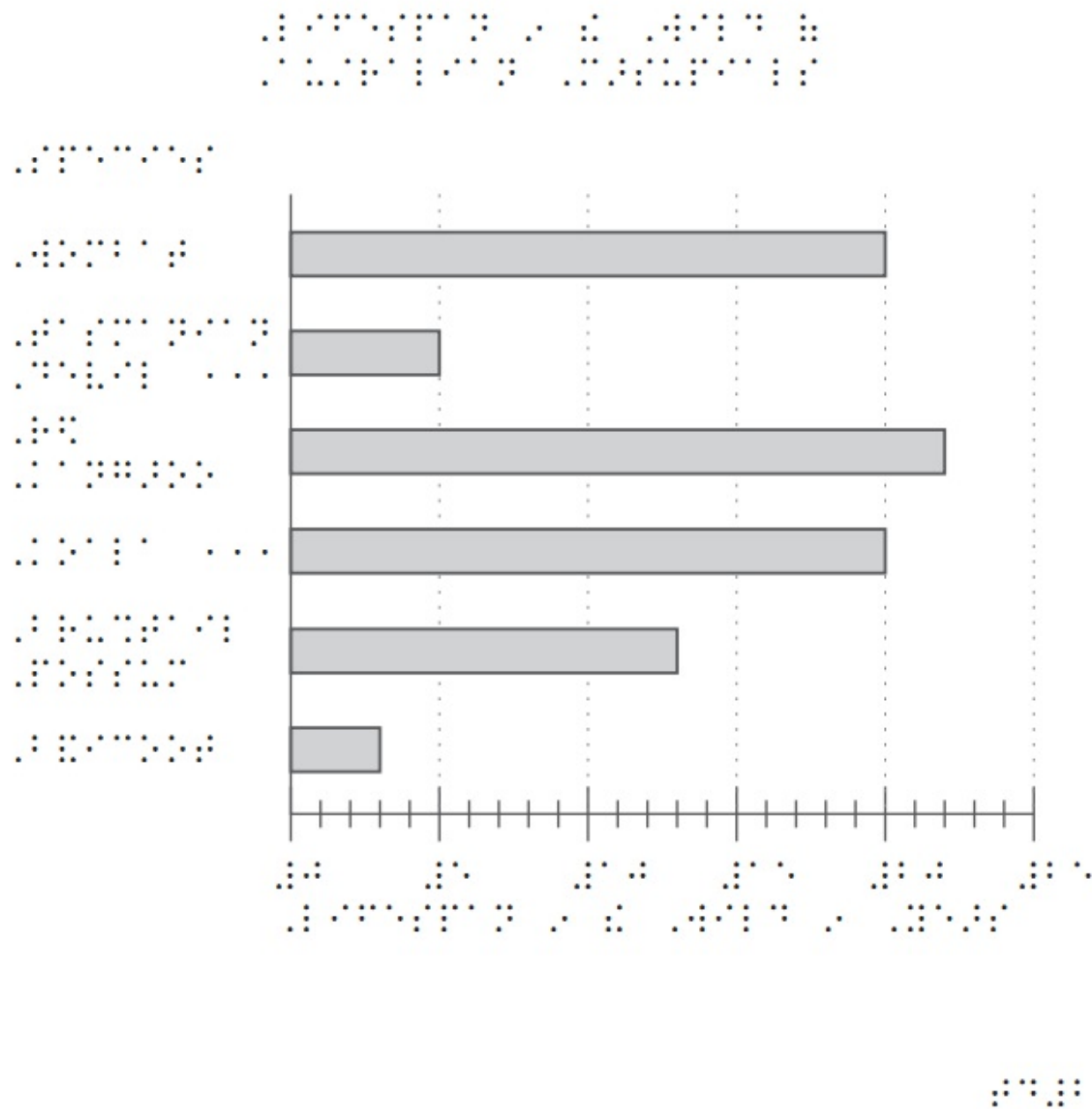
Warm Up 3

The y-axis or vertical axis is at the left of the bar graph. To the left of the y-axis are the scales. In print, the label for the y-axis is usually centered to the left of these scales. In braille, the label for the y-axis is usually at the top left of the graph. Remember, the label describes the category that the scales represent. On sheet TD1 what is the label for the y-axis?

A = Weights of Four Marsupials in Pounds

B = Weight of Adult Male in Pounds

C = Species

Correct Answer: Weight of Adult Male in Pounds

Warm Up 4

Some bar graphs have columns or bars that go vertical, or up and down. We will use the term bars in this unit. The labels for the bars are under the x-axis. Some bar graphs have bars that go horizontal, or across. The labels for these bars are to the left of the y-axis. On sheet TD1, what are the labels for the bars?
A = possum, koala, Tasmanian Devil
B = possum, Tasmanian Devil, kangaroo
C = possum, koala, Tasmanian Devil, kangaroo

Correct Answer: possum, koala, Tasmanian Devil, kangaroo

Warm Up 5

On a bar graph, one of the axes has the range of values for the scales. The lowest value will be in the bottom left corner of the bar graph. On sheet TD2 what is the range of the values?

A = The values go from 5 to 25.

B = The values go from 0 to 25.

C = The values go from 0 to 30.

Correct Answer: The values go from 0 to 25.

Warm Up 6

The first step to find out the value of a bar is to decide which direction the bars are going. The bars can start on the x-axis and go up. The bars can start on the y-axis and go to the right. Look at sheets TD1 and sheet TD2. What is the position of the bars on the two graphs?

A = On sheet TD1 the bars go up from the x-axis and on sheet TD2 the bars go right from the y-axis.

B = On both sheets TD1 and TD2 the bars go up from the x-axis.

C = On sheet TD1 the bars go right from the y-axis and on sheet TD2 the bars go up from the x-axis.

Correct Answer: On sheet TD1 the bars go up from the x-axis and on sheet TD2 the bars go right from the y-axis.

Warm Up 7

To find the value of a bar, you need to follow it until its end. Then using your finger move to the left or down until you find the axis with the values. On Sheet TD2 find the bar on the y-axis labeled Koala. Go to the end of the bar and then follow it down to the x-axis. What is the value of the bar?

A = 15 years

B = 20 years

C = 25 years

Correct Answer: 20 years

Warm Up 8

The value of a bar doesn't always have its value labeled. When there is no label you need to estimate the value of the bar. On Sheet TD1 find the bar labeled koala. Follow the bar up past the gridline to where the bar ends. The value of the bar is higher than the value on the gridline you just passed. Follow the gridline you just passed to the left until you get to the y-axis. There is no value written for this gridline. Look at the value above and below the gridline. What is the value of the gridline?

A = 25 pounds

B = 30 pounds

C = 50 pounds

Correct Answer: 25 pounds

Warm Up 9

On Sheet TD2 look at the values on the x-axis. Start at 0 and go to 5. Did you notice that there is a tick mark for each number that is between 0 and 5? Use the tick marks to find out how many years the brushtail possum lives in the wild.

A = 10 years

B = 13 years

C = 15 years

Correct Answer: 13 years

Warm Up 10

On Sheet TD2 how many years does the red kangaroo live in the wild?

A = 20 years

B = 22 years

C = 25 years

Correct Answer: 22 years

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you tried some bar graphs, how well do you understand the topic?

A = Very well, I know this material already.
B = Pretty well, I worked with bar graphs before, but I could use some practice.
C = Not very well, I need more practice.

Graphic TD3 is on the following 2 pages in print and simbraille.

Introduction Problem Set A

In problem set A you will answer 5 multiple choice and one open ended question about data on sheet TD3. The Tasmanian Devil is an endangered species. One threat is that they are often out searching for food to eat. They search on the road for bodies of animals that were hit by a car. Distances in Australia are long, and people typically drive fast. The Tasmanian Devil's black and white fur makes it very hard for drivers to see it in the road, especially at dusk. Dusk is the Tasmanian Devil's favorite time to come out and search for roadkill to have for its own dinner!

Problem A1

How many Tasmanian Devils are killed on roads in winter?

A = 50 Tasmanian Devils
B = 200 Tasmanian Devils
C = 500 Tasmanian Devils

Correct Answer: 50 Devils

Problem A2

What is the range of the values on the y-axis?

A = 0 to 100
B = 50 to 200
C = 0 to 600
Correct Answer: 0 to 600

Problem A3

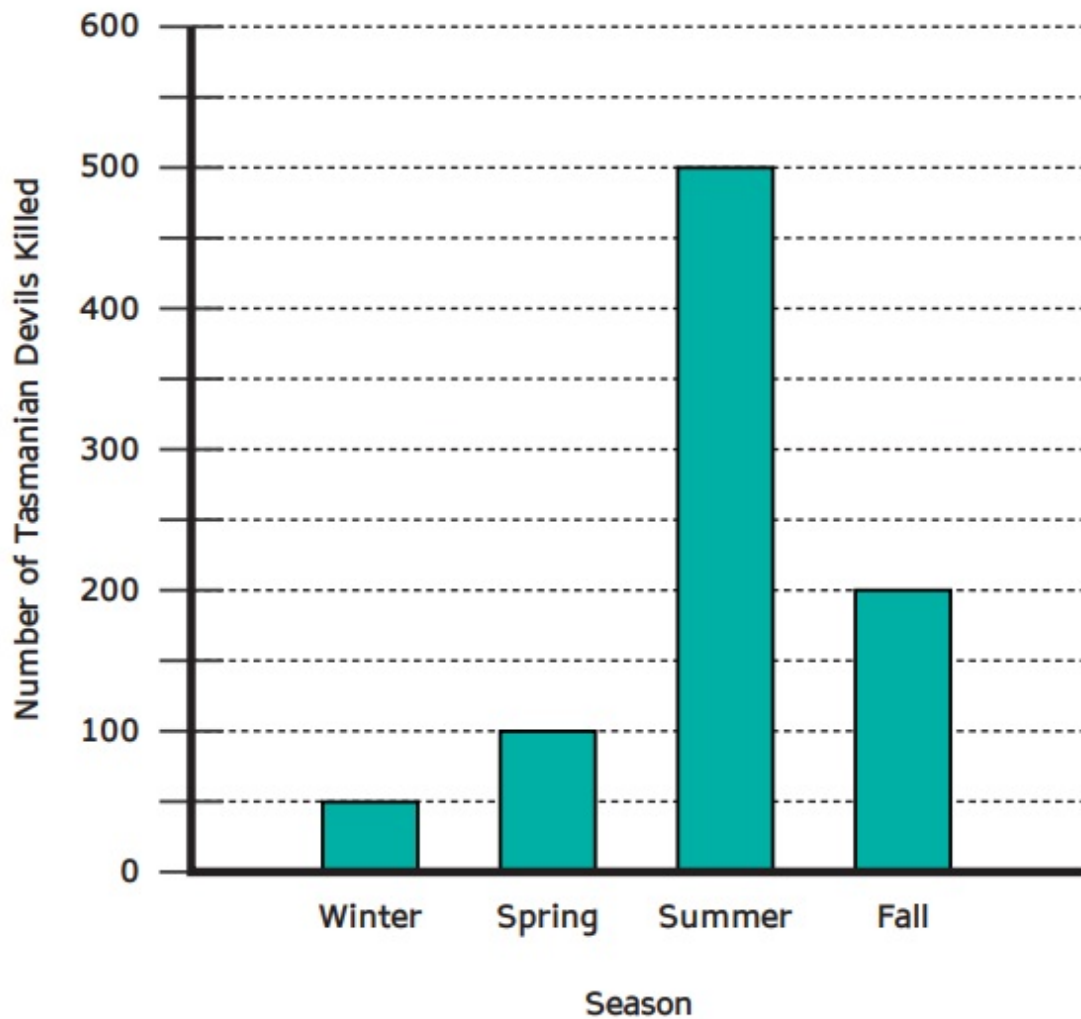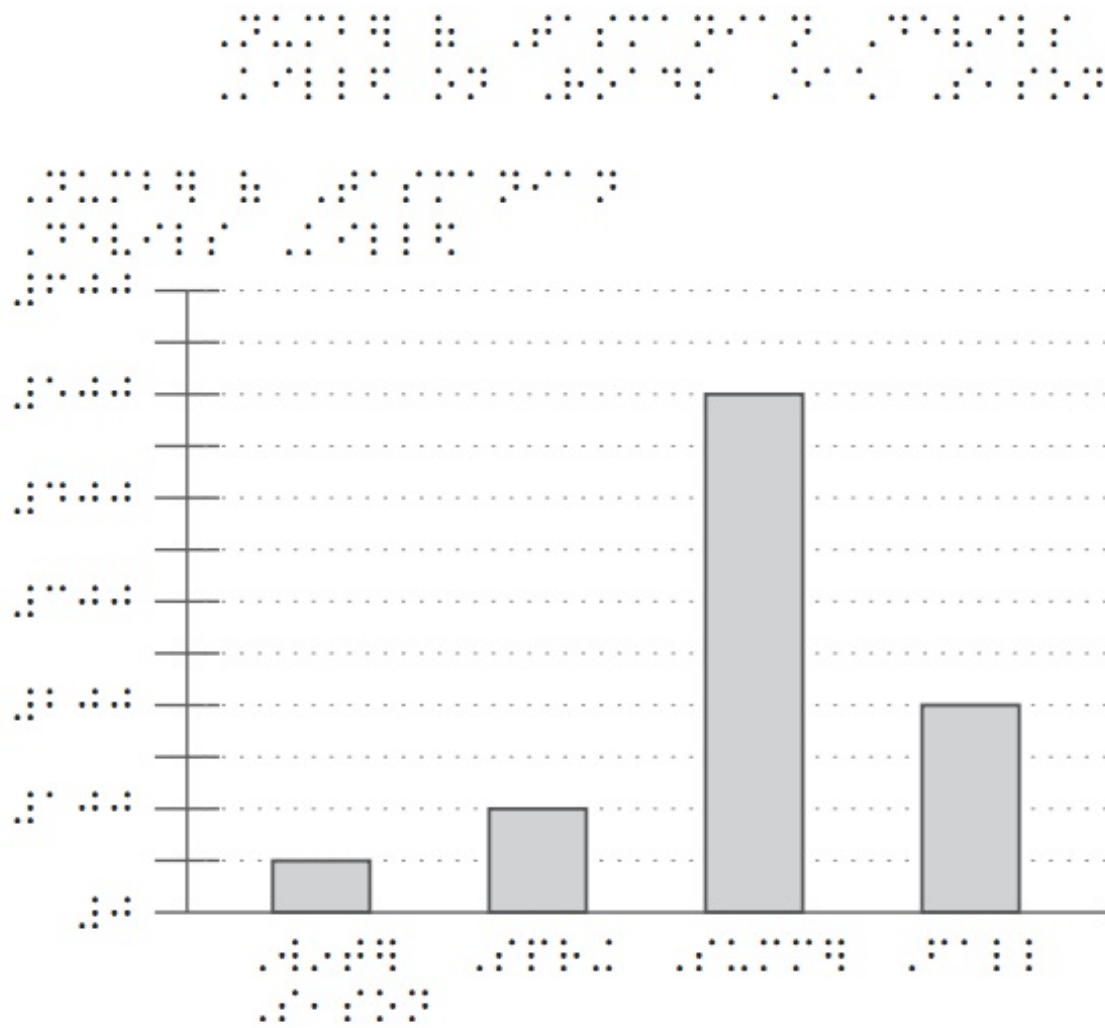The label for the bar with a height of 100 is:
A = fall
B = spring
C = winter
Correct Answer: spring

Number of Tasmanian Devils Killed on Roads Each Season

TD3

⠀⠀⠀⠀⠀⠠⠃⠗⠁⠟�⠀⠃⠀⠉⠇� braille

⠀⠀⠀⠀⠀braille heading line 1
⠀⠀⠀⠀⠀braille heading line 2

Problem A4

The data on this bar graph shows:

A = an increase in the number of road deaths from winter to spring.

B = a decrease in the number of road deaths from winter to spring.

C = an increase in the number of road deaths from summer to fall.

Correct Answer: an increase in the number of road deaths from winter to spring.

Problem A5 - A

How many more Tasmanian Devils are killed in the summer months compared to all the other months combined?

A = 150

B = 500

C = 750

Correct Answer: 150

Problem A5 - B

How many more Tasmanian Devils are killed in the fall months compared to the winter?

A = twice as many

B = three times as many

C = four times as many

Correct Answer: four times as many

Problem A5 - C

In Australia, the warmest seasons are fall and summer. How many Tasmanian Devils are killed during these 2 seasons?

A = 250

B = 300

C = 700

Correct Answer: 700

Problem A6 - A

According to the bar graph, being on the road is dangerous for the Tasmanian devil especially in the summer. Can you think of something that could help reduce the threat? How would that idea work? Record your answer.

Problem A6 - B

The bar graph shows that the death rate on the roads is highest in the summer. Can you think of one reason why that might be the case? Record your answer.

Problem A6 - C

Some towns with high Tasmanian Devil populations post signs to try to get drivers to slow down on the roads. What time of year would you suggest for this kind of program in order to have the most impact? Why do you think that? Record your answer.

Graphic TD4 is on the following 2 pages in print and simbraille.

Introduction Problem Set B

In problem set B you will answer 5 multiple choice and one open ended question about data on sheet TD4. One of the major threats to Tasmanian Devils is being hit by cars. The bar graph shows the estimated number living in an Australian national park. When park officials decided to pave the gravel road through the park they caused problems for the Tasmanian Devils. Then the officials reduced the speed limit in the park from 80 miles per hour to 60 miles per hour. When that didn't help enough, they posted signs along the road showing pictures of the Tasmanian Devil saying, "Slow down! Don't squash us!"

Problem B1

What is the label for the bar that has 30 Tasmanian Devils during its project phase?
A = Paved Road
B = Speed Limit
C = Speed Limit + Signs
Correct Answer: Speed Limit

Problem B2

What is the numeric value of the bar labeled Gravel Road?
A = 15
B = 25
C = 40
Correct Answer: 40

Problem B3

The best description of the scales on the x-axis are:
A = They begin at 0 and go to 50.
B = They begin at 0 and go to 20.
C = There are four categories representing different time periods in the park.
Correct Answer: They begin at 0 and go to 50.

Problem B4

The shortest bar on this graph is labeled:
A = Speed Limit + Signs
B = Paved Road
C = Speed Limit
Correct Answer: Paved road

Problem B5 - A

How many more Tasmanian Devils were saved by the addition of road signs compared to adding just the speed limit?
A = 15
B = 30
C = 40
Correct Answer: 15

Problem B5 - B

How many fewer Tasmanian Devils were there after the road was paved compared to when it was gravel?
A = 15
B = 5
C = 40
Correct Answer: 15

Problem B5 - C

What is the difference between the Tasmanian Devil population in the park at its largest value compared to its smallest value?
A = 25
B = 15
C = 20
Correct Answer: 20

The Number of Tasmanian Devils During Each Road Project Phase

TD4

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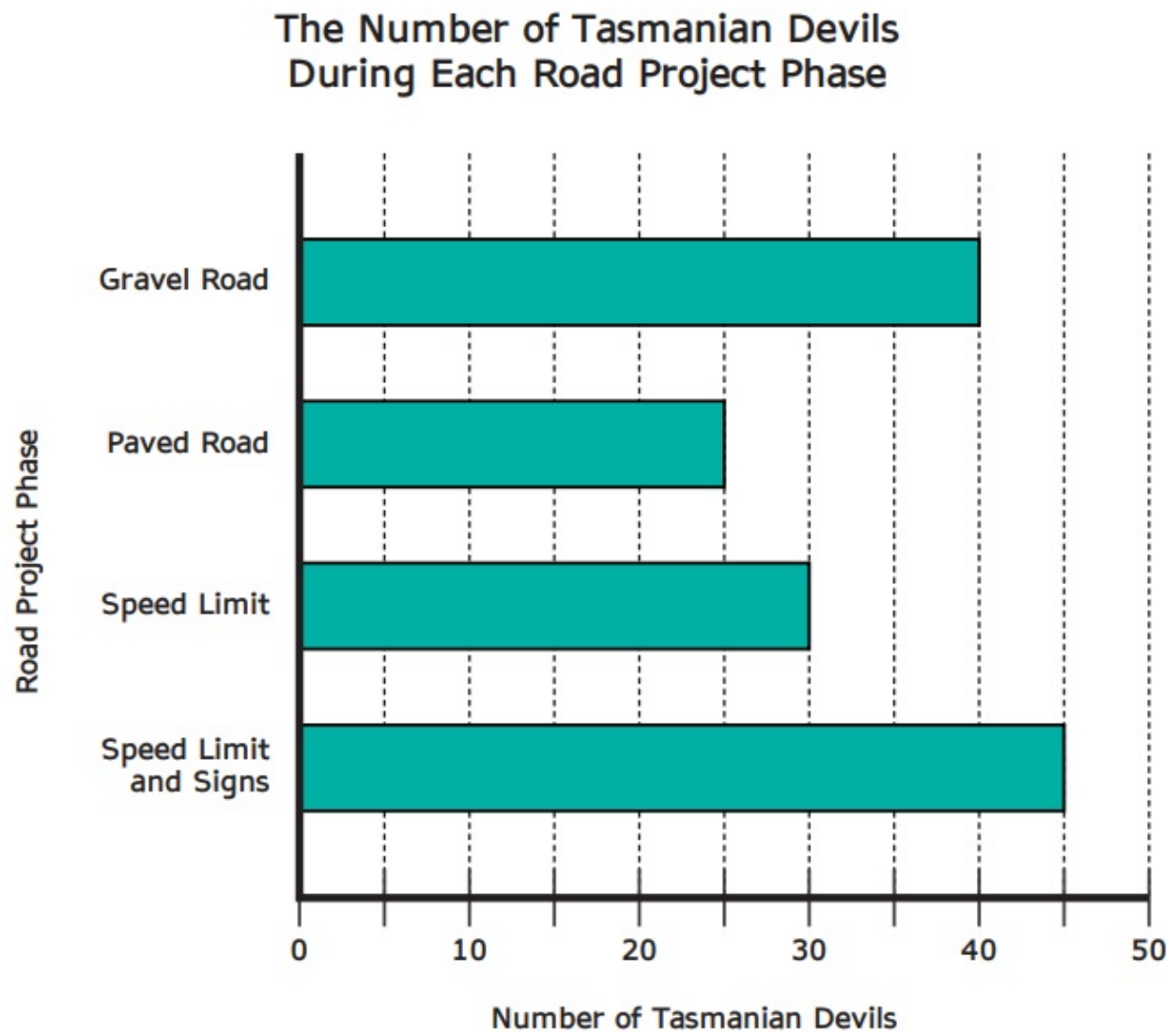
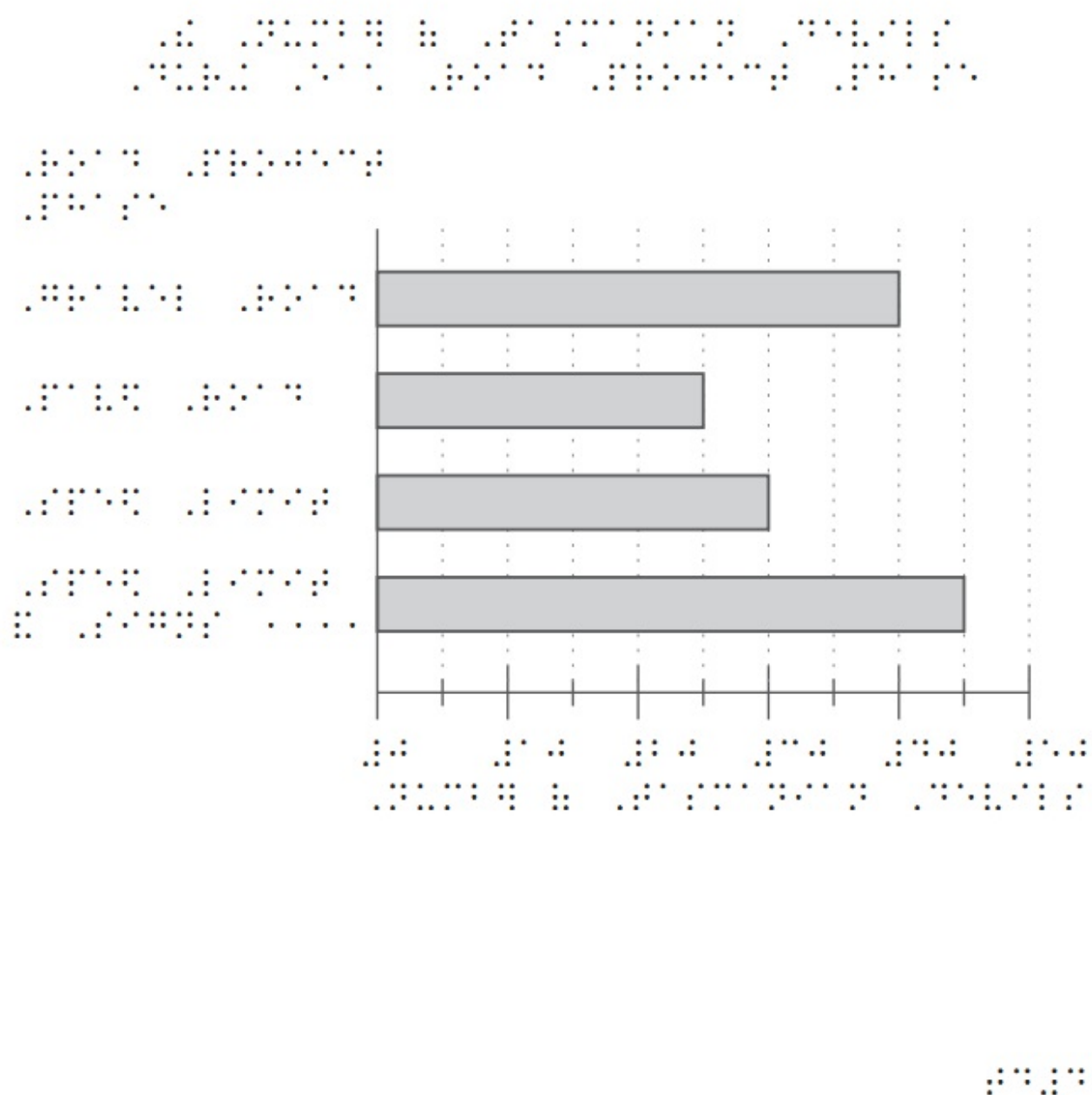## Problem B6 - A

Can you think of one other thing that park officials could do to protect the Tasmanian Devil from people driving too fast through the park? Record your answer.

Problem B6 - B

To reduce the number of Tasmanian Devils hit by cars, if you could only reduce the speed limit or put up signs, which method would you choose? Why do you think that would be the most effective method? Record your answer.

Problem B6 - C

According to the bar graph, the population of Tasmanian Devils was lowest after the park road was paved. Why do you think that happened? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use bar graphs in your school work?
A = Super, I can work with almost any bar graph.
B = Ok, but I need more practice.
C = Not good, bar graphs are confusing.

What I Learned

What is one thing you learned about reading and interpreting bar graphs? Record your answer.

Conclusion

The Tasmanian Devil is a species unique to Australia. Its aggressive personality and hunting habits put it at risk to be killed. Bar graphs convey information. Labels on the x-axis and y-axis guide you to knowing what each bar represents. It's important to be accurate when following a bar and to verify the value of the bar. Tap the next button to see your Score Report for this unit.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Tasmanian Devil: Bar Graphs 1.

- Have the student construct a bar graph with data either found on the Internet or in a book or data you or the student make up. In constructing the bar graph, the student may wish to use a variety of large print or embossed graph paper available from APH. APH even offers bold-line tactile graph sheets, which combine tactile and print. Alternatively, the student may wish to use materials from the APH product, **MathBuilders: Unit 8: Manipulative Set**, Catalog No: 61-421-091.
- Have the student poll peers and then create a bar graph based on the results.
- **Have the student compare and contrast a single category bar graph and single category line graph showing the same data set.**
- Create a riddle or puzzle that can only be solved by gathering information from a bar graph you supply the student.
- Have the student research the Tasmanian Devil to learn additional facts about this endangered species.
- Have the student locate videos of the Tasmanian Devil to watch in order to see this species in its natural habitat.
- Have the student locate Australia on a map or globe. The student can calculate the travel distance from the United States to Australia.

Grey Crowned Crane

Vocabulary

Columns: Columns are a vertical arrangement of items.

Estimate: To estimate means to find the approximate value of something. For example, on a bar graph, a bar may end between two values on the y-axis and the reader will need to estimate the value of the data point.

Gridlines: Gridlines are faint horizontal or vertical lines that help readers keep their place when moving up, down, left or right on the bar graph.

Key: The key differentiates the categories on the bar graph through color, texture, or letter combinations. Another term for "key" is "legend."

Range of Values: The range of values is the lowest to the highest values shown on the bar graph.

Scale: The scale is the distance between units shown on the bar graph.

X-axis: The x-axis or horizontal axis is the horizontal line on the bottom of the bar graph.

Y-axis: The y-axis or vertical axis is the vertical line on the left side of the bar graph.

Meet the Grey Crowned Crane

The grey crowned crane is a primitive bird species that inhabits the warmer areas in Africa. They stand approximately 3 feet tall and weigh about 8 pounds. The body of the grey crowned crane is mostly grey, with white wings. Its head is topped with stiff golden feathers that resemble a crown. This beautiful bird thrives in the wetlands and grasslands of Eastern and Southern Africa. Their numbers are declining due to illegal capture and a decrease of their natural habitat. International conservation organizations and local centers that protect wetlands are working hard to protect the grey crowned crane. Tap the next button to continue.

Graphic CC1 is on the following 2 pages in print and simbraille.

Get Ready for Some Questions

Get sheet CC1 out from your notebook. First, scan the entire double bar graph to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use Sheet CC1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the double bar graph on sheet CC1 tap the next button.

Getting Started 1

Describe this double bar graph and tell what each part is. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the grey crowned crane from this double bar graph? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.
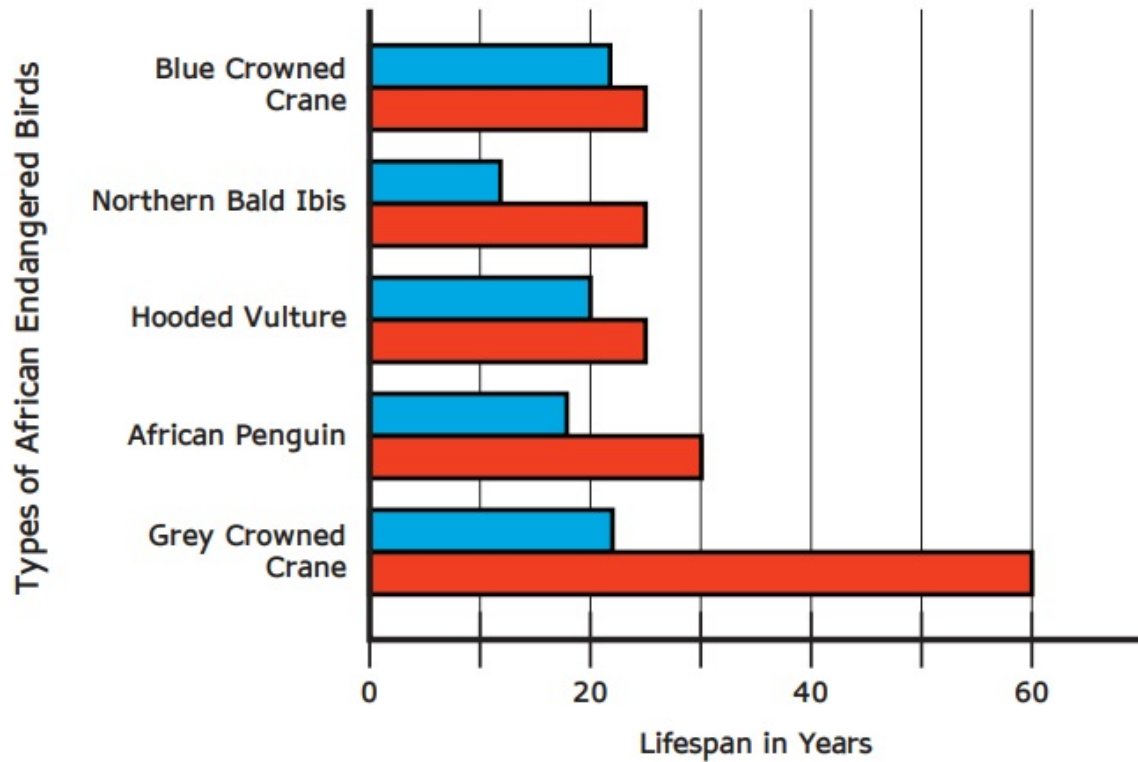
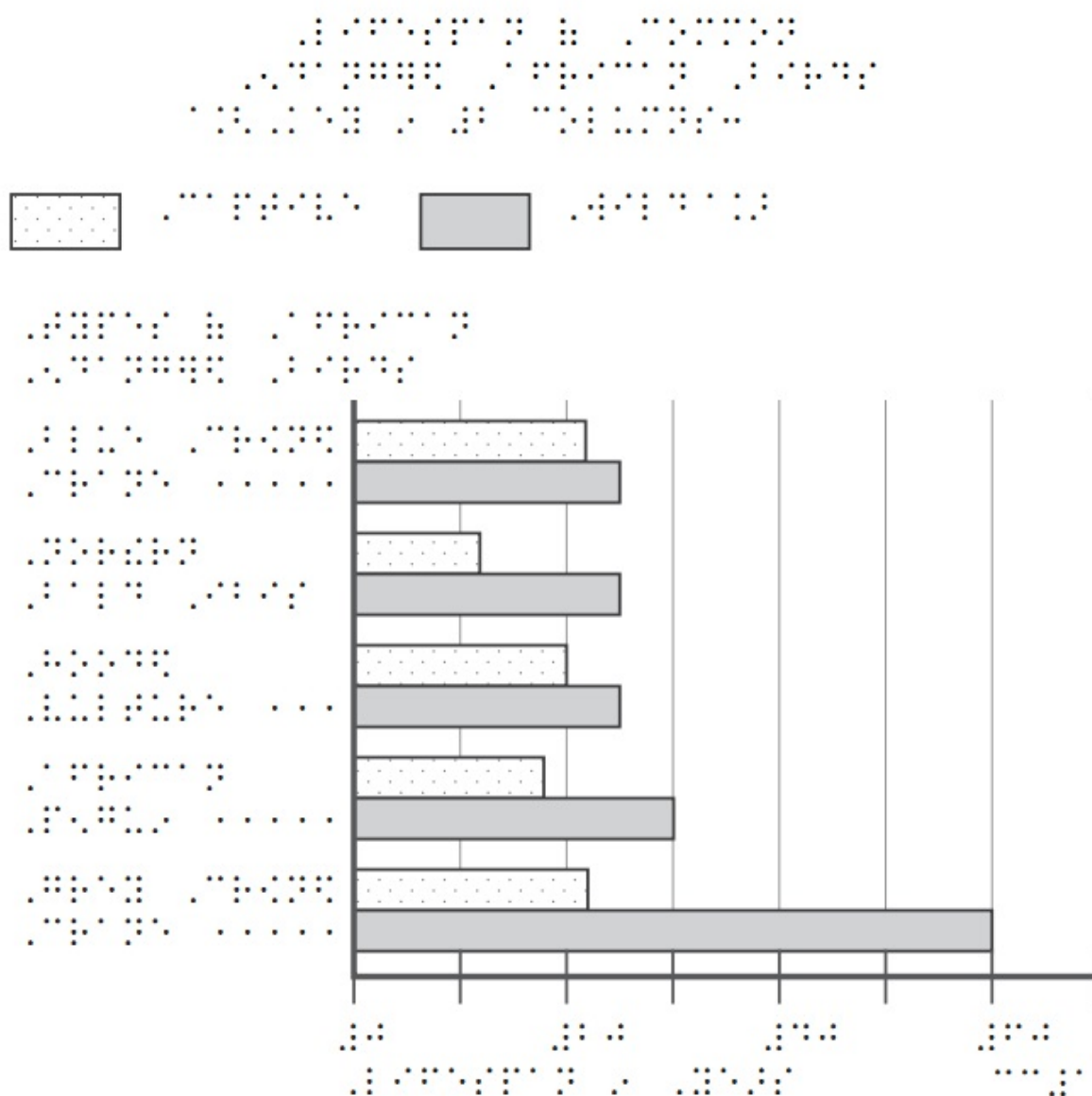## Lifespan of Common Endangered African Birds

Key:

■ Captive   ■ Wild

Types of African Endangered Birds

- Blue Crowned Crane
- Northern Bald Ibis
- Hooded Vulture
- African Penguin
- Grey Crowned Crane

Lifespan in Years

CC1

Graphic CC2 is on the following 2 pages in print and simbraille.

Get Ready for the Warm Up

You are going to use sheets CC1 and CC2 to build your skills with double bar graphs. Get both sheets out of your notebook. Be sure to check your answer to each question about the double bar graphs. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about grey crowned cranes comes from research done by scientists. The grey crowned crane's natural habitat is the wetlands of Africa. Wetlands are areas with land that is swamp-like that birds often live in. People creating communities and draining the wetlands have affected wetland regions around the world. International organizations have worked hard to educate local people about wetland conservation and captive programs. Conservation programs work to increase the number of grey crowned cranes. The decline of the wetlands is just one of the reasons the grey crowned crane and many other African birds are endangered.

Warm Up 1

Remember, a title is usually at the top of a bar graph. The title helps you understand what the bar graph is about. If you have more than one bar graph to look at, the title helps you know which bar graph you have. On sheets CC1 and CC2, read the titles of the bar graphs. Which bar graph is about the lifespan of endangered African birds?

A = The bar graph on sheet CC1

B = The bar graph on sheet CC2

C = Both the bar graphs on sheets CC1 and CC2

Correct Answer: The bar graph on sheet CC1

Warm Up 2

The x-axis or the horizontal axis is at the bottom of the bar graph. The scale or category for each bar is underneath the x-axis. There is a label below the scales or categories on the x-axis that gives a general description of what they represent. On sheet CC2, what is the label for the x-axis?
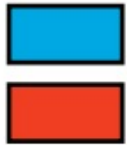
A = North America and Africa
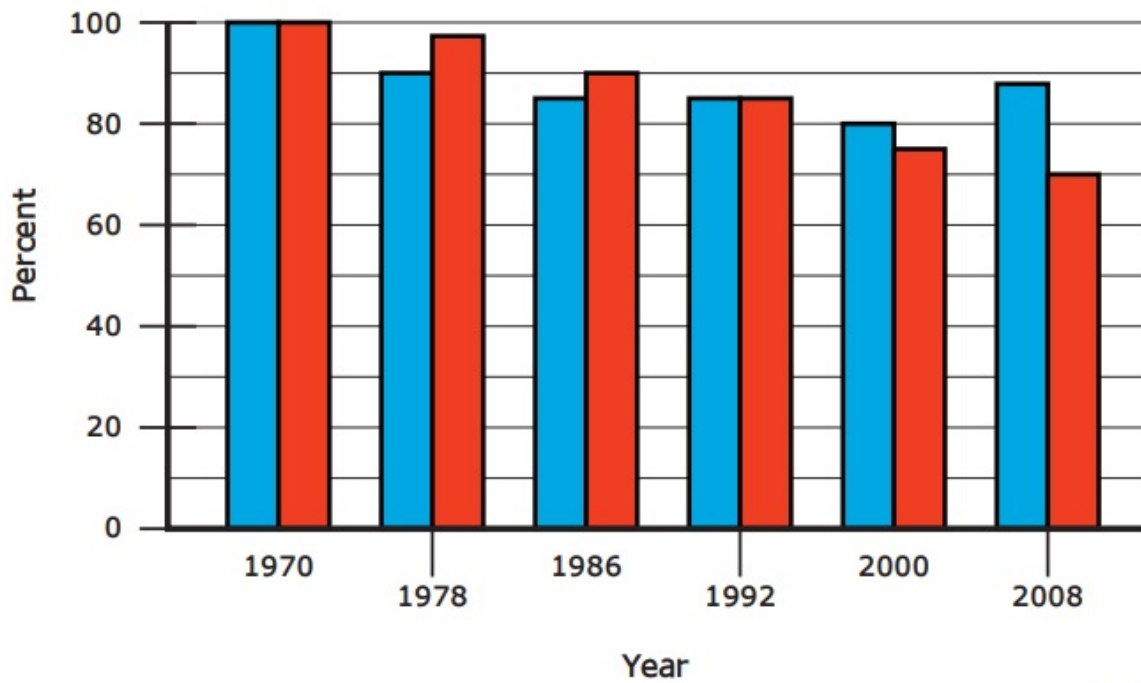
B = Percent

C = Year

Correct Answer: Year

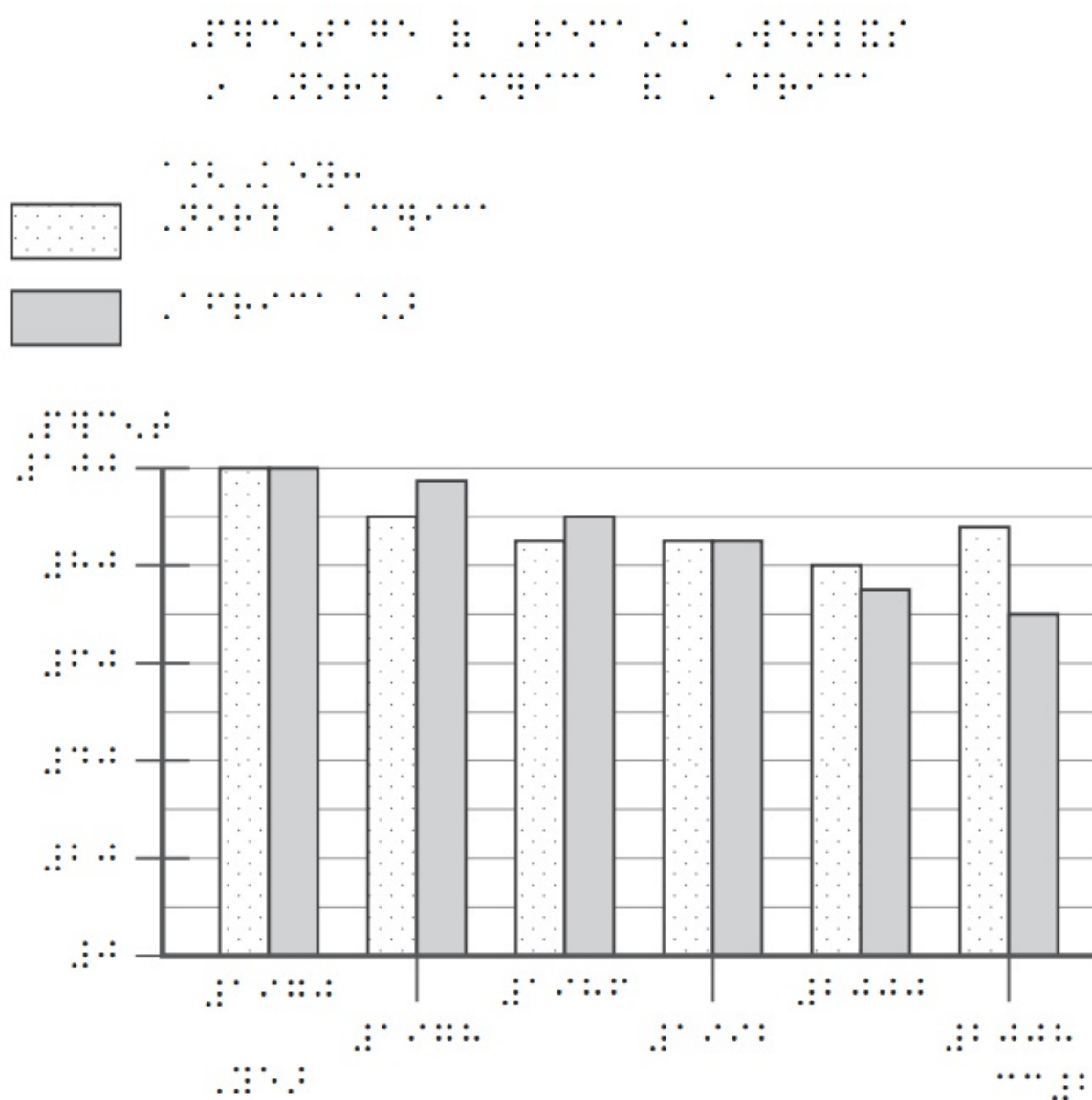## Percentage of Remaining Wetlands in North America and Africa

Key:

[ ] North America

[ ] Africa

CC2

Warm Up 3

The y-axis or vertical axis is at the left of the bar graph. To the left of the y-axis are the scales or categories. In print, the label for the y-axis is usually centered vertically to the left of these scales or categories. In braille, the label for the y-axis is usually at the top left of the graph. Remember, the label describes what the categories or scales represent. On sheet CC2 what is the label for the y-axis?

A = North America and Africa

B = Percent

C = Year

Correct Answer: Percent

Warm Up 4

Some bar graphs have columns or bars that are vertical, or go up and down. We will use the term bars in this unit. The categories or scales for these bars are under the x-axis. Other bar graphs have bars that are horizontal, or go across. The categories or scales for these bars are to the left of the y-axis. On sheet CC1, what are some of the categories on the y-axis?

A = Captive, Wild

B = 0, 10, 20, 30

C = Northern Bald Ibis, Hooded Vulture, Grey Crowned Crane

Correct Answer: Northern Bald Ibis, Hooded Vulture, Grey Crowned Crane

Warm Up 5

On a bar graph, one of the axes has a range of values for the scales. The lowest value will be in the bottom left corner of the bar graph. On sheet CC1, what is the range of the values on the x-axis?

A = The values go from 0 to 70.

B = The values go from 10 to 70.

C = The values go from capture to wild.

Correct Answer: The values go from 0 to 70.

Warm Up 6

Double bar graphs display two sets of data on the same graph. There is a key so you know which bar is for each data set. These bars can be different colors, patterns, or textures. On sheet CC2, what do the 2 bars represent?

A = Captive and Wild

B = North America and Africa

C = Percent and Year

Correct Answer: North America and Africa

Warm Up 7

To find the value of a bar, you need to follow it to the end. Then using your finger move to the left or down until you find the axis with the values. On sheet CC1, find the category labeled "Hooded Vulture" on the y-axis. Use the key to determine which bar is for "Captive." Go to the end of that bar and then follow it down to the x-axis. How many years do captive hooded vultures live?

A = 25 years

B = 15 years

C = 20 years

Correct Answer: 20 years

Warm Up 8

Double bar graphs help compare data on the same graph. Read across the categories on the x-axis of CC2 to find the years that go with each set of bars. When looking at the years on the x-axis, notice they are staggered on two lines. Notice that in 1970, the bars are the same height. Find another set of bars with the same height. Follow the bars down to the x-axis and continue until you find the year that goes with that set of bars. In what year after 1970 did North America and Africa have the same percentage of wetlands remaining?

A = 1986

B = 1978

C = 1992

Correct Answer: 1992

Warm Up 9

Bars do not always end right on a gridline. When this happens, you will need to estimate the value. On sheet CC2, find the bars again for "1992". Follow both bars up past the gridline to where the bars end. The value of the bars is higher than the value on the gridline you just passed. Follow the gridline you just passed to the left until you get to the y-axis. Find the value for this gridline. Since the bars went past the gridline, you will need to estimate the value of the bars based on how far the bars extend past the gridline. What is your estimate of the percent of the remaining wetlands in North America and Africa in 1992?

A = 80 percent

B = 85 percent

C = 95 percent

Correct Answer: 85 percent

Warm Up 10

Use sheet CC1. Compare the lengths of the double bars to determine which African bird has the greatest difference in lifespan when it is captive versus living in the wild.

A = African Penguin
B = Grey Crowned Crane

C = Northern Bald Ibis

Correct Answer: Grey Crowned Crane

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried some double bar graphs, how well do you understand this topic?

A = Very well, I know this material already.
B = Pretty well; I've worked on double bar graphs, but I could use some practice.
C = Not very well; I need more practice.

Graphic CC3 is on the following 2 pages in print and simbraille.

Introduction Problem Set A

In problem set A, you will answer five multiple choice and one open ended question about data on sheet CC3. Unlike many other types of birds, the grey crowned crane is not migratory. This means it lives mainly in one place. It may travel several kilometers to look for food or nesting, but will stay within a specific range area near its wetlands habitat. As wetlands decrease, scientists predict that the grey crowned crane's living and travel range will also decrease.

Problem A1

What is the range of the values on the x-axis?
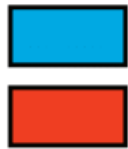
A = 0 to 7000 sq. km.

B = 0 to 4500 sq. km.

C = 200 to 6000 sq. km.
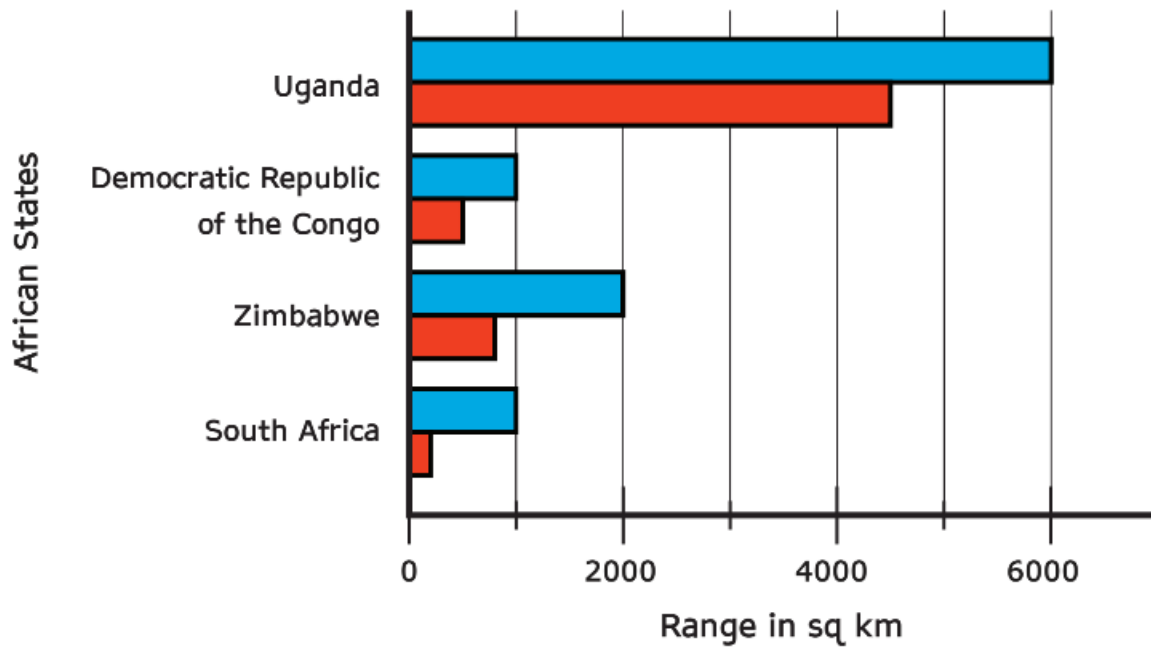
Correct Answer: 0 to 7000 sq. km.

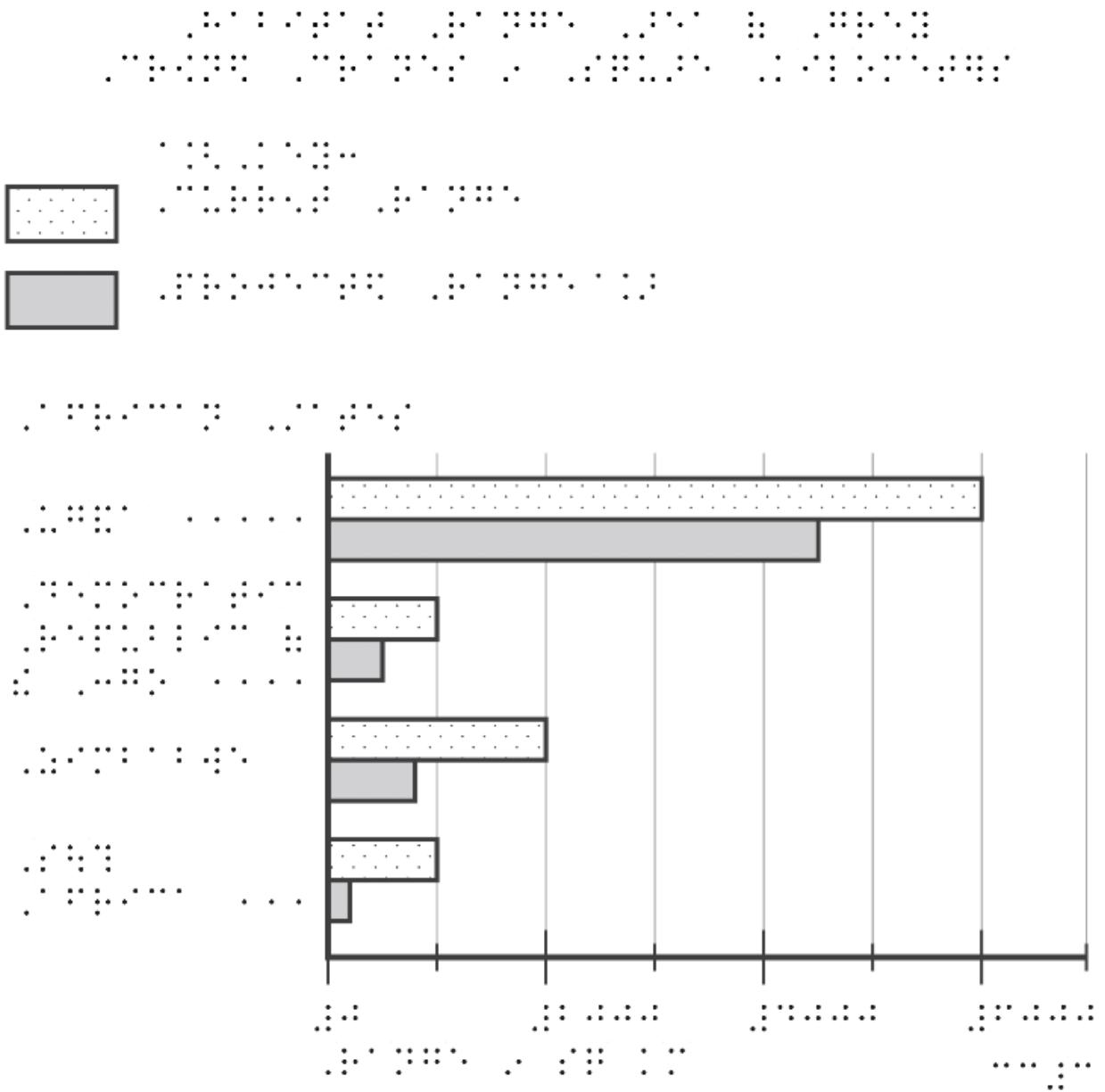## Habitat Range Area of Grey Crowned Cranes in Square Kilometers

CC3

⠀⠠⠮⠀⠊⠎⠀⠁⠀⠃⠊⠛⠀⠙⠊⠋⠋⠻�二⠉⠑⠀⠃⠞⠺�
⠀⠠⠁⠋⠗⠊⠉⠁⠝⠀⠑⠇⠑⠏⠓⠁⠝⠞⠎⠀⠁⠝⠙⠀⠠⠁⠎⠊⠁⠝⠀⠑⠇⠑⠏⠓⠁⠝⠞⠎⠲

Problem A2

What is the current and projected range for the grey crowned crane in Uganda?

A = 4500 sq. km. for current, 6000 sq. km. for projected

B = 6000 sq. km. for current, 4500 sq. km. for projected

C = 2000 sq. km. for current, 800 sq. km. for projected

Correct Answer: 6000 sq. km. for current, 4500 sq. km. for projected

Problem A3

Which country is projected to have the smallest grey crowned crane range?

A = South Africa

B = Democratic Republic of the Congo

C = Uganda

Correct Answer: South Africa

Problem A4

The data on this double bar graph shows:

A = an increase from the current to projected range for the grey crowned crane.

B = no change from the current to projected range for the grey crowned crane.

C = a decrease from the current to projected range for the grey crowned crane.

Correct Answer: a decrease from the current to projected range for the grey crowned crane.

Problem A5 - A

Based on the projections, which country will lose half of the grey crowned crane's range?

A = Uganda

B = South Africa

C = Democratic Republic of the Congo

Correct Answer: Democratic Republic of the Congo

Problem A5 - B

What is the difference between the current and projected range for grey crowned cranes in Zimbabwe?

A = 800 sq. km.

B = 1200 sq. km.

C = 2000 sq. km.

Correct Answer: 1200 sq. km.

Problem A5 - C

Which two countries have the same current range for the grey crowned crane to travel?

A = Democratic Republic of the Congo and South Africa

B = Democratic Republic of the Congo and Uganda

C = South Africa and Zimbabwe

Correct Answer: Democratic Republic of the Congo and South Africa

Problem A6 - A

According to the double bar graph, the projected living range for the grey crowned crane is decreasing. Besides conserving the wetlands, can you think of any other efforts to protect the grey crowned crane? How would that idea work? Record your answer.

Problem A6 - B

If conservation efforts make a bigger impact to protect the wetlands in Africa how do you think this will change the projected range for the grey crowned craned? Record your answer.

Problem A6 - C

If scientists' projections are correct, what will happen to the grey crowned crane's range in the future? Why do you think so? Record your answer.

Introduction Problem Set B

In problem set B you will answer five multiple choice and one open ended question about data on sheet CC4. Another reason the wetlands have been declining in Africa is due to increased farming and livestock grazing. There have been conflicts between local farmers and conservation groups trying to protect the wetlands. There are a variety of native wildlife that rely on the wetlands for food, water, shelter, and nesting. Conservation groups have worked with local people to educate them on the importance of protecting the wetlands. They have also developed ways to farm in the area without hurting the natural habitats of the wildlife.

Kenya's Livestock Population Versus Wildlife Population

Key:

■ Livestock
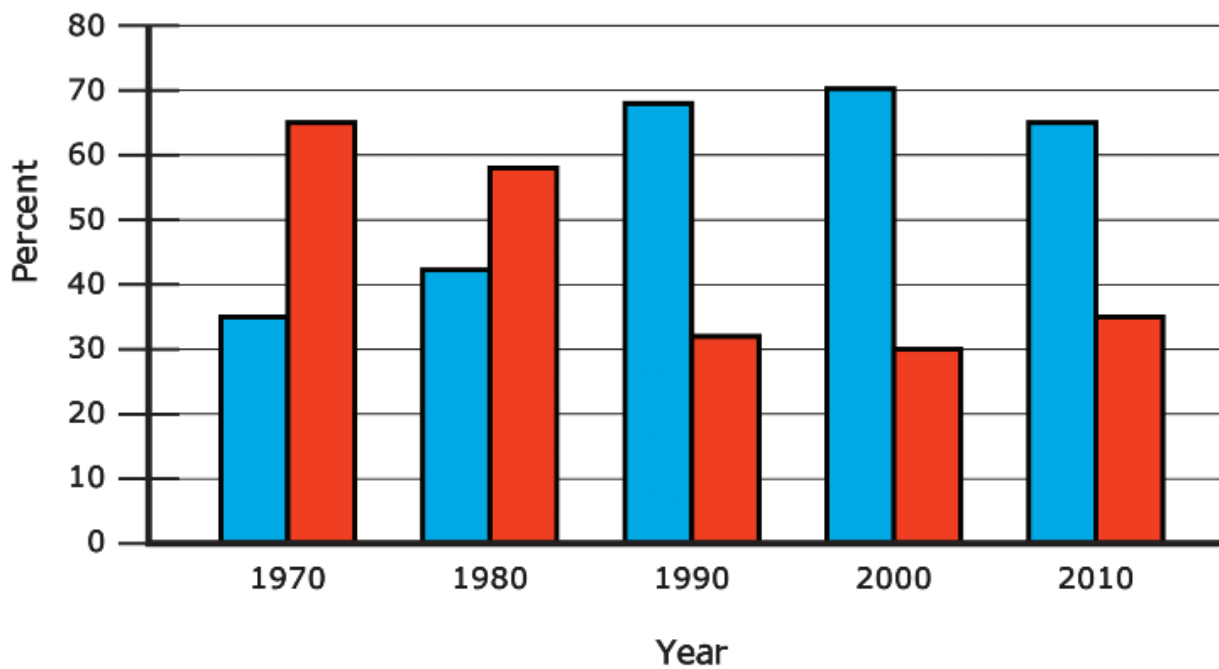
■ Wildlife

CC4
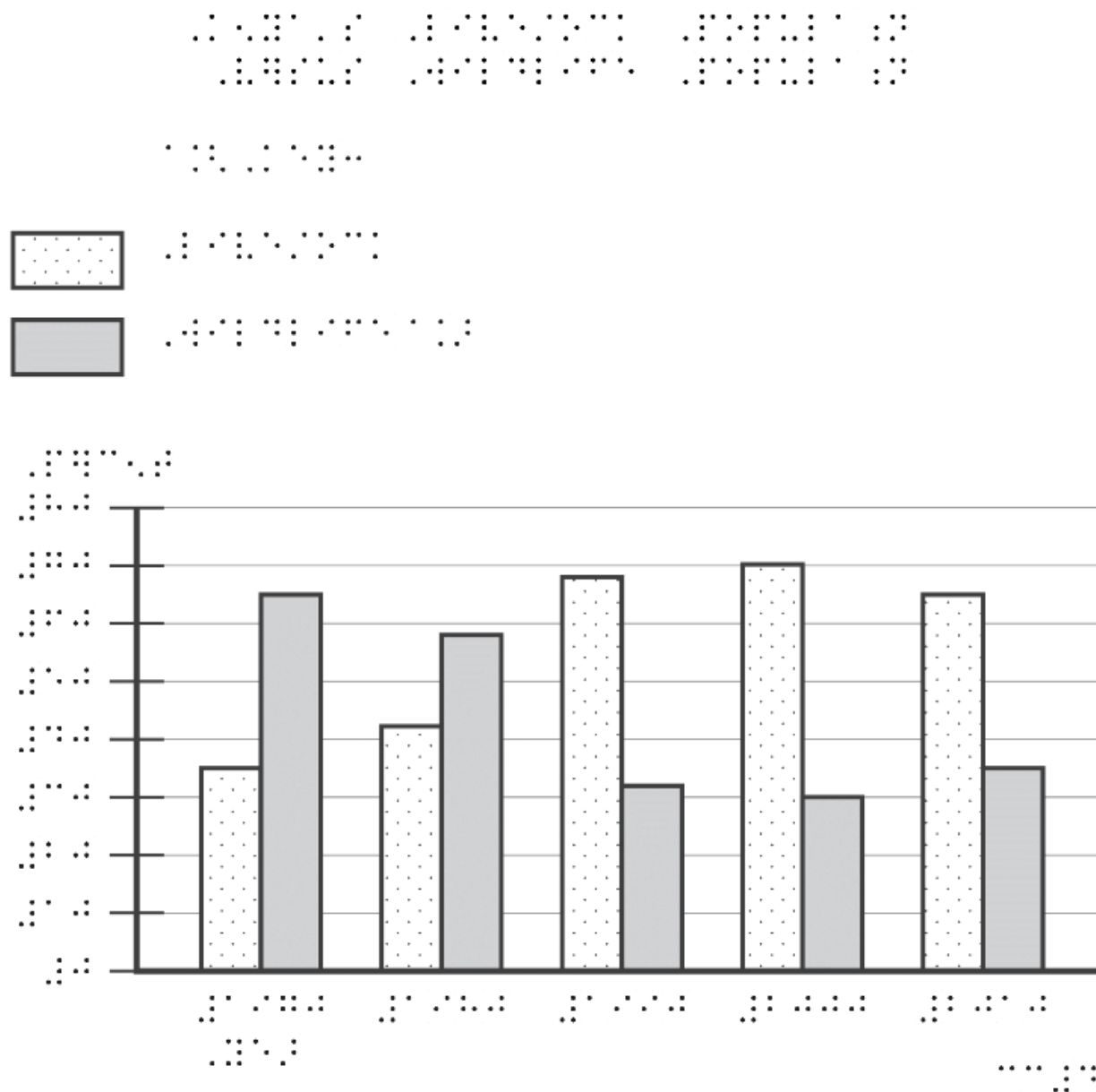
Problem B1

The best description of the scale on the y-axis is:

A = Percent from 1970 to 2010

B = Percent from 0 to 80

C = Livestock and Wildlife

Correct Answer: Percent from 0 to 80

Problem B2

What year had the highest percentage of wildlife?

A = 1970

B = 2000

C = 2010

Correct Answer: 1970

Problem B3

In 1980 what were the percentages of livestock and wildlife?

A = 42 percent, 58 percent

B = 70 percent, 30 percent

C = 35 percent, 65 percent

Correct Answer: 42 percent, 58 percent

Problem B4

Which year did the livestock percentage first become greater than the wildlife percentage?

A = 1970
B = 1990
C = 2010

Correct Answer: 1990

Problem B5 - A

From 1970 to what year did the percentage of livestock double?

A = 1980

B = 2000

C = 2010

Correct Answer: 2000

Problem B5 - B

What is the difference between the wildlife population at its highest percent compared to the wildlife population at its lowest percent?

A = 60 percent

B = 35 percent

C = 25 percent

Correct Answer: 35 percent

Problem B5 - C

Which year had the smallest percentage difference between livestock and wildlife?

A = 1980

B = 1990

C = 2000

Correct Answer: 1980

Problem B6 - A

Wildlife populations increased in 2010. Why do you think this occurred? What else do you think can be done to assist with this process? Record your answer.

Problem B6 - B

In 2000, conservation teams started a program to work with local farmers to protect the wildlife. Do you think this was helpful? Why or why not? Record your answer.

Problem B6 - C

According to the double bar graph, the wildlife percentage decreased from 1970 to 2000. Why do you think that happened? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use double bar graphs in your school work?

A = Super, I can work with almost any double bar graph.

B = Ok, but I need more practice.

C = Not good, double bar graphs are confusing.

What I Learned

What is one thing you learned about reading and interpreting double bar graphs? Record your answer.

Conclusion

The grey crowned crane is a highly prized bird in Africa. In fact, it is Uganda's national bird. Many people around the world try to purchase them but conservation teams are working hard to protect them by keeping them in their native habitat. Double bar graphs convey sets of information. Labels on the x-axis, y-axis, and the key will guide you to knowing what each bar represents. It is important to be accurate when following a bar and to verify the value of the bar. Tap the next button to see your Score Report for this unit.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Grey Crowned Crane: Bar Graphs 2.

- Have the student construct a bar graph with data either found on the Internet or in a book or data you or the student make up. In constructing the bar graph, the student may wish to use a variety of large print or embossed graph paper available from APH. APH even offers bold-line tactile graph sheets, which combine tactile and print.
- Have the student collect data on two different categories (e.g., number of students who prefer one food vs. another, number of students who like football vs. those who don't) and have the student create a bar graph with the data collected.
- Create a riddle or puzzle that can only be solved by gathering information from a bar graph you supply the student.
- Provide the student bar graphs that have keys. Together examine the information in the key and how it relates to the bar graph.
- Have the student compare and contrast a double bar and double line graph showing the same data sets.
- Have the student research the grey crowned crane to learn additional facts about this endangered species.
- Have the student locate videos of the grey crowned crane to watch in order to see this species in its natural habitat.
- Have the student locate Africa on a map or globe. The student can calculate the travel distance from the United States to specific countries in Africa.

Cane Toad

Vocabulary

Data points: Data points are specific measurements of observations. They are plotted on the line graph.

Estimate: To estimate means to find the approximate value of something. For example, on a line graph, a data point may fall between two values labeled on the y-axis and the reader will need to estimate the value of the data point.

Gridlines: Gridlines are faint horizontal or vertical lines that help readers keep their place when moving up, down, left or right on the line graph.

Key: The key differentiates the categories on the line graph through color, texture, or abbreviations. Another term for "key" is "legend."

Range of Values: The range of values is the lowest to the highest values shown on the line graph.

Scale: The scale is the distance between units shown on the line graph.

X-axis: The x-axis or horizontal axis is the horizontal line on the bottom of the line graph.

Y-axis: The y-axis or vertical axis is the vertical line on the left side of the line graph.

Meet the Cane Toad

The cane toad is a very large toad found in Australia. An adult can be 8 inches long and weigh 4 pounds. The cane toad has warts on its neck and back. If it feels threatened, it will release a poisonous fluid from the warts. The cane toad is not native to Australia, and it is not endangered. In fact, it is a pest species. In 1935, some sugar cane growers brought 100 cane toads from Hawaii to Australia. They hoped the cane toads would eat beetles infesting their sugar cane crop. The cane toads did not like the beetles, but they did like the Australian countryside. They reproduce very quickly and do not have any natural predators in Australia. As the population grows, newly-mature cane toads migrate into neighboring areas. They hop at night, traveling in groups like a toad army. By the year 2020, the cane toad will have invaded almost half a million square miles of Australia. Tap the next button to continue.

Graphic CT1 is on the following 2 pages in print and simbraille.

Alert the braille reader to the transcriber note that explains the first 2 digits of the year are omitted from the line graph.

Get Ready for Some Questions

Get sheet CT1 out from your notebook. First, scan the entire line graph to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use sheet CT1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the line graph on sheet CT1 tap the next button.

Getting Started 1

Describe this line graph and tell what each part is. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the cane toad from this line graph? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.
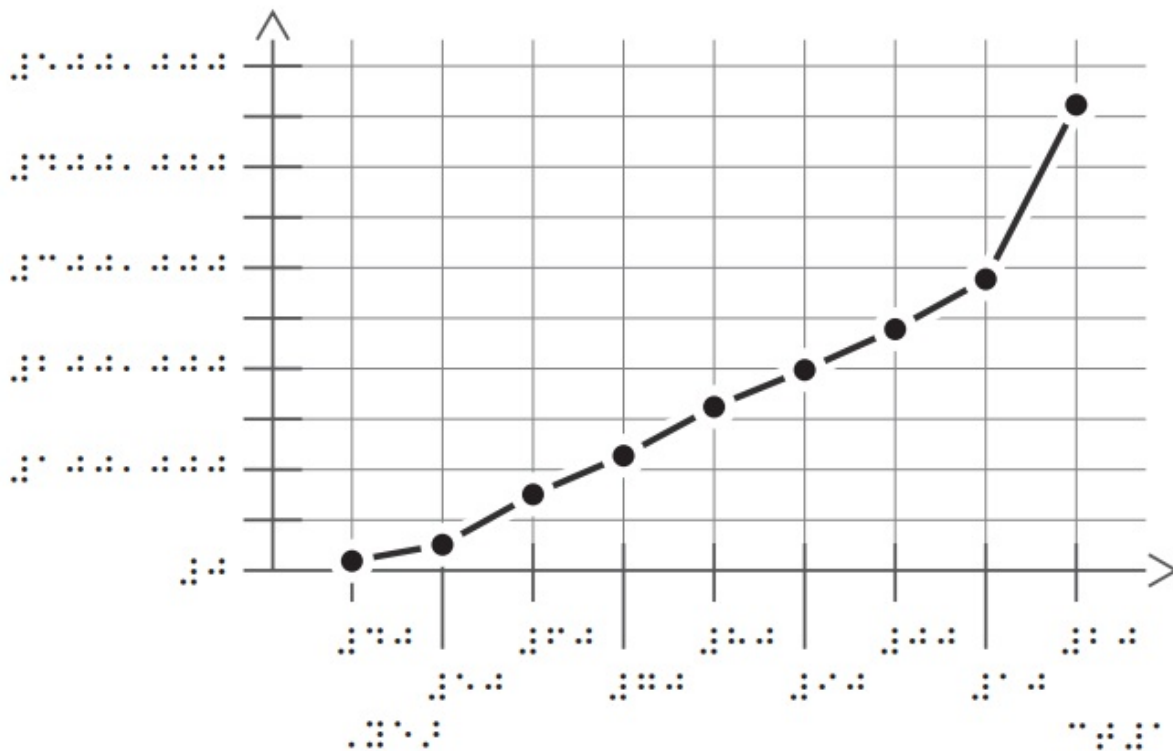
The Size of the Cane Toad Habitat by Decade
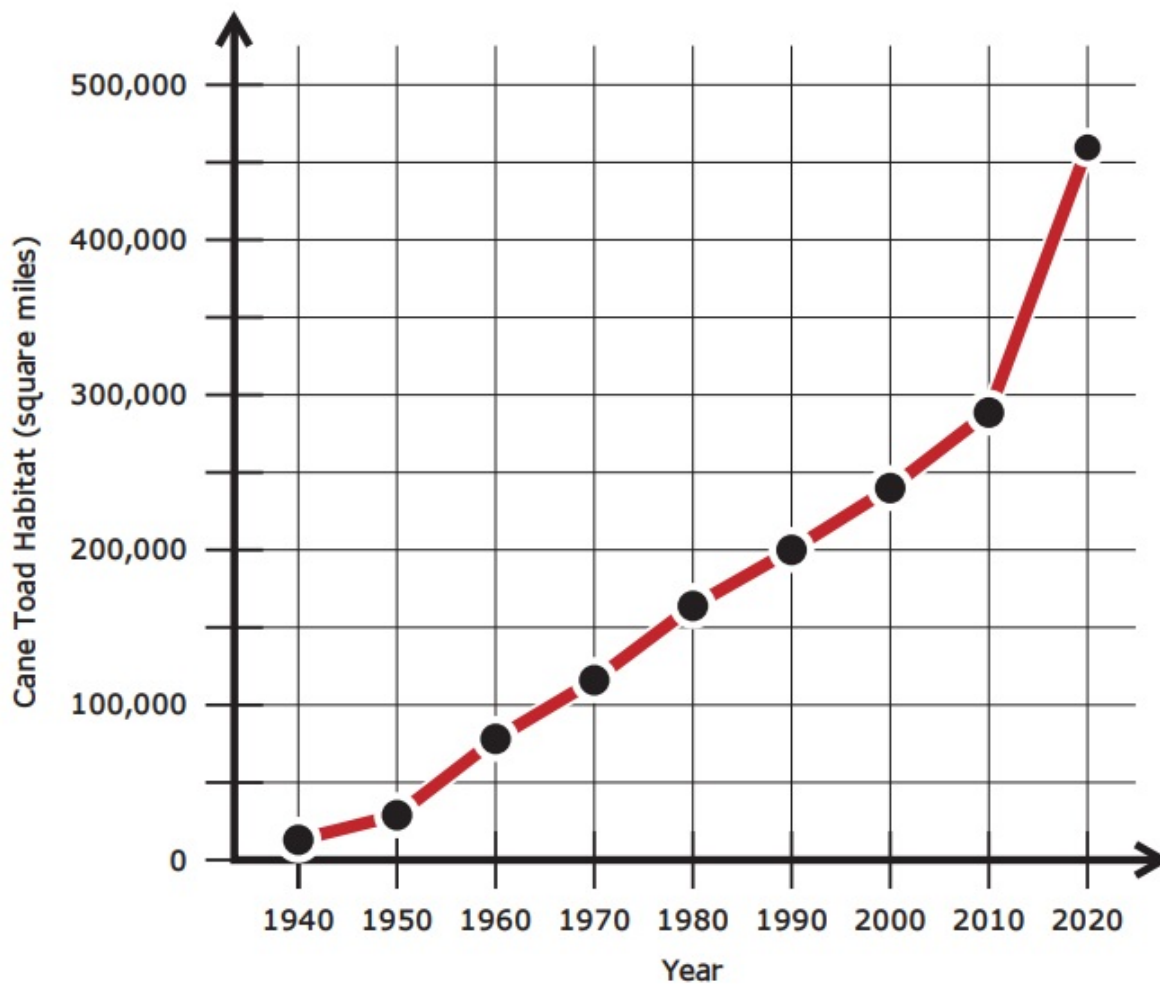
CT1

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Graphic CT2 is on the following 2 pages in print and Simbraille.

Get Ready for the Warm Up

You are going to use sheets CT1 and CT2 to build your skills with line graphs. Get both sheets out of your notebook. Be sure to check your answer to each question about line graphs. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about cane toads comes from research done by scientists. The cane toads travel long distances. Their speed varies based on the type of surface they have to hop on. Researchers are finding that cane toads are starting to change their sleeping habits due to the increase in temperature in Australia, although they still primarily travel and eat at night. Tap the next button to continue.

Warm Up 1

The title of a line graph is usually at the top of the graph. The title gives you information about the graph. On sheet CT2 look at the title. What do you know from the title?
A = The graph shows how far cane toads travel in a month.

B = The graph shows the size of the cane toad's habitat.

C = The graph shows how far cane toads travel in a week.

Correct Answer: The graph shows how far cane toads travel in a week.

Warm Up 2

The x-axis or horizontal axis is at the bottom of the line graph. The x-axis shows scales that may or may not be numeric values. On sheet CT1 what is the range of the values on the x-axis? If you are using the braille line graph, be sure to read the transcriber's note below the title.

A = 1940 to 2000

B = 1960 to 2020

C = 1940 to 2020

Correct Answer: 1940 to 2020

Warm Up 3

The y-axis or vertical axis is at the left of the line graph. To the left of the y-axis are the scales. In print, the label for the y-axis is usually centered to the left of these scales. In braille, the label for the y-axis is usually at the top left of the graph. On a line graph the scales for the y-axis are always numeric. On sheet CT2 what is the label for the y-axis?

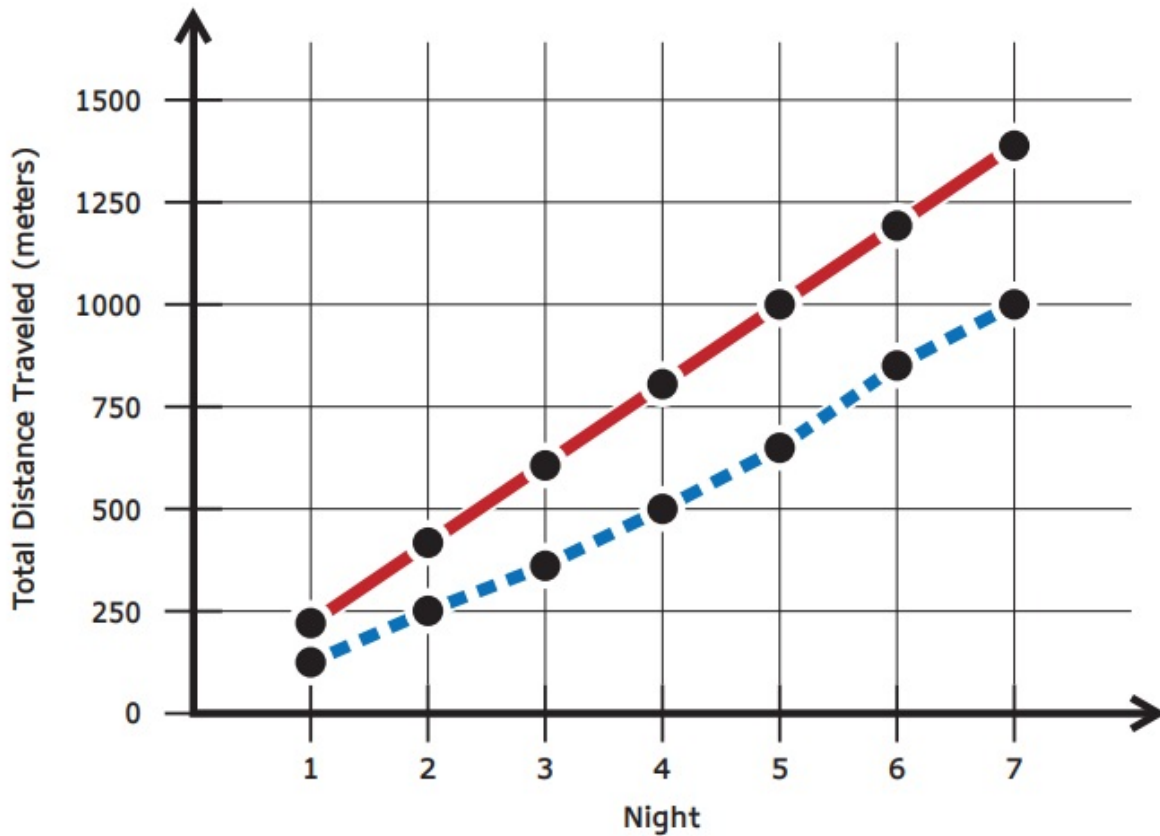A = Total Distance Traveled (meters)

B = Height

C = Cane Toad Habitat (square miles)

Correct Answer: Total Distance Traveled (meters)

Total Distance Traveled by Cane Toads in One Week

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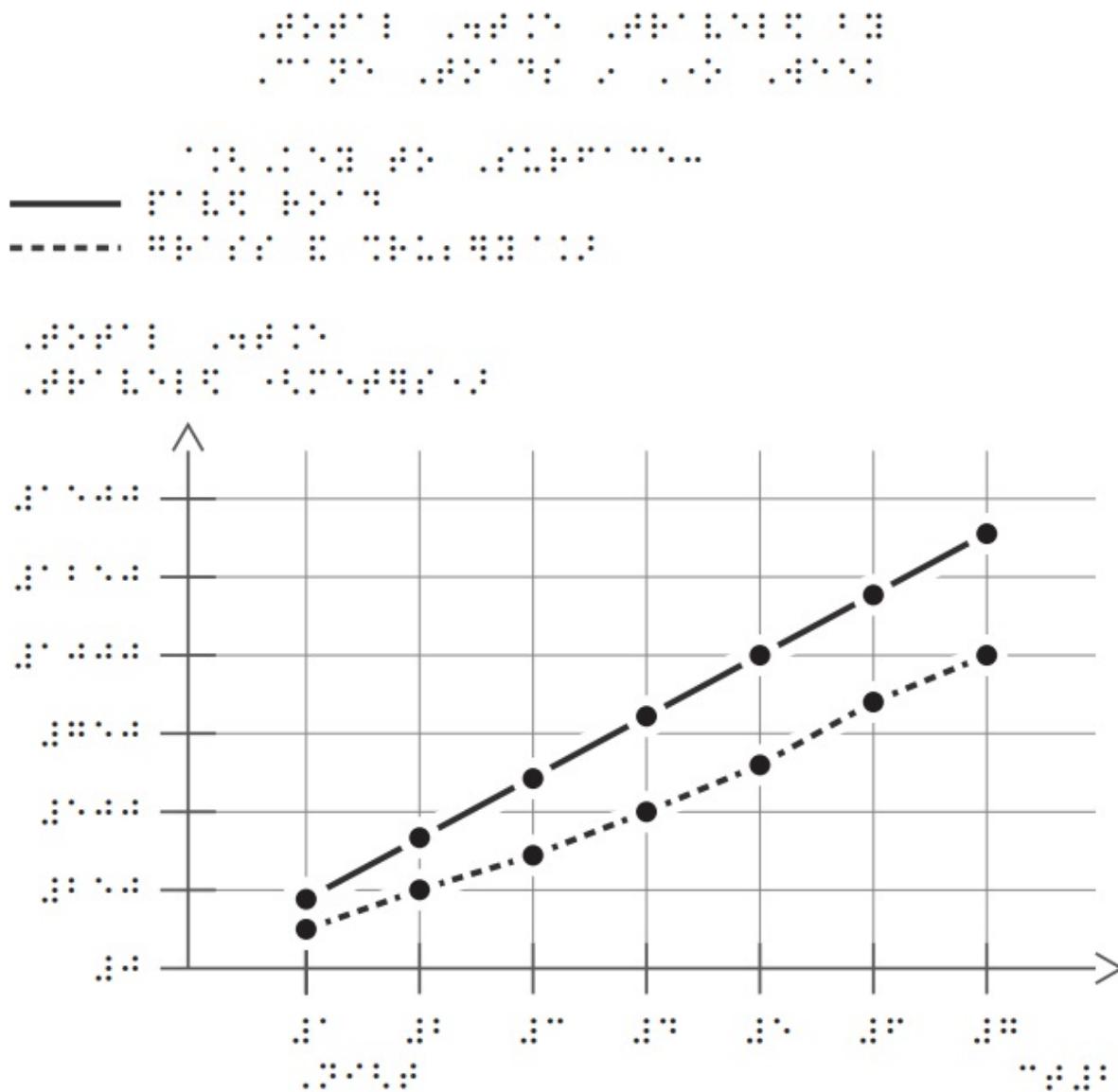
Warm Up 4

On sheet CT2 what is the range of the values on the y-axis?

A = 0 to 1250

B = 250 to 1500

C = 0 to 1500

Correct Answer: 0 to 1500

Warm Up 5

Some line graphs have a key to tell you what each line on the line graph stands for or represents. On sheet CT2 the key is at the top of the line graph. In braille, a transcriber's note symbol is used to open and close the key. On sheet CT2 the key includes:

A = paved road and meters

B = grass and shrubbery and paved road

C = meters and grass and shrubbery

Correct Answer: grass and shrubbery and paved road

Warm Up 6

A data point is used to show the measurement or amount of an observation.

On sheet CT1 look at the observations on the x-axis. Each observation is a year starting with 1940. To find out how many square miles the cane toad habitat is for 1970, first find 1970 on the x-axis. Then use your finger or eyes and move up until you find the data point. It is just above the gridline. Follow the gridline below the data point left to the y-axis. What is the value of the gridline on the y-axis?

A = 50,000

B = 100,000

C = 150,000

Correct Answer: 100,000

Warm Up 7

On sheet CT1 what is the estimated value of the data point for 1970? Remember, you found that for 1970 the data point is just above the gridline with a value of 100,000. Go up the y-axis to the next value, which is 200,000. Did you notice the gridline between 100,000 and 200,000? The value of that gridline is 150,000. Here's a way to help you estimate the value of the data point. Take a piece of paper or a ruler to help you go straight when moving from a data point to the y-axis. Put your paper or ruler laying it straight from the data point to the y-axis. Move your fingers or eyes left along the edge of the ruler or piece of paper until you reach the y-axis.

A = 90,000
B = 120,000
C = 170,000
Correct Answer: 120,000

Warm Up 8

On sheet CT2 for cane toads traveling on grass and shrubbery, how many meters did they travel by the end of night 4? First, use the key to find the line for grass and shrubbery. Next find night 4 on the x-axis. Go up until you find the data point on the grass and shrubbery line. Notice the data point is on a gridline. Follow the gridline until you reach the y-axis.

A = 250 meters

B = 500 meters

C = 750 meters

Correct Answer: 500 meters

Warm Up 9

On the y-axis you can find a value and then move your fingers or eyes right to see if there is a data point for that value. On sheet CT2 find 1,000 meters on the y-axis. Move right on the gridline until you find the first data point. Now, move down to the x-axis. What is the night that total distance has been traveled?

A = night 3

B = night 4

C = night 5

Correct Answer: night 5

Warm Up 10

On sheet CT2 notice that on Night 1 there is only one data point. This is because both the line for the paved road and the line for grass and shrubbery have the same value. How many meters did each group travel on Night 1?

A = 0 meters

B = 125 meters

C = 250 meters

Correct Answer: 250 meters

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you tried some line graphs, how well do you understand the topic?

A = Very well, I know this material already.

B = Pretty well, I worked with line graphs before, but I could use some practice.

C = Not very well, I need more practice.

Graphic CT3 is on the following 2 pages in print and simbraille.

Introduction Problem Set A

In problem set A, you will answer 5 multiple choice and one open ended question about data on sheet CT3. The cane toad's presence in Australia puts native species at risk. A predator that eats a cane toad will be poisoned. The freshwater crocodile is a native Australian species. It lives in river pools and is not typically aggressive. Its silver skin makes it a favorite for tourists to watch. The freshwater crocodile's typical diet includes fish, frogs and other river creatures. The graph shows the estimated number of freshwater crocodiles in a national park and what happened when cane toads invaded the park.

Problem A1

Text: How many cane toads were in the park in 2003?
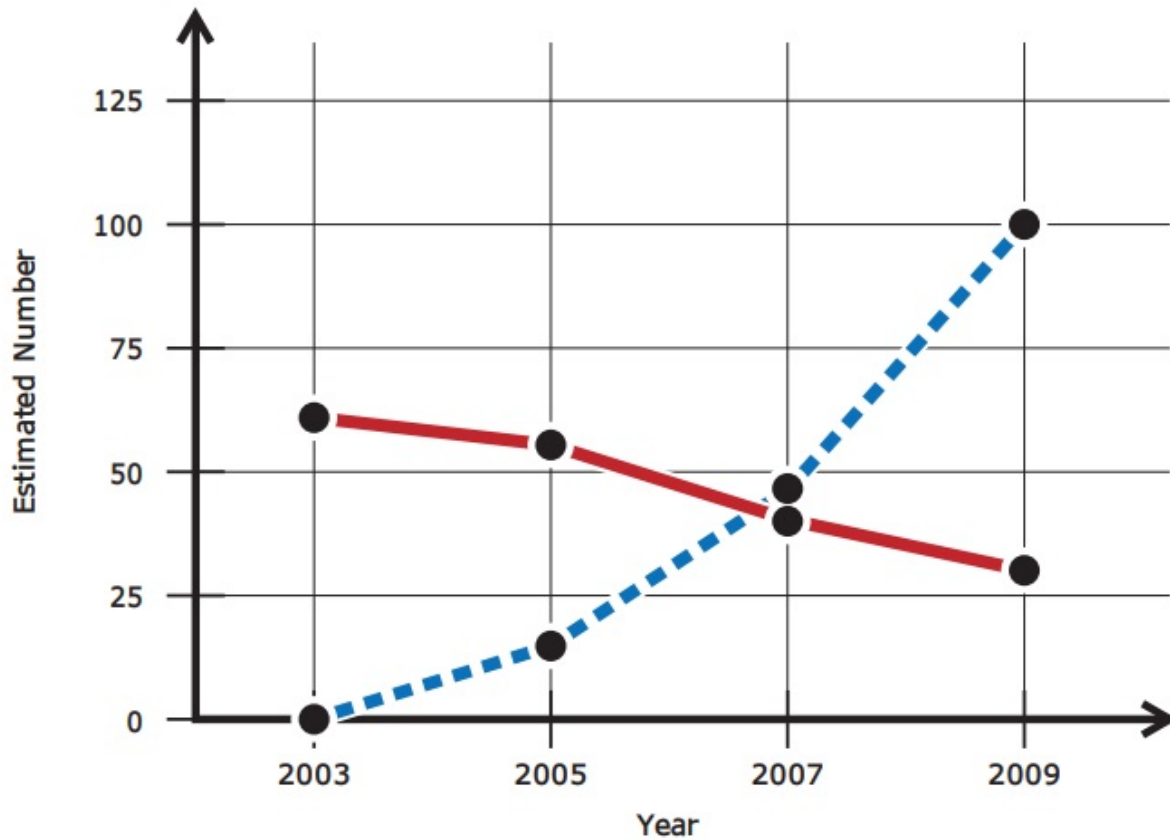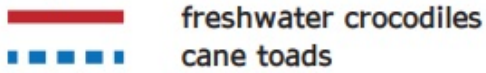
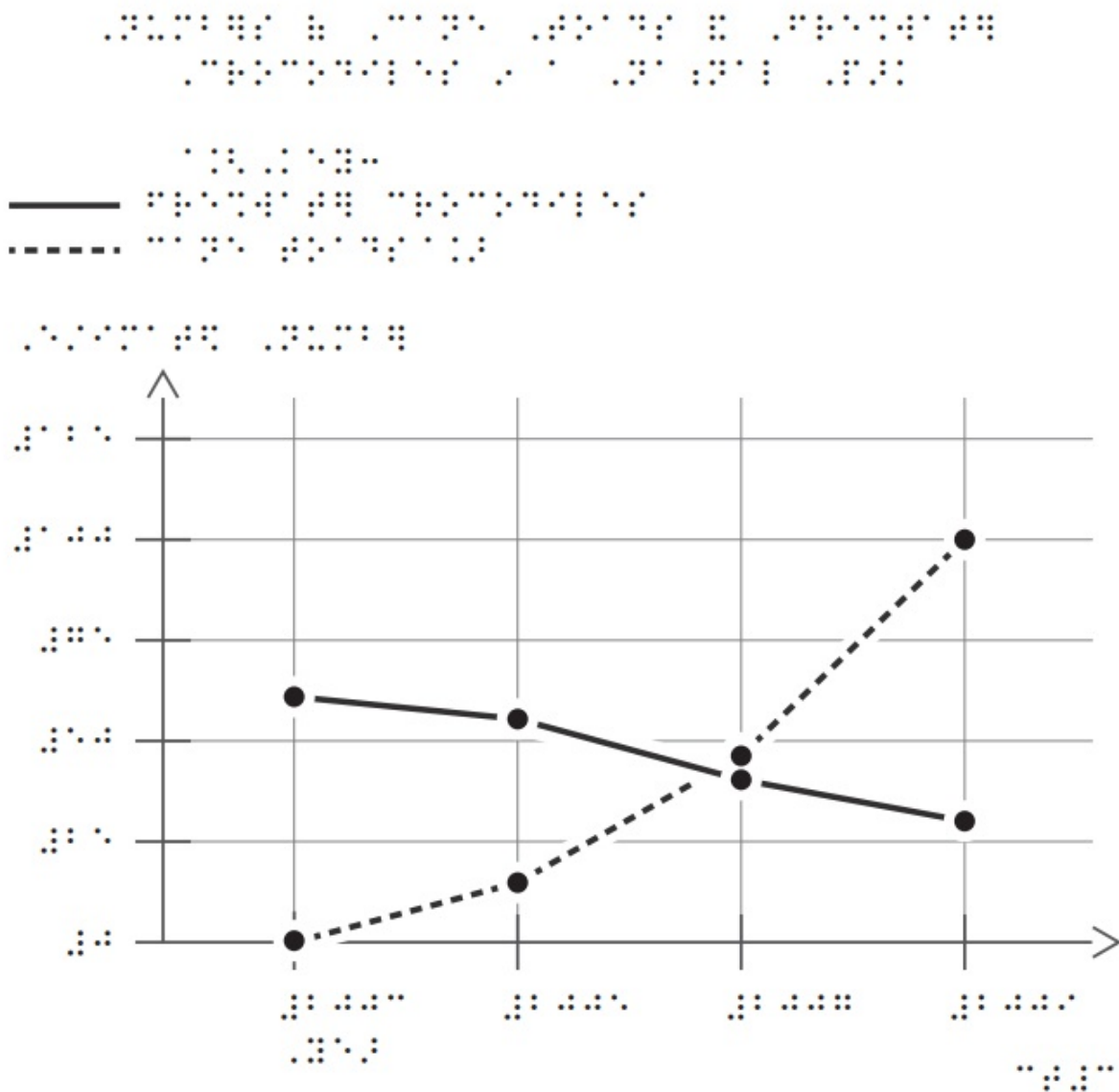A = 0 cane toads
B = 55 cane toads
C = 100 cane toads
Correct Answer: 0 cane toads

Numbers of Cane Toads and Freshwater Crocodiles in a National Park

CT3

⠠⠇⠥⠞⠑⠽ ⠼⠃ ⠨⠄⠄⠏⠄ ⠨⠀⠄⠞⠽ ⠼⠑ ⠨⠏⠄⠍⠞⠑⠇⠀⠛⠄
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Problem A2

Text: In what year were there 100 cane toads?
A = 2005
B = 2007
C = 2009
Correct Answer: 2009

Problem A3

Text: In which year were there the greatest number of cane toads?
A = 2003
B = 2007
C = 2009
Correct Answer: 2009

Problem A4

Text: This line graph shows that from 2003 to 2009:
A = The cane toad population increased, and the freshwater crocodile population decreased.
B = The freshwater crocodile population grew, and the number of cane toads fell.

C = The freshwater crocodile population decreased until 2007; then the number of freshwater crocodiles increased, and the number of cane toads fell.

Correct Answer: The cane toad population increased, and the freshwater crocodile population decreased.

Problem A5 - A

Text: What is the biggest difference in the number of freshwater crocodiles and cane toads in one year?

A = 50
B = 60
C = 70
Correct Answer: 70

Problem A5 - B

Text: From 2003 to 2009, what was the impact of the cane toad invasion on the freshwater crocodile population?

A = The freshwater crocodile population declined from 60 to 28.

B = There were 15 fewer freshwater crocodiles.
C = There were 40 more freshwater crocodiles.
Correct Answer: The freshwater crocodile population declined from 60 to 28.

Problem A5 - C

Text: In 2003, how many more freshwater crocodiles were in the park compared to cane toads?

A = 15
B = 45
C = 60
Correct Answer: 60

Problem A6 - A

If the average rate of decline of crocodiles continues, in what year might there not be any crocodiles left in the park? Record your answer.

Problem A6 - B

In 2007, there were the same number of cane toads and crocodiles in the park. Based on the graph data, would you expect the numbers of crocodiles and cane toads to be the same again? Why or why not? Record your answer.

Problem A6 - C

If nothing changes in the park, what do you think will happen to the cane toad numbers in 2011? Record your answer.

Graphic CT4 is on the following 2 pages in print and simbraille.

Introduction Problem Set B

In problem set B, you will answer 5 multiple choice and one open ended question about data on sheet CT4. Surprisingly, a baby freshwater crocodile is more likely to survive an encounter with a cane toad than an adult freshwater crocodile. The reason is that the adult's jaws can open wide enough to eat the whole cane toad and be poisoned. A baby freshwater crocodile can only bite or lick the cane toad, so it will only get enough poison to make it sick. To find out if baby freshwater crocodiles that get sick from cane toads learn to avoid the cane toads, scientists studied two equal groups of baby freshwater crocodiles. One group was offered crickets as a snack every day for a period of time. The other group was offered cricket-sized pieces of cane toad for the same time period.

Problem B1

Text: On Day 3, how many baby freshwater crocodiles in the cricket group ate their snack?
A = 10
B = 18
C = 22
Correct Answer: 18

Problem B2

Text: How many total freshwater crocodiles ate a snack on Day 1? Hint: Look at the title of the graph.

A = 10
B = 20
C = 40
Correct Answer: 40

Problem B3

Text: The best description of the values on the x-axis is:
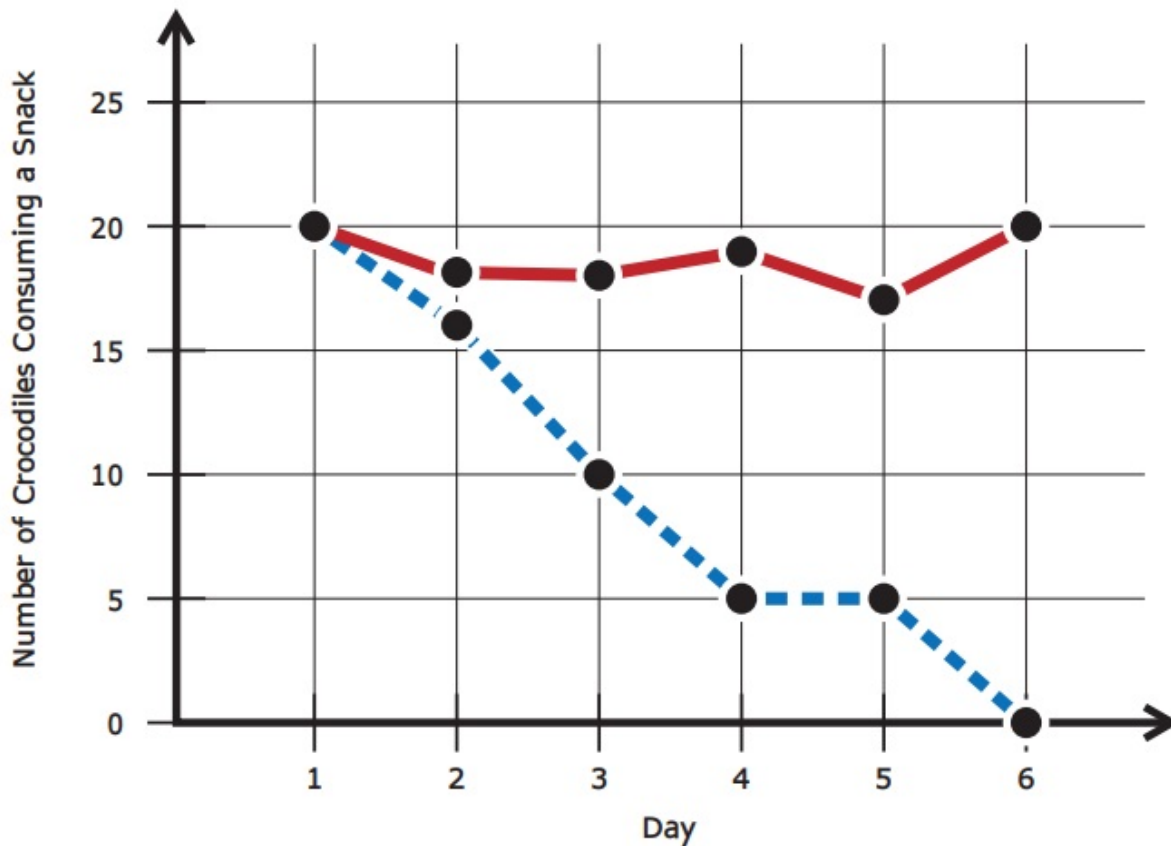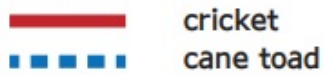A = number of baby freshwater crocodile offered each type of snack
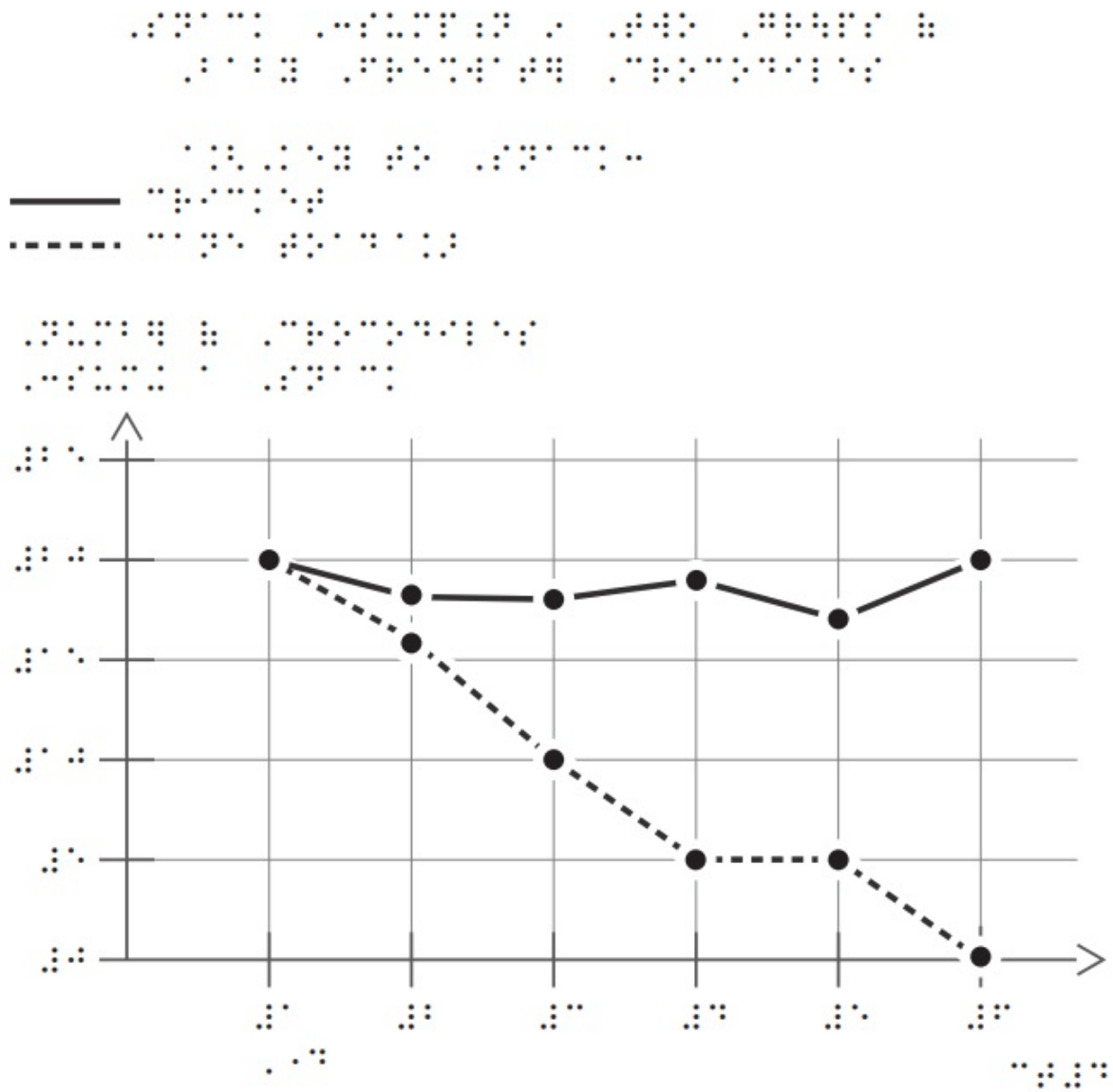B = number of baby freshwater crocodiles
C = days of the study
Correct Answer: days of the study

Snack Consumption in Two Groups of
Baby Freshwater Crocodiles

Snack:
— cricket
▪▪▪▪▪ cane toad

CT4

⠠⠋⠏⠗⠍⠄ ⠍⠎⠇⠗⠞⠌⠫ ⠲ ⠨⠙⠕ ⠨⠼⠃⠖⠙⠗ ⠃
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Problem B4

Text: On what day are baby freshwater crocodiles in the cane toad group just as likely to eat as those in the cricket group? Look for where the two lines intersect, that is share a data point.

A = Day 1

B = Day 3

C = Day 6

Correct Answer: Day 1

Problem B5 - A

Text: How many baby freshwater crocodiles in the cane toad group learned to avoid the cane toad snack by Day 2?

A = 4

B = 5

C = 6

Correct Answer: 4

Problem B5 - B

Text: On Day 5, how many baby freshwater crocodiles in the cane toad group skipped their snack?

A = 10

B = 15

C = 20

Correct Answer: 15

Problem B5 - C

Text: For baby freshwater crocodiles in the cricket group, what was the difference between the most and the least number that ate a snack?

A = 3

B = 2

C = 1

Correct Answer: 3

Problem B6 - A

If the study continued for another 3 days, what would each of the lines look like on the graph? Why do you think this? Record your answer.

Problem B6 - B

What would happen to the cricket snack group line if the researchers started to feed them cane toad snacks? Why do you think this? Record your answer.

Problem B6 - C

If a new group of baby crocodiles are offered cane toad snacks, what would you expect to happen? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use line graphs in your school work?

A = Super, I can work with almost any line graph.
B = Ok, but I need more practice.
C = Not good, line graphs are confusing.

What I Learned

What is one thing you learned about reading and interpreting line graphs? Record your answer.

Conclusion

The cane toad is a species that has invaded much of Australia. It has thrived in Australia because it does not have any natural predators. Australia's long straight roads make it easy for the cane toads to travel quickly to new areas, where they displace native species. In this unit you worked with line graphs. Line graphs are especially useful to show how things change over time or by distance. For example, you saw how the cane toad population and the size of its habitat has increased over time. The good news is that the cane toad invasion may be stopped because the cane toads need a moist climate to survive and the rest of Australia is too dry. Still, the story of the cane toad is a good warning not to bring non-native species into new areas. Tap the next button to see your Score Report for this unit.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Cane Toad: Line Graphs.

- Have the student construct a line graph with data either found on the Internet or in a book or data you or the student make up. In constructing the line graph, the student may wish to use the APH product **Graph Benders**, Catalog No.: 1-03400-00, **Tactile Graphic Line Slate**, Catalog No: 1-00100-00, and/or a variety of large print or embossed graph paper. APH also offers bold-line tactile graph sheets, which combine tactile and print. The APH **Graphic Aid for Mathematics**, Catalog No: 1-00460-01, is also available.
- Provide the student line graphs that have keys. Together examine the information in the key and how it relates to the line graph.
- Have the student compare and contrast a double bar and double line graph showing the same data sets.
- Have the student create a double line graph with information provided in a double bar graph.
- Have the student use a map to measure the distance between Hawaii and Australia. Discuss how long it might take to travel this distance by plane or boat. The student can use the Internet to look up the speeds of different types of boats and planes to do the calculation.
- Have the student use a map of Australia to measure the distances of major highways between cities that the cane toad has traveled along.
- Have the student research the cane toad to learn additional facts about this invasive species.
- Have the student locate videos of the cane toad to watch in order to see this species in its natural habitat.

Giant Clam

Vocabulary

Category: A division of people or things regarded as having shared characteristics.

Key: The key differentiates the categories on the circle graph through color, texture, or letter combinations. Another term for "key" is "legend."

Lead line: A lead line shows where a label would go when the label for a section or wedge cannot fit inside the section or wedge.

Percent: Percent means parts per hundred, measured or counted based on the whole divided into one hundred parts. For example, 1/100 = 1%; 50/100 = 50%.

Pie chart: The term pie chart is often used interchangeably with circle graph.

Section or Wedge: The term section or wedge refers to the pieces making up the circle graph.

Meet the Giant Clam

The giant clam is an endangered species found on the coral reefs around the island continent of Australia and throughout the southern Pacific Ocean. A giant clam can grow to be 5 feet long and weigh 450 pounds. When a giant clam is about 6 months old it attaches itself to a spot on the reef and stays there for the rest of its life. It feeds on algae in the ocean water. A flap of skin called the mantle can usually be seen between the two halves of the giant clam's shell. The mantle can be blue or green depending on the color of the algae in the water. The shell pieces are held together by a muscle. This muscle is considered very good to eat. Tap the next button to continue.

Get Ready for Some Questions

Get sheet GC1 out from your notebook. First, scan the entire circle graph to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use Sheet GC1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the circle graph on sheet GC1 tap the next button.
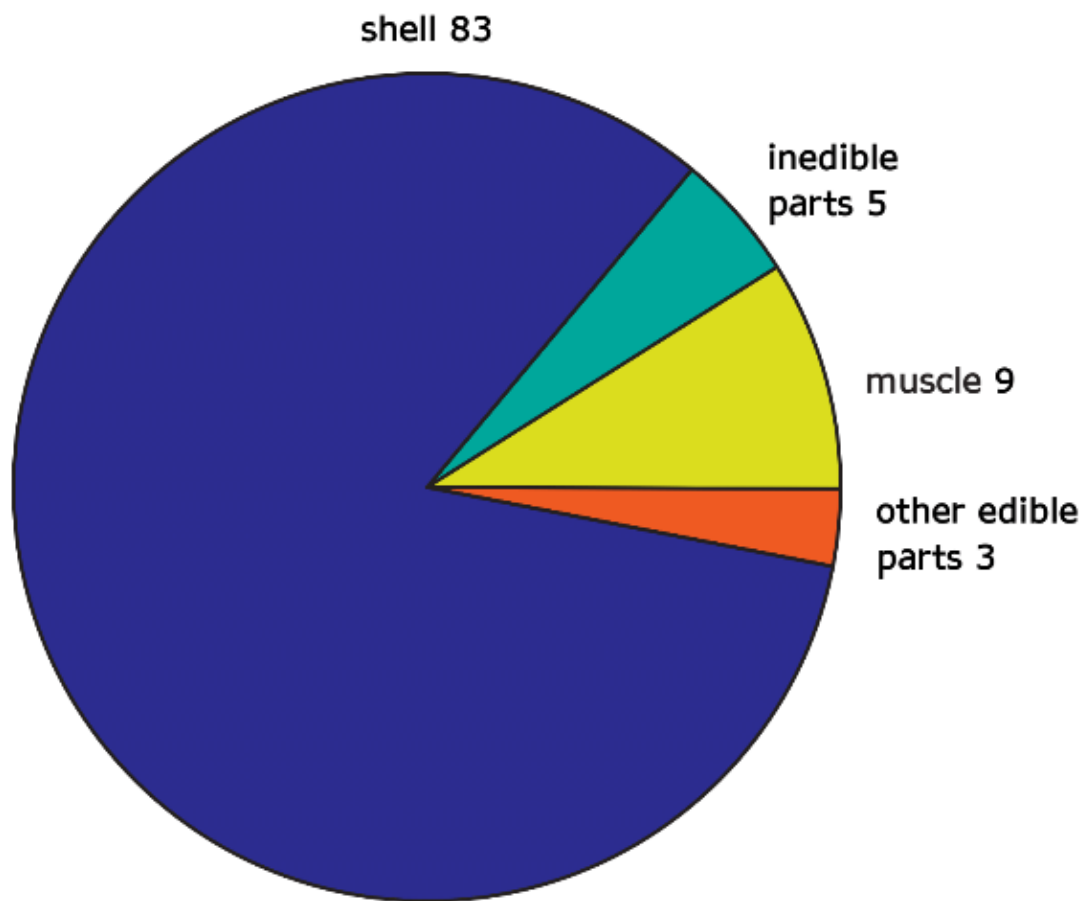
Getting Started 1

Describe this circle graph and tell what each part is. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.
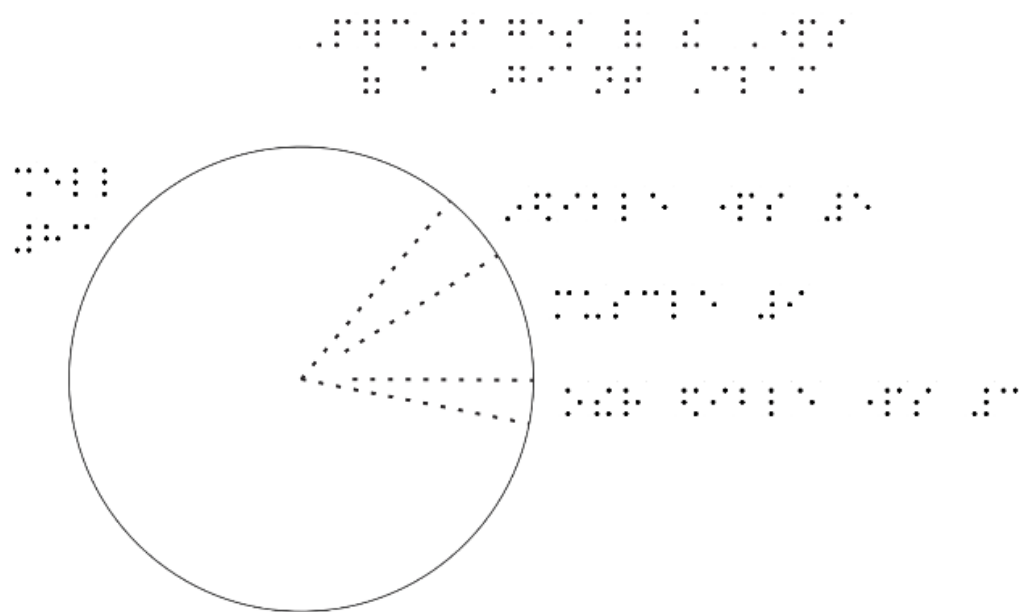
Getting Started 2

What is one thing you know about the giant clam from this circle graph? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Percentages of the Parts of a Giant Clam

shell 83

inedible parts 5

muscle 9

other edible parts 3

GC1

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⠠⠕⠝⠑ ⠞⠓⠊⠗⠙ ⠋⠕⠗⠞⠓

Graphic GC2 is on the following 2 pages in print and simbraille.

Get Ready for the Warm Up

You are going to use sheets GC1 and GC2 to build your skills with circle graphs. Get both sheets out of your notebook. Be sure to check your answer to each question about circle graphs. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about giant clams comes from research done by scientists. In some cultures, people believe that eating the muscle of giant clams will give someone extra-special romantic powers! Giant clams are now an endangered species in the wild because people harvest them to eat. So many people want to eat giant clams that there are now giant clam farms in the ocean. Farmers raise the giant clams to sell. Giant clams are different sizes depending on where they are in the life cycle. A hatchling can be as little as 1 inch while a fully grown adult can be more than 4 feet long. A diver spending time on a coral reef will see many clams each at different stages of development. Tap the next button to continue.

Warm Up 1

A circle graph is also called a pie chart. Some circle graphs have a title, and some do not. The title is usually at the top of the circle graph and it gives information about the data in the graph. Look at the top of sheet GC1 and GC2. What statement describes the titles on these circle graphs?

A = Neither circle graph has a title.

B = The circle graph on sheet GC1 provides information about the sizes of clams on a coral reef.

C = The circle graph on sheet GC2 provides information about the sizes of clams on a coral reef.

Correct Answer: The circle graph on sheet GC2 provides information about the sizes of clams on a coral reef.

Warm Up 2

Circle graphs are made up of pieces that are called sections or wedges. When you are exploring a circle graph, start on one wedge and hold your finger there so you will know where you started. Use a finger on your other hand to count the sections. On sheet GC1 how many sections are shown on the circle graph?
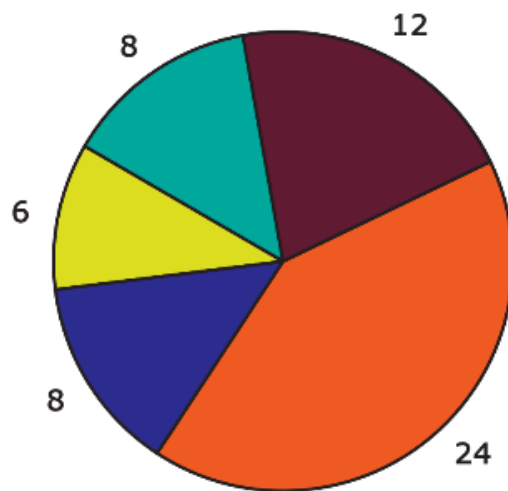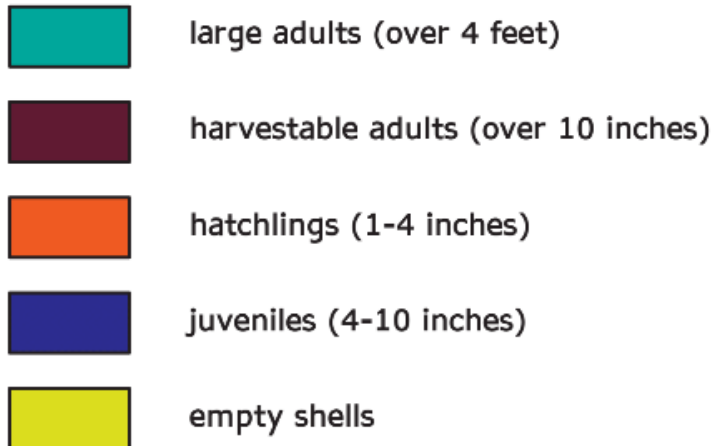
A = 4

B = 5

C = 6

Correct Answer: 4

The Number of Different Sizes of Giant Clams
Observed on a Coral Reef (1 square mile)

Key:

large adults (over 4 feet)

harvestable adults (over 10 inches)

hatchlings (1-4 inches)

juveniles (4-10 inches)

empty shells

GC2

Warm Up 3

Some circle graphs have a key that lists the labels of the sections. The key usually goes in the order of the sections on the circle graph. On sheet GC2 what is the size of the clams listed for the third item in the key?

A = over 10 inches

B = over 4 feet

C = 1 to 4 inches

Correct Answer: 1 to 4 inches

Warm Up 4

Each section of a circle graph has a value. Values can be inside the sections, next to the sections, or in the key. On sheet GC2 how many giant clams are there that are 4-10 inches long?

A = 6 giant clams

B = 8 giant clams

C = 15 giant clams

Correct Answer: 8 giant clams

Warm Up 5

On sheet GC1 the total percentage of the sections add up to 100 percent. Of the three sections that are not shell, what do you know?
A = The inedible part is the largest percentage.
B = The muscle is the smallest percentage.
C = Other edible parts is the smallest percentage.
Correct Answer: Other edible parts is the smallest percentage.

Warm Up 6

On sheet GC2, how many giant clams are over 4 feet long?
A = 8 giant clams

B = 12 giant clams

C = 24 giant clams

Correct Answer: 8 giant clams

Warm Up 7

On sheet GC2, which 2 groups have the same number of giant clams?

A = large adults and hatchlings

B = hatchlings and juveniles

C = large adults and juveniles

Correct Answer: C = large adults and juveniles

Warm Up 8

On sheet GC1 the percentage of the shell is:

A = the largest percentage of the giant clam

B = less than the other combined parts of the giant clam

C = the lowest percentage of the giant clam

Correct Answer: the largest percentage of the giant clam

Warm Up 9

On sheet GC1 what parts of the giant clam total 14 percent?

A = the other edible parts and the muscle

B = the other edible parts and the inedible parts

C = the muscle and inedible parts

Correct Answer: the muscle and inedible parts

Warm Up 10

On sheet GC2 what is the total for empty shells, juveniles and large adults?

A = 22 giant clams

B = 24 giant clams

C = 26 giant clams

Correct Answer: 22 giant clams

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried some circle graphs, how well do you understand this topic?

A = Very well, I know this material already.

B = Pretty well; I've worked on circle graphs, but I could use some practice.

C = Not very well; I need more practice.

Graphic GC3 is on the following 2 pages in print and simbraille.

Introduction Problem Set A

In problem set A you will answer 5 multiple choice and one open ended question about data on sheet GC3. The giant clam is now a protected species; meaning, that it is illegal to take one away from its home on a coral reef. However, there is a big demand for clam meat, so people are starting to try to raise giant clams in ocean farms. Clam farmers put hundreds of tiny giant clams in baskets tied to the ocean floor and waited for them to grow. Then, some farmers tried a new method. They cleaned algae off the baskets every 3 months. They also took out half the giant clams each year to give the rest more room.

Problem A1

What are the giant clam size categories shown in the two circle graphs?

A = 6, 12, and 24 inches
B = 15, 30, and 45 inches
C = 5, 10, and 15 inches
Correct Answer: 5, 10 and 15 inches

Problem A2

The two circle graphs show the results for a 3-year period in which two methods of raising giant clams were used. What percentage of giant clams raised by Method 1 were still only 5 inches long after 3 years?

A = 5 percent
B = 20 percent
C = 60 percent
Correct Answer: 20 percent

Problem A3

After 3 years for giant clams raised in Method 2, what percentage of giant clams were 15 inches long?

A = 20 percent
B = 60 percent
C = 75 percent
Correct Answer: 75 percent

Problem A4

Look at the two circle graphs. What is true about the two clam farming methods used?

A = Giant clams grow at the same rate under either method.
B = Giant clams grow faster under Method 1.

C = Giant clams grow faster under Method 2.

Correct Answer: Giant clams grow faster under Method 2

Percentages of Size Categories of 3-Year-Old Giant Clams Grown Under Two Methods

Method 1

60 percent
10 inches

20 percent
15 inches

20 percent
5 inches

Method 2

75 percent
15 inches

5 percent
5 inches

20 percent
10 inches

GC3

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Problem A5 - A

Giant clams must be at least 15 inches long to be harvested and sold as food. What is the difference in percentage between Method 1 and Method 2 for the giant clams that can not be harvested?

A = 5 percent

B = 40 percent
C = 55 percent

Correct Answer: 55 percent

Problem A5 - B

For Methods 1 and 2, look at the giant clams that are 15 inches long and are ready to harvest. What is the difference in percentage between giant clams ready for harvest in the two groups?

A = 35 percent
B = 45 percent
C = 55 percent

Correct Answer: 55 percent

Problem A5 - C

To sell giant clams for food they must be 15 inches or longer. For giant clams raised in Method 1, what percentage of giant clams are not yet ready to be sold for food?

A = 25 percent
B = 40 percent
C = 80 percent

Correct Answer: 80 percent

Problem A6 - A

Ocean farmers who use Method 2 have more giant clams ready to harvest after 3 years. But they have to take care of the clams by cleaning the cages and removing some of them every 3 months. Do you think that Method 2 is worth the extra effort? Why or why not? Record your answer.

Problem A6 - B

Comparing the circle graphs tells you that Method 2 produces larger clams in 3 years. Remember that Method 2 involves cleaning the cages and removing some clams from the cages every 3 months. Why do you think that removing clams and cleaning the cages might help produce larger giant clams? Record your answer.

Problem A6 - C

A nutrition problem on a farm using Method 2 occurred, affecting the rate of growth of the giant clams. How do you think this will change the percentages in the circle graph? Record your answer.

Graphic GC4 is on the following 2 pages in print and simbraille.

Introduction Problem Set B

In problem set B you will answer 5 multiple choice and one open ended question about data on sheet GC4. In addition to being harvested as a food source, some giant clams are also used for scientific research. For example, scientists might want to include giant clams in research on how ocean pollution affects the coral reef ecosystem. Giant clams are now sought-after for the aquarium trade. Museums, restaurants, shops, and private collectors often include a colorful giant clam on the bottom of a large aquarium, as if it were a real coral reef in the ocean.

Problem B1

What percentage of the giant clams are raised on farms for food? Be sure to carefully read all the labels on the circle graph.

A = 17 percent
B = 23 percent
C = 38 percent

Correct Answer: 23 percent

Percentage of Giant Clam Market by Source and Purpose

Source:
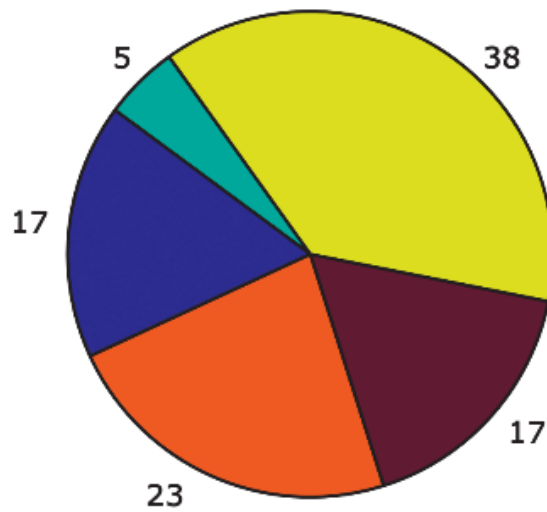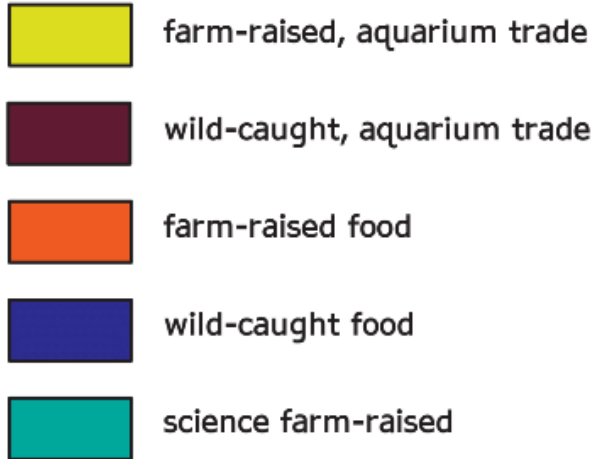
- farm-raised, aquarium trade
- wild-caught, aquarium trade
- farm-raised food
- wild-caught food
- science farm-raised

GC4

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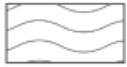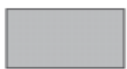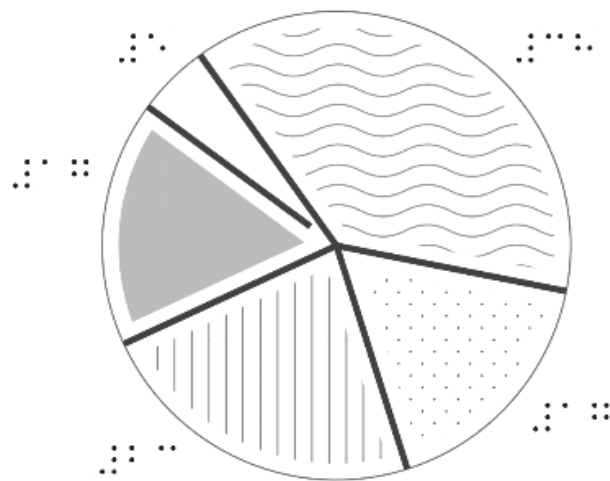
Problem B2

What percentage of the giant clams are raised on farms for use in science?

A = 5 percent
B = 17 percent
C = 23 percent

Correct Answer: 5 percent

Problem B3

What is the largest category represented in the circle graph?

A = Giant clams raised on farms for the aquarium trade.
B = Giant clams taken from the wild for food.

C = Giant clams taken from the wild for the aquarium trade.

Correct Answer: Giant clams raised on farms for the aquarium trade.

Problem B4

What can you conclude about the giant clam trade from the circle graph?

A = The smallest market is for food.
B = The largest market is for science research.
C = The largest market is for aquarium use.

Correct Answer: The largest market is for aquarium use.

Problem B5 - A

How much bigger is the aquarium trade market compared to the food market?

A = 15 percent
B = 25 percent
C = 35 percent

Correct Answer: 15 percent

Problem B5 - B

Giant clams are raised on farms for three reasons. What is the difference in the total percentage of clams raised for aquarium trade compared to the total percentage of clams raised for food and science research?

A = 10 percent
B = 17 percent
C = 24 percent
Correct Answer: 10 percent

Problem B5 - C

What is the difference in the percentage of giant clams farm raised for food and those caught in the wild for food?

A = 5 percent
B = 6 percent
C = 7 percent
Correct Answer: 6 percent

Problem B6 - A

There are new laws about who can sell giant clams raised for the aquarium trade. Now there are fewer wild-caught giant clams available for sale but people still want these clams for their aquariums. Describe what the circle graph would now look like? Record your answer.

Problem B6 - B

Fewer people want to eat clams for food. How will changing the use for the clams change the way the graph looks? Record your answer.

Problem B6 - C

Scientists are given permission to use wild-caught giant clams for science. How will changing the use for the wild-caught clams change the way the graph looks? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use circle graphs in your school work?
A = Super, I can work with almost any circle graph.
B = Ok, but I need more practice.

C = Not good, circle graphs are confusing.

What I Learned

What is one thing you learned about reading and interpreting circle graphs? Record your answer.

Conclusion

The giant clam used to be found throughout the coral reefs in the southern Pacific Ocean. Although it is disappearing from the wild, the species may survive because people are raising giant clams on ocean farms. In this unit, you used circle graphs to learn about the giant clam's value as food and for the aquarium trade. Circle graphs can be a useful way to compare sizes and amounts. However, some people say that if a circle graph has more than six segments, it gets too difficult to tell them apart and there may not be enough room for the labels. Still, if the goal is to compare a small number of categories, circle graphs can do the job! Tap the next button to see your Score Report for this unit.

Follow-Up

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Giant Clam: Circle Graphs.

- Have the student construct a circle graph with data either found on the Internet or in a book or data you or the student make up. In constructing the circle graph, the student might wish to use the APH **Draftsman Tactile Drawing Board and stylus**, Catalog No: 1-08857-00, the **APH Braille-Large Print Protractor**, Catalog No: 1-04115-00, and a **Fiskars compass**, or they might prefer using a **Sewell Raised Line Drawing Board**, braille paper, pen, the APH **Braille-Large Print Protractor**, Catalog No: 1-04115-00, and the APH **Tactile Compass for Math & Art**, Catalog No: 1-08834-00. The following website features videos of such constructions: https://www.tsbvi.edu/videos-webinars/mathematics.
- Have the student examine circle graphs that have keys observing the relationship between the information in the key and the circle graph.
- Have the student poll their peers about a subject of interest. Based on the results, ask the student to calculate percentages and create a circle graph to represent the findings.
- Have the student research the giant clam to learn additional facts about this invasive species.
- Have the student research the impact of pollution on coral reefs.
- Have the student locate countries which have coral reefs off their coasts on a map of the southern hemisphere.
- Have the student develop a pamphlet or presentation that highlights the importance of protecting coral reefs in our oceans.
- Have the student locate videos of the giant clam to watch in order to see this species in its natural habitat.
- Have the student locate Australia on a map or globe. The student can calculate the travel distance from the United States to Australia.

Platypus

Vocabulary

Compare and Contrast: When comparing and contrasting items, the reader looks for the similarities and differences among the items. In the set of animals: cat, dog, and horse, they all have four legs, but the dog and cat are animals that live inside and outside houses, whereas horses only live outside of houses.

Element: The term element refers to an item in a set. On a Venn diagram, elements that have something in common are shown in a circle.

Intersection or Overlap: Intersection or overlap occurs when something fits into more than one group. For example, Set A contains animals that live in water such as whales, dolphins, and fish. Set B contains animals that live on land such as dogs, cats and horses. The set of ducks and the set of frogs fit inside the intersection or overlap of the other two sets because they spend time in both the water and on land.

Key: The key differentiates the categories on the Venn diagram through color, texture, or letter combinations. Another term for "key" is "legend."

Set: A set is a group of elements that often have something in common. For example, in the set of animals with four legs, elements are: cat, dog, and horse. You can also have a set of even numbers such as 2, 4, and 6.

Universal Set: The universal set is the set of all elements under consideration. On a Venn diagram, a rectangle may be drawn around all the circles to show they are part of the universal set. An upper-case U may be in the upper left corner of the rectangle to signify "universal."

Meet the Platypus

Many people consider the platypus to be the strangest creature that has ever lived! It is a mammal native to Australia. The platypus has fur, and feeds its young with milk, but it lays eggs instead of giving birth to babies. It spends most of its time in fresh water, living in rivers and ponds. It has a flat tail like a beaver. Instead of a mouth, it has a bill like a duck's. The platypus is also an unusual mammal because it is venomous, like a wasp or snake. Males have a stinger on their back legs. The venom will not kill a human, but people who have been stung say that it is extremely painful. The platypus has been a protected species for a long time. At this time, due to conservation efforts it is not technically endangered. Tap the next button to continue.

Graphic PL1 is on the following 2 pages in print and simbraille.

Get Ready for Some Questions

Get sheet PL1 out from your notebook. First, scan the entire Venn diagram to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use Sheet PL1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the Venn diagram on sheet PL1 tap the next button.

Getting Started 1

Describe the data in the Venn diagram. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the platypus from this Venn diagram? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Has Fur   Is Venomous

duck   cat   rattlesnake

platypus

alligator   bear   cane toad

PL1
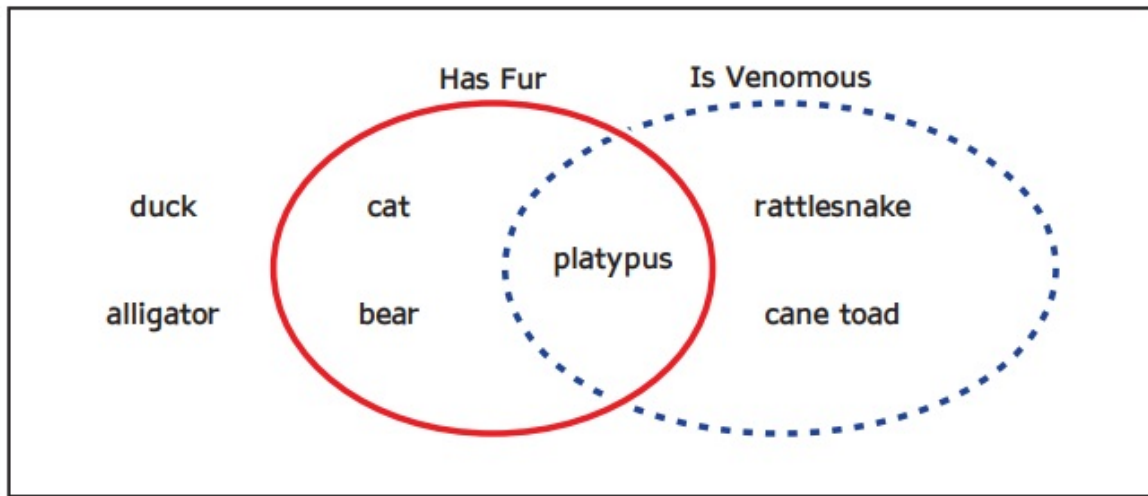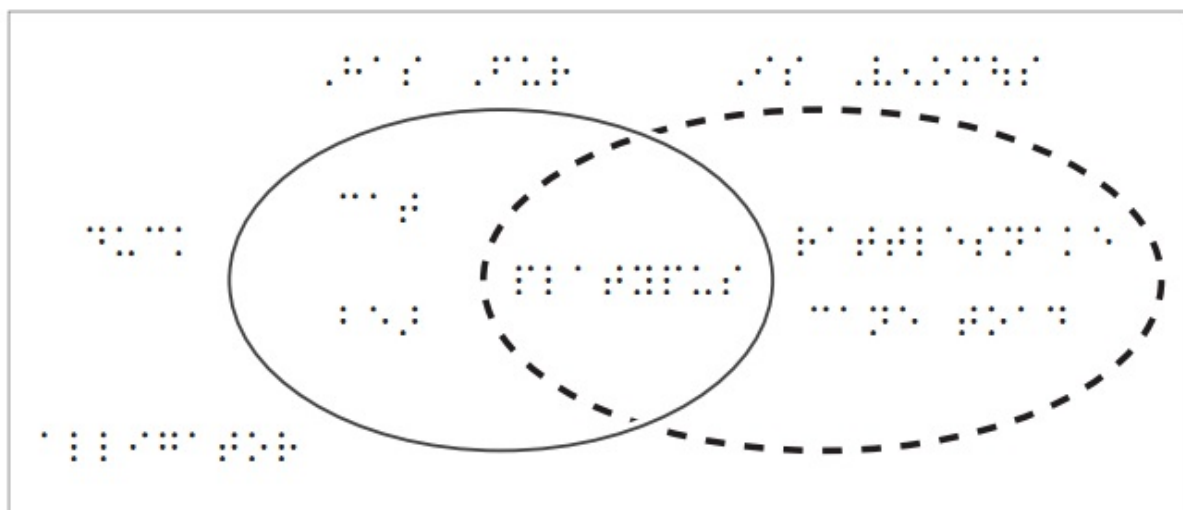
Graphic PL2 is on the following 2 pages in print and simbraille.

Get Ready for the Warm Up

You are going to use sheets PL1 and PL2 to build your skills with Venn diagrams. Get both sheets out of your notebook. Be sure to check your answer to each question about Venn diagrams. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about the platypus comes from research done by scientists. The island continent of Australia has many unusual species, including several rare mammals. Mammals are animals that have hair or fur, are warm-blooded, and feed their young milk produced in the mother's body. Most mammal species give birth to live babies that grow outside the mother's body. But there are some mammal species that give birth to very tiny babies that then crawl into a pouch in the mother's body to finish growing. Mammals that have a pouch are marsupials. The platypus is a mammal, but it is very unusual because it lays eggs that hatch, like a bird does. Tap the next button to continue.

Warm Up 1

Some Venn diagrams have a title, and some do not. As you know, titles are at the top of diagrams. Look for titles on sheets PL1 and PL2. Which statement is true about the titles on these Venn diagrams?

A = Neither diagram has a title.
B = The title of sheet PL1 is Characteristics of Animals in Australia.
C = The title of sheet PL2 is Characteristics of Animals in Australia.

Correct Answer: The title of sheet PL2 is Characteristics of Animals in Australia.

Warm Up 2

When you look at Venn diagrams it is important to find each circle or ellipse and to see how it is positioned. Each circle or ellipse is called a set. Each may have a different color or texture. Use your eyes and/or hands to explore a Venn diagram so you understand how many sets are on it and what is in each set. On sheet PL2 how many sets are shown?
A = 3
B = 4
C = 5
Correct Answer: 4

Characteristics of Animals in Australia

Key:

━━━━━ Develops in Pouch

╌ ╌ ╌ Live Babies

Has Fur

Lays Eggs

bird

platypus

cat

dog

horse

cow

koala

Tasmanian devil

kangaroo

wombat
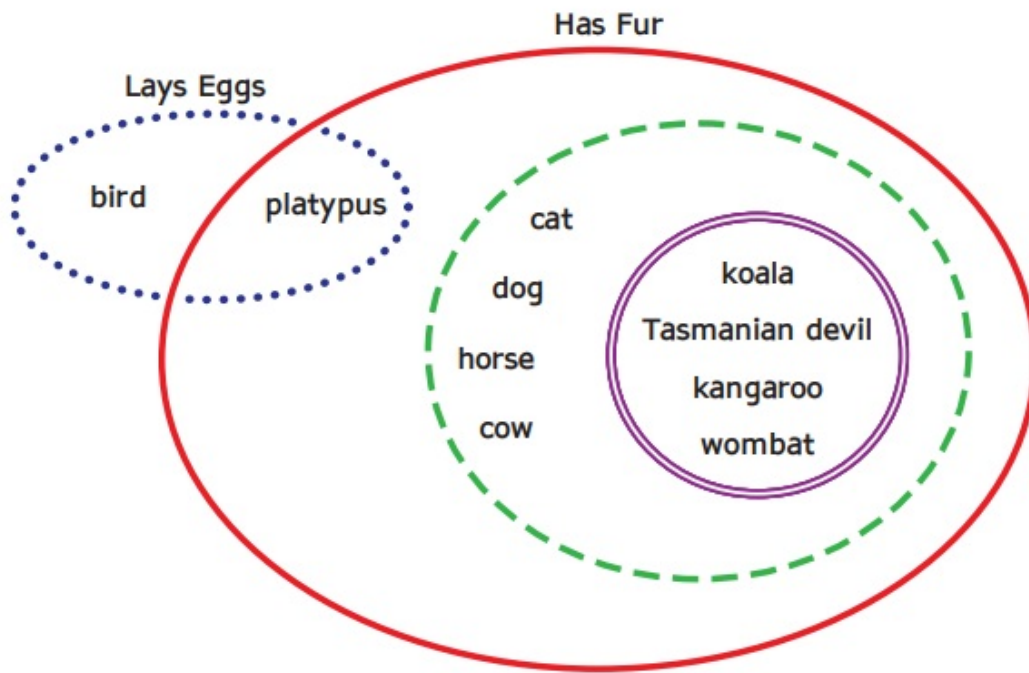
PL2
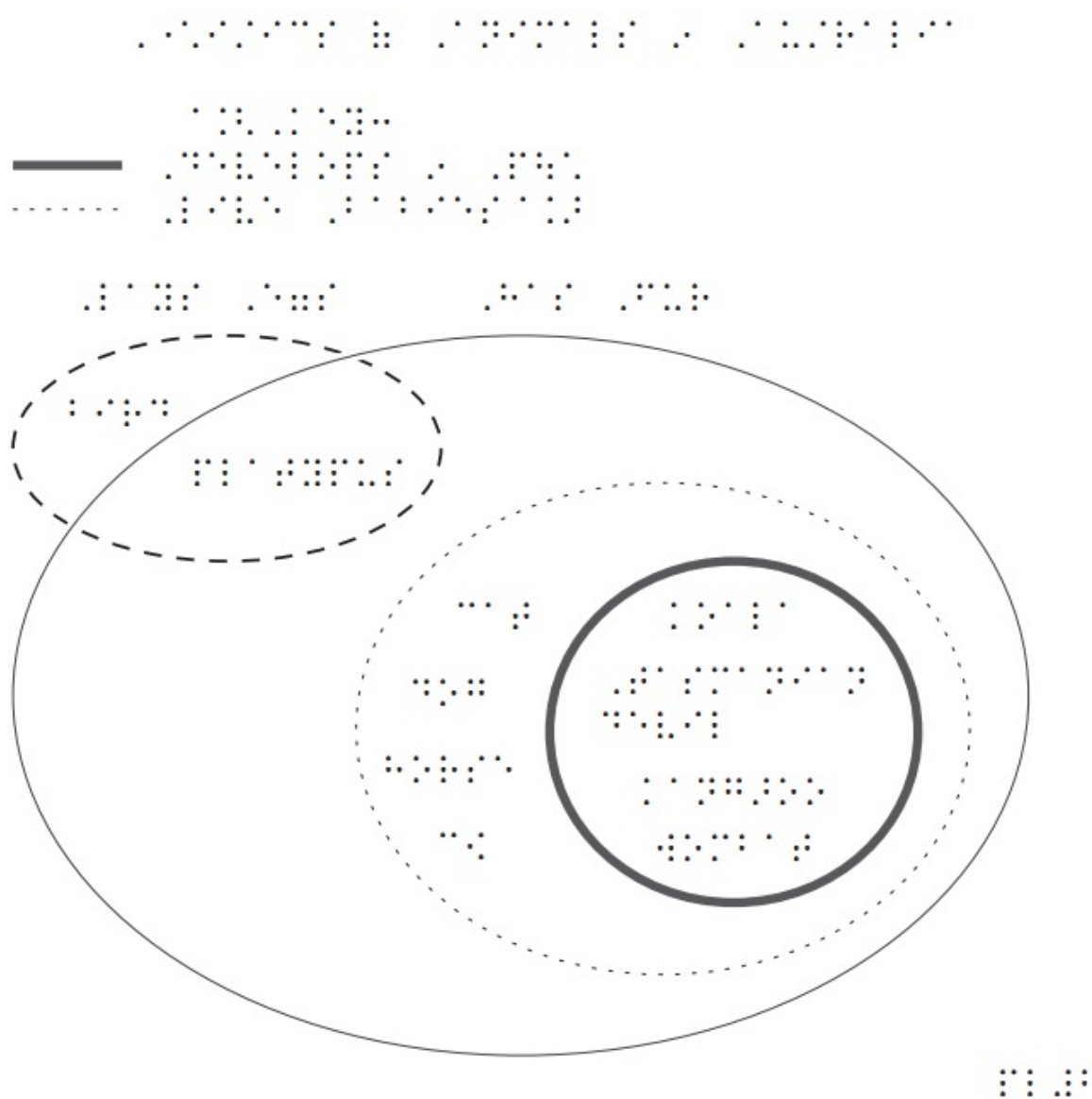
Warm Up 3

Venn diagrams show the relationship between sets that have elements. A set is a group of elements that often have something in common. Look at sheet PL1. Find the set labeled "Is Venomous". There are 3 elements in this set. What are they?

A = cat, bear, platypus

B = rattlesnake, cane toad, platypus

C = alligator, duck, platypus

Correct Answer: rattlesnake, cane toad, platypus

Warm Up 4

On sheet PL2 what animals are in the set labeled "Lays Eggs"?
A = bird
B = platypus
C = platypus and bird
Correct Answer: platypus and bird

Warm Up 5

Look at sheet PL2. After the title you'll see the key. The key is for the labels used for the sets in this Venn diagram. How is the set "Live Babies" shown?
A = abbreviation LB
B = solid line
C = dashed line
Correct Answer: dashed line

Warm Up 6

On sheet PL2 find the set "Live Babies". What set is inside of this set?
A = Lays Eggs
B = the universal set
C = Develops in Pouch
Correct Answer: develops in Pouch

Warm Up 7

Some Venn diagrams have areas of intersection or overlap. Intersection or overlap means an element fits in more than one set. Look at sheet PL1. Do you see how the platypus is in the overlap or intersection? This animal is venomous and has fur. Now, look at sheet PL2. What animal is in the overlap of the set "Has Fur" and "Lays Eggs"?
A = bird
B = platypus
C = Tasmanian devil
Correct Answer: platypus

Warm Up 8

Sheet PL2 has four sets. The set "Has Fur" has 2 sets that are completely inside of it. The set "Develops in Pouch" contains animals that:
A = have fur but do not lay eggs
B = have fur and have live babies
C = have fur and lay eggs
Correct Answer: have fur and have live babies

Warm Up 9

The term universal set means all the possible elements that can be part of the set under consideration. A rectangle drawn around all the circles in the Venn diagram represents the universal set. When an element doesn't fit in any of the sets represented by the circles or ellipses, it is written in the rectangle. Look at sheet PL1. What animals are not venomous and don't have fur?
A = cane toad and alligator
B = duck and rattlesnake
C = alligator and duck
Correct Answer: alligator and duck

Warm Up 10

On Sheet PL2 how many animals have live babies?
A = 4 animals
B = 8 animals
C = 9 animals
Correct Answer: 8 animals

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried some Venn diagrams, how well do you understand this topic?
A = Very well, I know this material already.

B = Pretty well; I've worked on these types of Venn diagrams before, but I could use some practice.

C = Not very well; I need more practice.

Graphic PL3 is on the following 2 pages in print and simbraille.

Introduction Problem Set A

In problem set A you will answer 5 multiple choice and one open ended question about data on sheet PL3. Take sheet PL3 out of your notebook. Zoos and conservation centers play an important role in helping endangered and unusual species. Scientists can study the animals and try to learn how to help them survive. School field trips give students the opportunity to see creatures that they would never see otherwise because the animals are too rare or live in places that people would not be able to visit. The Taronga Zoo is located near the capital of Sydney on the continent of Australia. There, school groups can see the platypus and the Tasmanian devil. They can also arrange to stay overnight on the zoo grounds in the "Roar and Snore Campground."

Problem A1

A group of 150 students visited the Taronga Zoo. The Venn diagram shows how many students visited each exhibit. How many students only visited the Platypus Exhibit?
A = 18
B = 24
C = 40
Correct Answer: 18

Problem A2

How many students only went to the Tasmanian Devil Exhibit?
A = 15
B = 24
C = 23
Correct Answer: 24

Number of Student Visitors

Platypus Exhibit   Tasmanian Devil Exhibit

18   40   24

15

24   26

?

Roar and Snore
Campground

PL3

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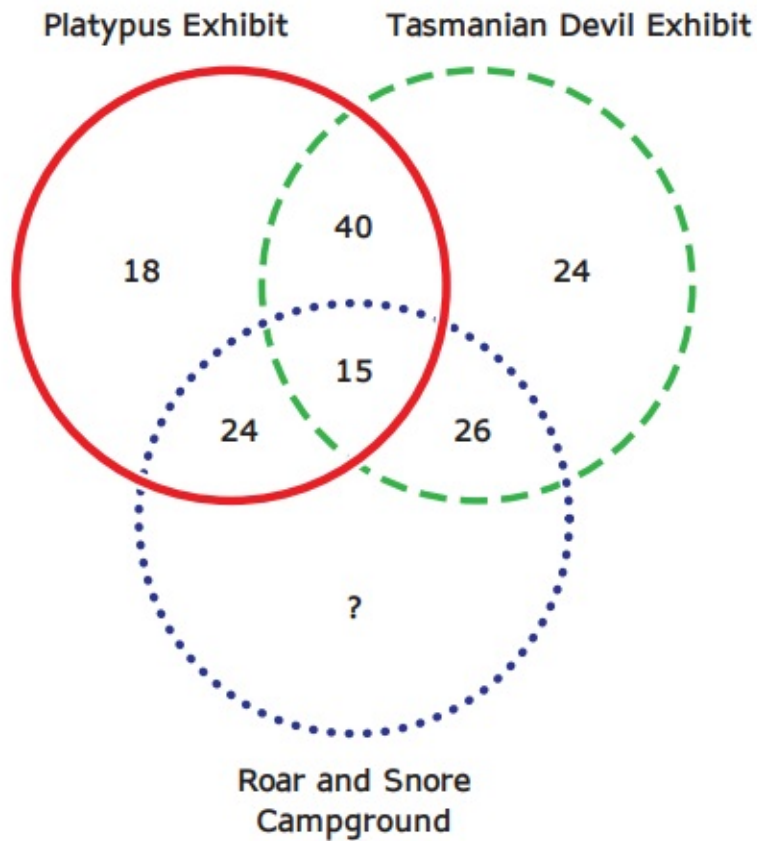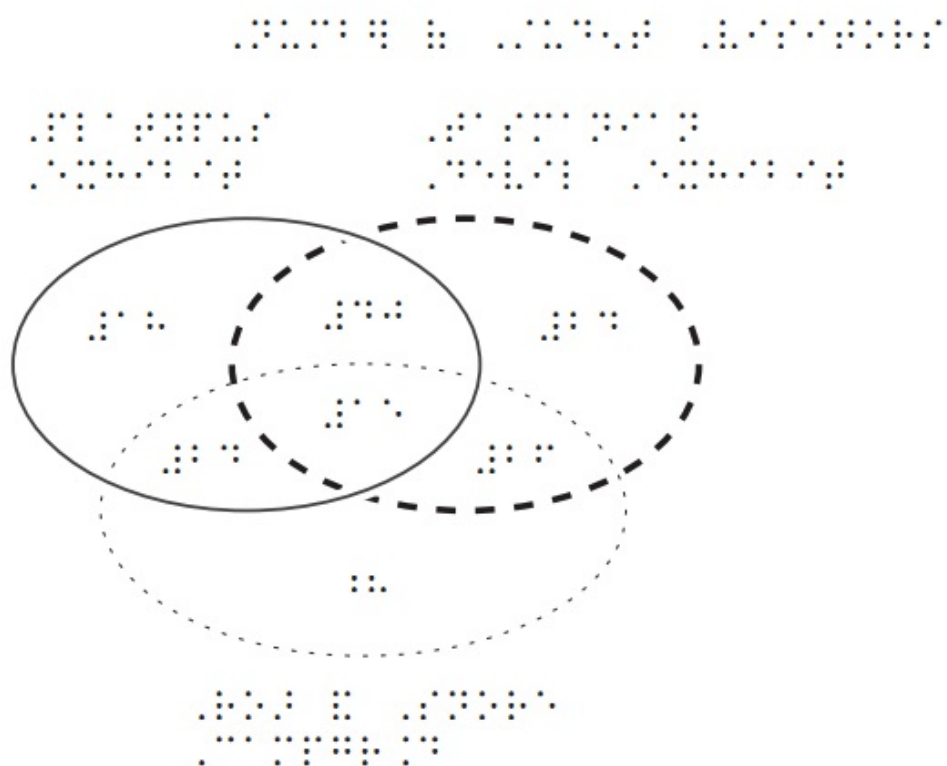
Problem A3

How many students only went to both the Platypus and Tasmanian Devil exhibits?
A = 24
B = 26
C = 40
Correct Answer: 40

Problem A4

How many of the students stayed overnight in the Roar and Snore Campground and also visited the Platypus Exhibit? Carefully look at both circles and where they overlap.
A = 15
B = 24
C = 39
Correct Answer: 39

Problem A5 - A

How many of the 150 students only stayed at the Roar and Snore Campground and did not visit any exhibits while at the zoo?
A = 3
B = 4
C = 15
Correct Answer: 3

Problem A5 - B

How many students did not visit the Roar and Snore Campground?
A = 82
B = 121
C = 147
Correct Answer: 82

Problem A5 - C

How many students in all visited the Platypus Exhibit?
A = 55
B = 69
C = 97
Correct Answer: 97

Problem A6 - A

The zoo charges an admissions fee for school groups to visit. It costs $10 per student. It costs an additional $20 per student per night to stay at the Roar and Snore

Campground. If the zoo wants to try to earn more money for its programs, what will be the best strategy for them to use? Should they increase the number of visitors to exhibits like the Platypus and the Tasmanian Devil, or get more visitors to stay overnight at the Roar and Snore Campground? Why do you think this will be the best strategy? Record your answer.

Problem A6 - B

Imagine that the zoo stops offering the Roar and Snore Campground option. How will the Venn diagram change? What will it look like? Record your answer.

Problem A6 - C

If a student has time to see only one exhibit, do you think she will choose the Platypus or the Tasmanian Devil? What information in the diagram makes you think that she will pick this exhibit? Record your answer.

Graphic PL4 is on the following 2 pages in print and simbraille.

Introduction Problem Set B

In problem set B you will answer 5 multiple choice and one open ended question about data on sheet PL4. Take sheet PL4 out of your notebook. Students in a class were given an assignment. They were to work in teams to research an Australian species and then do a presentation to the rest of the class about what they had learned. The teacher also asked them to organize the 12 species that had been selected into a Venn diagram that shows the similarities and differences between the animals. Continue to the problems to see the Venn diagram the students drew.

Key:

cr crocodile
kk kookaburra
pl platypus
sp funnel-web spider
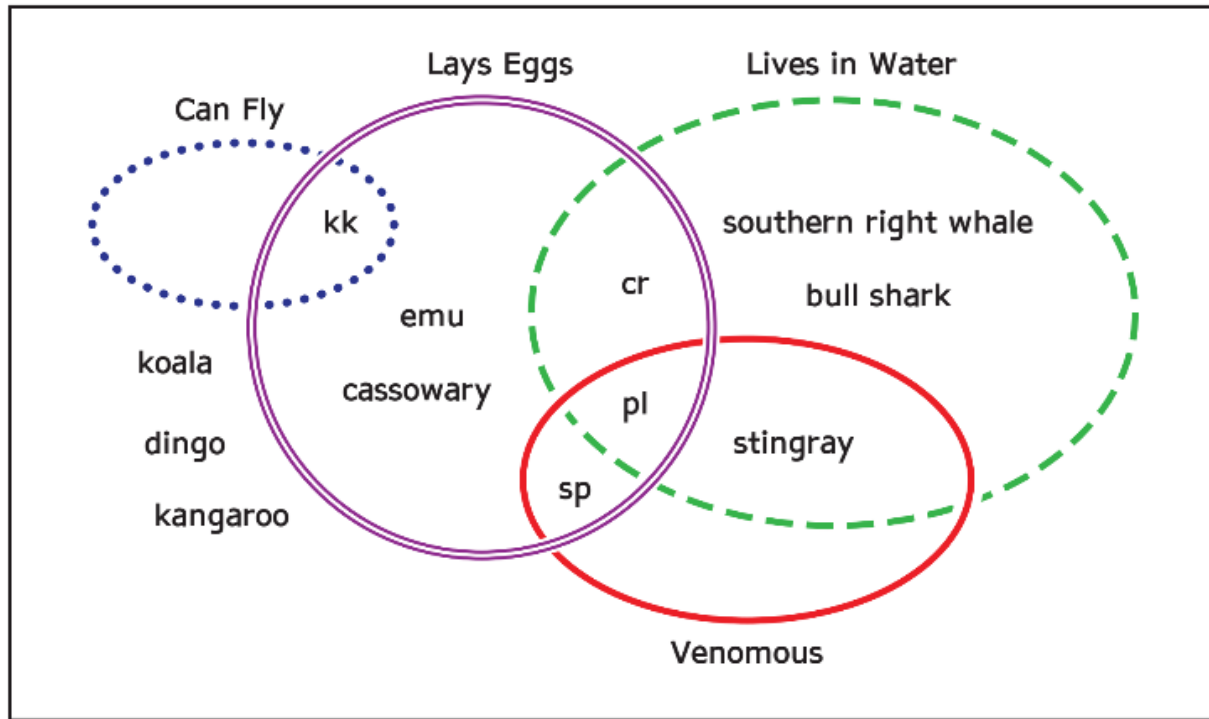
PL4

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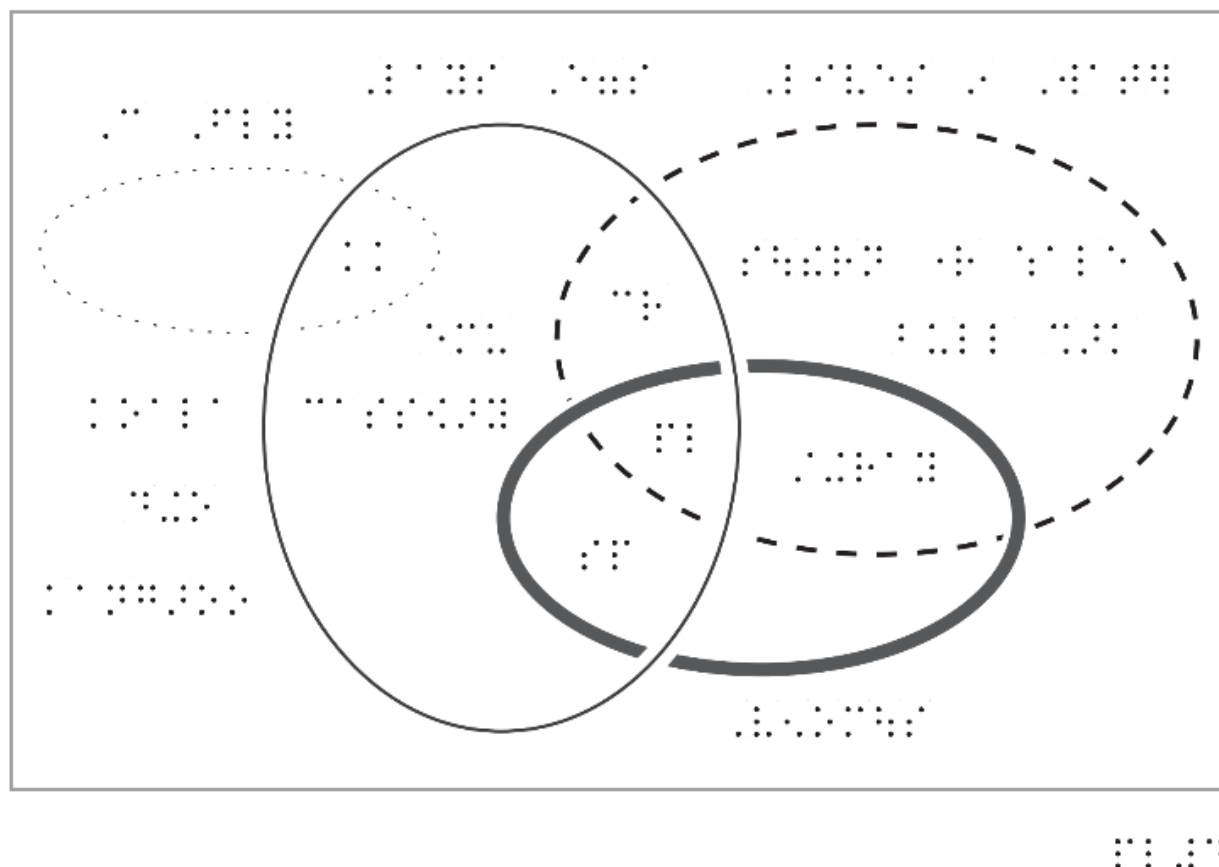
Problem B1

According to the Venn diagram, what animal is venomous, lays eggs, but does not live in water?

A = platypus

B = funnel-web spider

C = crocodile

Correct Answer: funnel-web spider

Problem B2

Which category includes the largest number of species?

A = Can Fly
B = Lays Eggs
C = Venomous
Correct Answer: Lays Eggs

Problem B3

What species are included in the circle labeled "Venomous"?
A = copperhead, death adder, and platypus
B = platypus, kookaburra, and cassowary
C = platypus, funnel-web spider, and stingray
Correct Answer: platypus, funnel-web spider, and stingray

Question B4

The Venn diagram shows that the kookaburra, emu, and cassowary all lay eggs. But the kookaburra is different. According to the Venn diagram, what does the kookaburra do that the emu and cassowary do not?
A = It lives in water.
B = It has a venomous sting.
C = It can fly.
Correct Answer: It can fly.

Problem B5 - A

What fraction of the species being studied by the class are venomous?
A = 1/3
B = 1/2
C = 1/4
Correct Answer: 1/4

Problem B5 - B

What species does lay eggs, is venomous, and lives in water?
A = crocodile
B = stingray
C = platypus
Correct Answer: platypus

Problem B5 - C

How many species chosen by the class do not fit in any of the categories: Can Fly, Lays Eggs, Lives in Water, or Venomous?
A = 4
B = 3
C = 2
Correct Answer: 3

Problem B6 - A

Remember that the species that lays eggs are most often picked by the class for their reports. If 6 more venomous species are added to the Venn diagram, how will the Venn diagram change? Record your answer.

Problem B6 - B

The class uses four categories to organize the species they chose by the features they have in common. If the category "Venomous" is taken out of the diagram, which species will be most similar to the platypus? How did you reach this conclusion? Record your answer.

Problem B6 - C

The class decides to add a circle to the Venn diagram named "Australian species" that includes all 12 species. Where will this circle go? Why will you put it there? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use Venn diagrams in your school work?"

A = Super, I can work with almost any Venn diagram.

B = Ok, but I need more practice.

C = Not good, Venn diagrams are confusing.

What I Learned

What is one thing you learned about reading and interpreting Venn diagrams? Record your answer.

Conclusion

In this unit you worked with Venn diagrams. This kind of graphic is useful for categorization. For example, the platypus has a lot in common with mammals like the otter. Both animals have fur and live in the water. But the platypus also has features that are very different from most mammals. Two hundred years ago at a museum a group of scientists in England first saw a platypus that had been stuffed and sent from Australia. They thought it was a fake. Venn diagrams can help you keep track of things that are similar in some ways and different in other ways. Tap the next button to see your Score Report for this unit.

Follow-Up

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Platypus: Venn Diagrams.

- Have the student construct a Venn diagram with data either found on the Internet or in a book or data you or the student make up. In constructing the Venn diagram, the student may wish to use the APH product **Textured Sorting Circles and Shapes,** Catalog Number: 1-08834-00.
- Have the student make his/her own Venn Diagrams. For students who are braille readers they can do this using the APH **Tactile Compass for Math & Art**, Catalog Number: 1-08894-00 to draw the circles on braille paper placed on a drawing board (Sewell Raised Line Drawing Board or just a clipboard with craft foam). Students can then use their braille writer to label the Venn diagram. Students who are print readers can use writing tools that provide them visual access. The following website features videos of creating a Venn diagram using these visual and tactile tools: https://www.tsbvi.edu/videos-webinars/mathematics.
- Have the student take data from a table and develop a Venn diagram of the data. Alternatively, have the student take a Venn diagram and place the data into a table. The student can use a spinner to tally information/preferences and then create a Venn diagram to represent it. Alternatively, the student can create a Venn diagram and then poll their peers to fill in the numbers.
- Have the student use data to create three representations of the data (e.g., circle graph, bar graph, Venn diagram). Discuss which representation he/she thinks is easiest to read and why. Discuss for what reasons one may want to use one type of representation over another.
- Have the student look at Venn diagrams laid out in formats that differ from the ones in this unit. Ask the student to compare and contrast the similarities between the Venn diagrams in this unit and the ones you provide.
- Have the student research the platypus to learn additional facts about this endangered species.
- Have the student locate videos of the platypus to watch in order to see this species in its natural habitat.
- Have the student locate Australia on a map or globe. The student can calculate the travel distance from the United States to Australia.

Dinosaur Ant

Vocabulary

Coordinate plane: A coordinate plane is formed when two number lines intersect at a right angle. A coordinate plane is sometimes referred to as a Cartesian graph or coordinate graph.

Gridline: Gridlines are a series of numbered horizontal and vertical lines that divide a coordinate plane into squares to form a grid.

Intersection: An example of an intersection is the point at which two lines cross.

Key: The key tells the meaning of symbols on the coordinate plane through color, texture, or abbreviations. Another term for "key" is "legend."

North arrow: A north arrow is used to show cardinal directions. The reader needs to understand where east, west, and south are located based on the direction the north arrow is pointing. Some coordinate planes use a compass rose that shows north, south, east, and west.

Ordered pair: The two numbers in an ordered pair represent an ordered point on the coordinate plane. The first number is the x-coordinate and the second number is the y-coordinate. The ordered pair is written (x, y).

Right angle: A right angle is an angle that measures 90°, for example, the angle formed at the intersection of two perpendicular lines.

Scale: The scale is the distance between units shown on the coordinate plane.

Symbol: A symbol stands for something else. For example, on a coordinate plane, a textured or colored circle can be used to represent a place.

Units: Units are tick marks (or extended gridlines) equally spaced on the x-axis or y-axis of the coordinate plane. Tick marks don't always have stated values but help in estimating distances.

X-axis: The x-axis is the horizontal number line of the coordinate plane.

X-coordinate: The x-coordinate is the first number in the ordered pair. It is the value on the x-axis. When plotting the x-coordinate you move left or right on the x-axis.

Y-axis: The y-axis is the vertical number line of the coordinate plane.

Y-coordinate: The y-coordinate is the second number in the ordered pair. It is the value on the y-axis. When plotting the y-coordinate you move up or down on the y-axis.

Meet the Dinosaur Ant

The dinosaur ant is an insect found on the southern coast of Australia. It is a much older species of ant than the ant species of today. It got its name because scientists think the species started in the time of the dinosaurs, millions of years before humans began to live on the Earth. The dinosaur ant is closely related to wasps. It has a stinger that is used to capture its prey, usually small insects. Dinosaur ants live in nests that extend about three feet underground. The biggest challenge for the dinosaur ant species is temperature. It prefers cooler weather than modern ants. It lives near the ocean where breezes from the water keep the temperature down, and it hunts at night out of the heat of the day. However, Australia's climate is gradually becoming warmer, possibly putting a species that has been around since the time of the dinosaurs at risk. Tap the next button to continue.

Graphic DA1 is on the following 2 pages in print and simbraille.

Get Ready for Some Questions

Get sheet DA1 out from your notebook. First, scan the entire coordinate plane to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use Sheet DA1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the coordinate plane on sheet DA1 tap the next button.

Getting Started 1

Describe the data in the coordinate plane. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the dinosaur ant from this coordinate plane? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Key Locations

Scale: Each unit represents 10 feet.

Key:

■ nest

● host tree

~ ocean
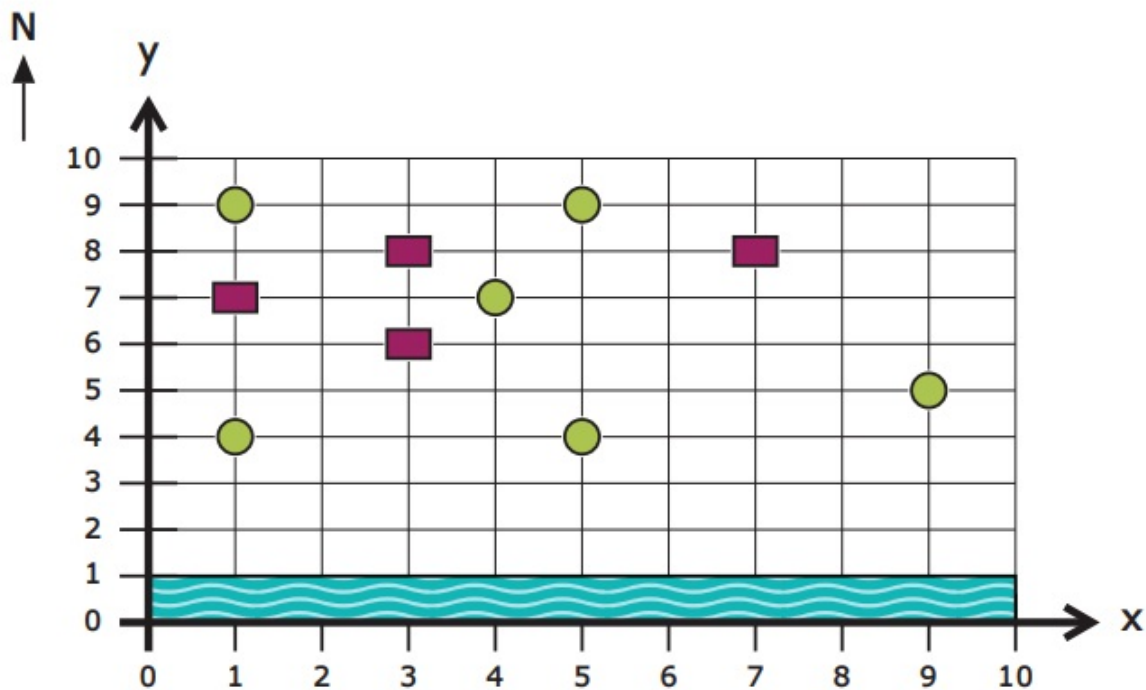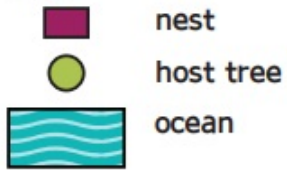
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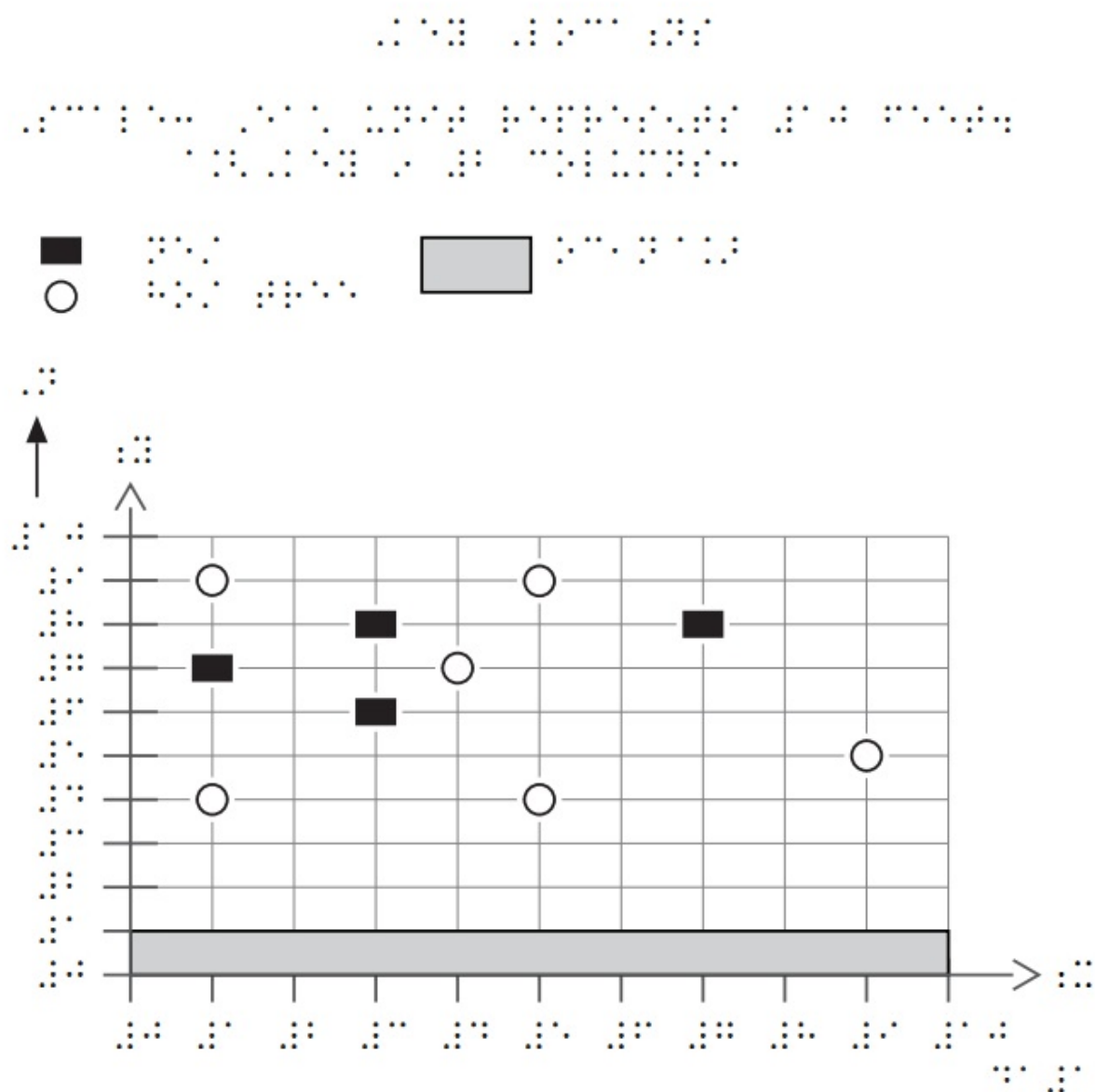
Graphic DA2 is on the following 2 pages in print and simbraille.

Get Ready for the Warm Up

You are going to use sheets DA1 and DA2 to build your skills with coordinate planes. Get both sheets out of your notebook. Be sure to check your answer to each question about coordinate planes. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about dinosaur ants comes from research done by scientists. There can be several dinosaur ant nests in the same area. In this case, the dinosaur ants in different nests will take turns hunting. If the dinosaur ants from one nest go out at sunset, dinosaur ants in other nearby nests will stay home that night. Scientists don't know how the dinosaur ants decide whose turn it is to hunt on a particular night. Tap the next button to continue.

Warm Up 1

A coordinate plane is formed when 2 number lines intersect at right angles. Another term for a coordinate plane is Cartesian graph. You might also hear the term coordinate graph. Look at sheet DA1. In which corner do the two number lines intersect?
A = top left
B = bottom left
C = bottom right
Correct Answer: bottom left

Warm Up 2

The bottom number line on a coordinate plane is the x-axis. Go across the x-axis on the coordinate plane on sheet DA2. Which statement is true about the x-axis?
A = values go from 0 to 10
B = values go from 0 to 8
C = values go from 0 to 12
Correct Answer: values go from 0 to 12

Warm Up 3

Look at the key on sheet DA2. It says that each unit equals 10 feet. So each time you move from one unit to the next, you're moving 10 feet. Go to the y-axis and find the value labeled 6. Move your finger up 3 units. How many feet have you moved?
A = 3 feet
B = 30 feet
C = 33 feet
Correct Answer: 30 feet

Nest Near a Host Tree

Scale: Each unit represents 10 feet.

Key:

——————— route of ant A

▪ ▪ ▪ ▪ ▪ route of ant B

⬤ nest

🟢 host tree

DA2

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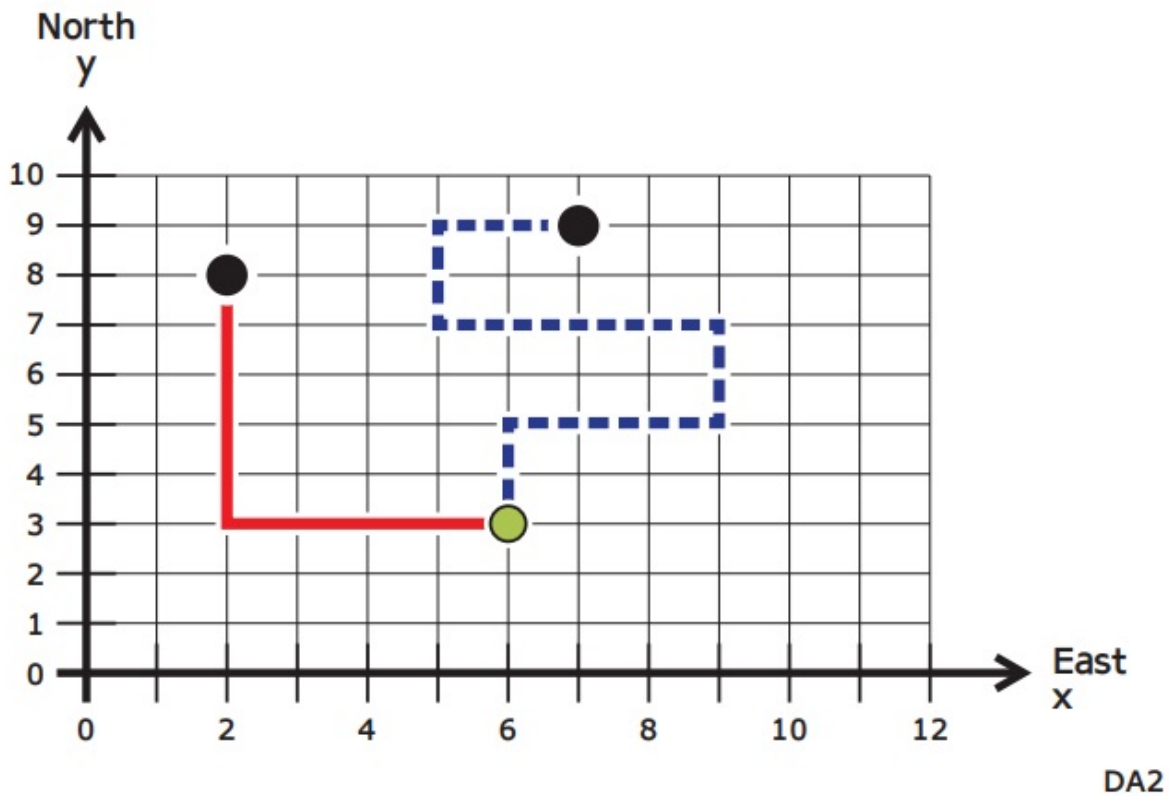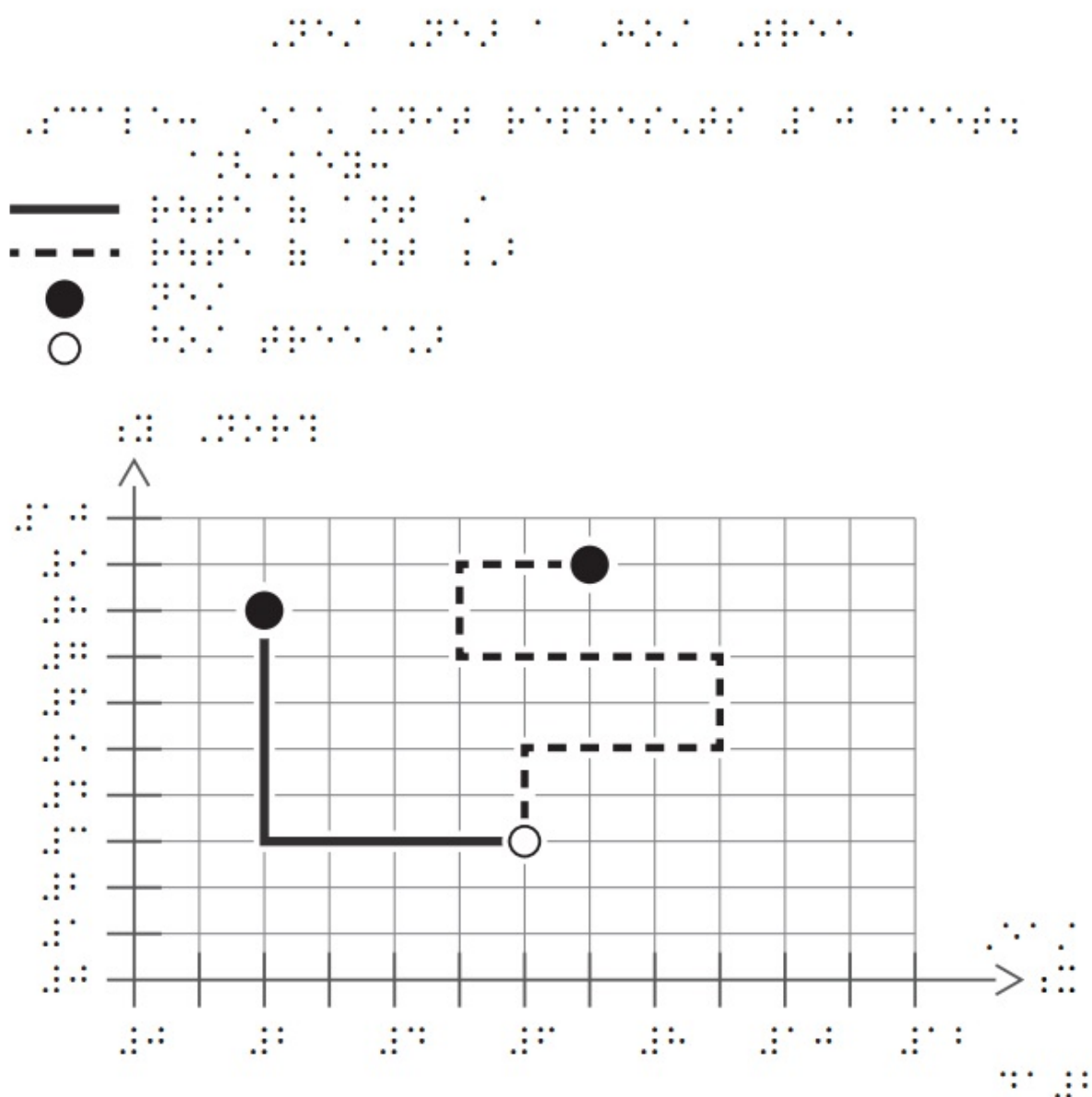
Warm Up 4

The point where the two number lines meet is in the bottom left corner and is called the origin. It has two coordinates. The first is the value on the x-axis and the second is the value on the y-axis. The values are written in parentheses with a comma separating the two numbers. On sheet DA1 what is the location of the origin?

A = (0, 0)
B = (0, 1)
C = (1, 0)

Correct Answer: (0, 0)

Warm Up 5

A pair of points on a coordinate plane is called an ordered pair. When you find an ordered pair the first number is the coordinate or location on the x-axis and the second number is the coordinate or location on the y-axis. On sheet DA2 there is a key. Find the symbol for the host tree in the key. Next, find that symbol on the coordinate plane. Follow the gridline down from the host tree symbol and find the coordinate of the point on the x-axis. What is the coordinate?

A = 3
B = 6
C = 7

Correct Answer: 6

Warm Up 6

On sheet DA2, put your finger on the host tree. Now, find the coordinate of this point on the y-axis. Follow the gridline to the left until you come to the y-axis. What is the coordinate on the y-axis for the host tree?
A = 6
B = 4
C = 3
Correct Answer: 3

Warm Up 7

On sheet DA2 the coordinates of the host tree are 6 on the x-axis and 3 on the y-axis. When you write the ordered pair, the numbers are written with the x coordinate first and the y coordinate second. How do you write the ordered pair for the host tree on sheet DA2?

A = (6, 3)
B = (6, 4)
C = (3, 6)

Correct Answer: (6, 3)

Warm Up 8

There are tick marks on the axes of the coordinate planes that represent the units. They are equally spaced on the x-axis and y-axis. Each time you move from one tick mark to the next you are moving a unit. On sheet DA1 find the symbol in the key for nest and the symbol for host tree. Locate the host tree at (1, 4). Then go three units up by moving your finger towards the top of the coordinate plane. Your finger is on:

A = A tree located at (1, 7)
B = A nest located at (1, 7)
C = There is nothing at (1, 7)
Correct Answer: A nest located at (1, 7)

Warm Up 9

On sheet DA2 follow the y-axis to the top and you'll find the word "north". Follow the x-axis to the right and you'll find the word "east". These cardinal directions help when describing how many units to move in different directions. On sheet DA2 find the nest at (7, 9). Then move 2 units west, 2 units south, and 4 units east. Which coordinate pair represents where you are at?

A = (7, 9)
B = (8, 9)
C = (9, 7)
Correct Answer: (9, 7)

Warm Up 10

On sheet DA1 the labels north and east are not used on the x-axis and y-axis. Instead, an arrow with an "N" above it is used to show where north is located. On sheet DA1 begin at (3, 8). Travel 2 units south, 6 units to the east, and 1 unit south. Which statement is true for your new location?

A = At (9, 5) there is a nest and the total number of feet traveled is 90 feet.
B = At (5, 9) there is a host tree and the total number of feet traveled is 80 feet.
C = At (9, 5) there is a host tree and the total number of feet traveled is 90 feet.

Correct Answer: At (9, 5) there is a host tree and the total number of feet traveled is 90 feet.

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried some coordinate graphs, how well do you understand this topic?

A = Very well, I know this material already.

B = Pretty well; I've worked on this kind of coordinate graph before, but I could use some practice.

C = Not very well; I need more practice.

Graphic DA3 is on the following 2 pages in print and simbraille.

Introduction Problem Set A

In problem set A you will answer 5 multiple choice and one open ended question about data on sheet DA3. Take sheet DA3 out of your notebook. Dinosaur ants hunt for food at night, when it is cool. They leave their nest to hunt at sunset. Each dinosaur ant hunts alone. It travels to its favorite tree. Scientists call this its "host tree." The dinosaur ant climbs the host tree trunk and searches for small insects. It returns to the nest at dawn, before the heat of the day.

Problem A1: A dinosaur ant is in its nest. Which ordered pair names the nest location?

A = (3, 8)
B = (7, 3)
C = (3, 7)
Correct Answer: (3, 7)

Problem A2: When night falls, a dinosaur ant leaves the nest and travels 2 units to the east. Then it turns south and goes 3 units. After it stops to rest, it continues 2 units to the east to its host tree. What is the location of its host tree?

A = (4, 6)
B = (7, 4)
C = (9, 7)
Correct Answer: (7, 4)

Host Trees Near a Nest

Scale: Each unit represents 10 feet.

Key:

⬭ nest

🔺 host tree

DA3

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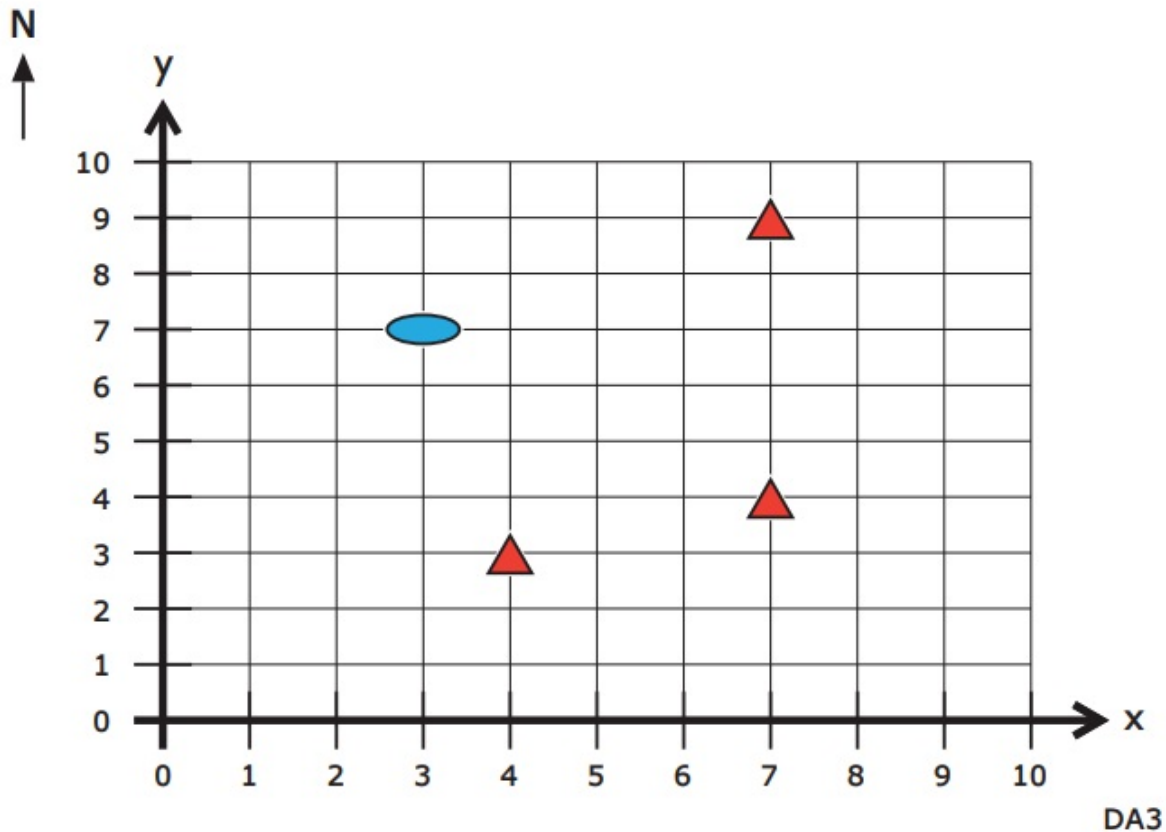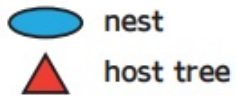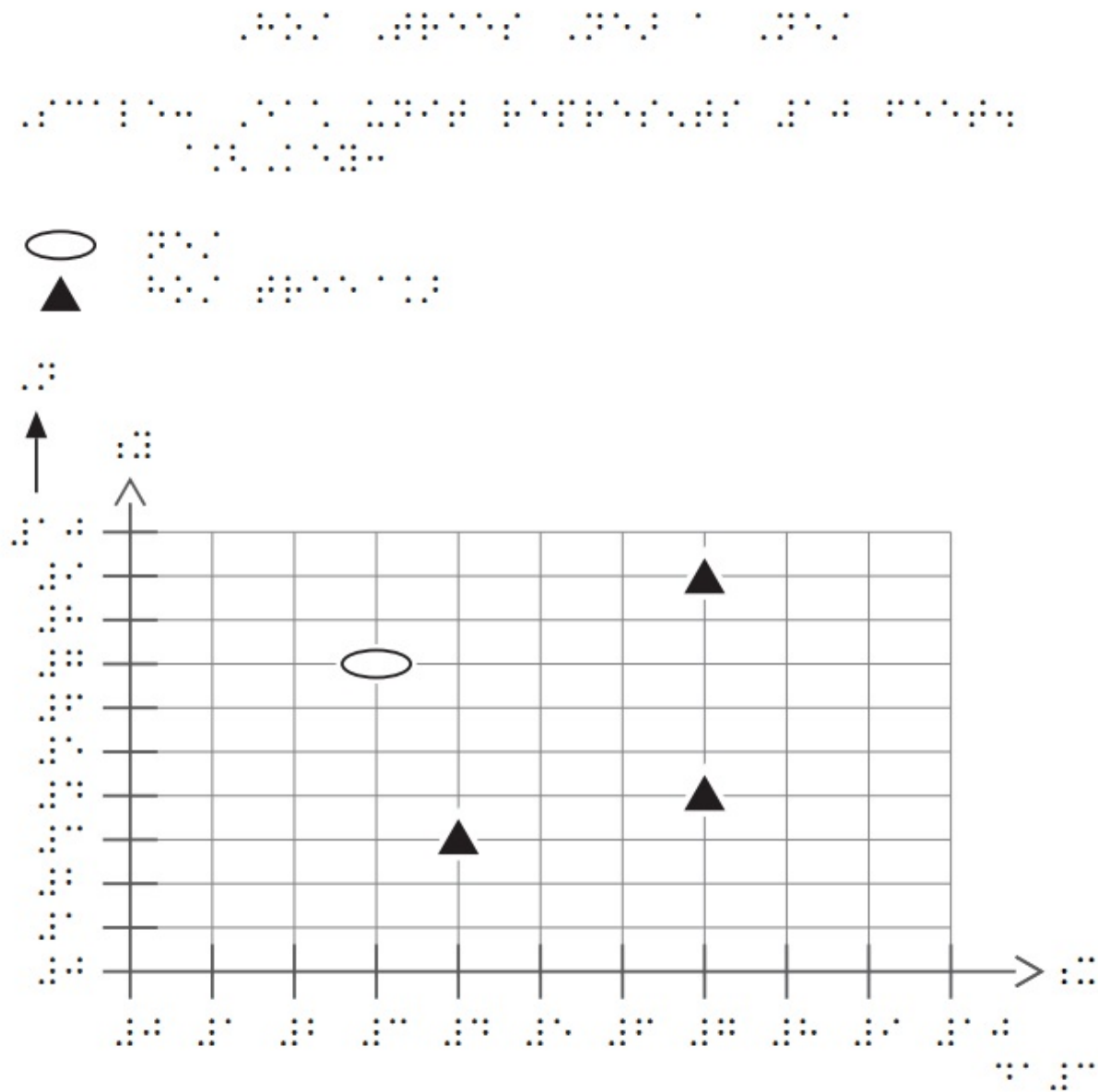
Problem A3: A dinosaur ant finds a fly on its host tree at (4, 3) and starts back with it to its nest. From its host tree, it travels north 4 units. Then it turns west and goes straight until it reaches its nest. How many feet total does it travel back to its nest from its host tree?

A = 40 feet
B = 50 feet
C = 60 feet
Correct Answer: 50 feet

Problem A4: A scientist is writing a book about dinosaur ants, and she wants to take pictures of one searching for prey in its host tree. She uses a truck to carry the ladder, flashlights, and camera equipment that she needs. She parks the truck at location (3, 5). Which ordered pair names the location of the closest host tree?

A = (7, 4)

B = (4, 3)
C = (7, 9)

Correct Answer: (4, 3)

Problem A5 - A

The three host trees in the graphic represent the vertices of a parallelogram, with four sides. One vertex of the parallelogram is missing. What ordered pair shows its location?

A = (4, 6)

B = (9, 4)
C = (4, 8)

Correct Answer: (4, 8)

Problem A5 - B

The ocean is located along the x-axis. Find the host tree closest to the ocean. Find the host tree furthest away from the ocean. How many feet apart are the two host trees?

A = 20 feet
B = 60 feet

C = 90 feet

Correct Answer: 60 feet

Problem A5 - C

Dinosaur Ant A and Dinosaur Ant B are both in the nest at (3, 7). Dinosaur Ant A's host tree is located at (7, 4). Dinosaur Ant B's host tree is located at (7, 9). If both ants travel four units to the east when they leave the nest, which ant is closest to its host tree?

A = Dinosaur Ant A is closer.

B = Dinosaur Ant B is closer.

C = Both Dinosaur Ant A and Dinosaur Ant B are equal distance.

Correct Answer: Dinosaur Ant B is closer.

Problem A6 - A

The dinosaur ants stopped hunting at the host tree located at (7, 9). Based on what you know about these ants and Australia, why might this have happened? Record your answer.

Problem A6 - B

The dinosaur ant nest on the graph was destroyed and needed to be rebuilt. What ordered pair do you think is the best location for the new nest? Why do you think so? Record your answer.

Problem A6 - C

The climate in the Australian continent is gradually getting warmer. The x-axis represents the ocean. What is the ordered pair for the host tree that would be hardest for dinosaur ants to hunt from when the weather is hot? Why do you think so? Record your answer.

Graphic DA4 is on the following 2 pages in print and simbraille.

Introduction Problem Set B

In problem set B you will answer 5 multiple choice and one open ended question about data on sheet DA4. Take sheet DA4 out of your notebook.

Modern ant species use their sense of smell to navigate, but dinosaur ants rely on their vision. They leave the nest at sunset while there is still some light. Then they return at dawn when the darkness lifts. Scientists wanted to know if the dinosaur ants memorized the path to their host tree or if they use landmarks to guide them. They caught dinosaur ants and released them in different locations, and then tracked the dinosaur ants to see if they could find their way back to their nest. A graduate student followed each dinosaur ant and used pins pushed in the ground to mark points where the dinosaur ant turned and changed direction.

Problem B1

Which ordered pair corresponds to the nest location?

A = (5, 3)

B = (3, 5)

C = (5, 5)

Correct Answer: (5, 3)

Problem B2

Scientists released a dinosaur ant at location (2, 12). It traveled 3 units to the east, and then turned south and headed straight to its nest. A student marked the point where it turned with a pin. From the pin, how many units did it travel south to the nest?

A = 9 units

B = 12 units

C = 14 units

Correct Answer: 9 units

Problem B3

When a dinosaur ant left the nest, it traveled east to a pin and then turned and traveled north to the closest host tree. What are the coordinates of the closest host tree?

A = (12, 6)

B = (6, 5)

C = (10, 4)

Correct Answer: (10, 4)

A Scientist's Map

Scale: Each unit represents 10 feet.

Key:

⬭ pin   ⭕ nest

🔺 host tree

DA4
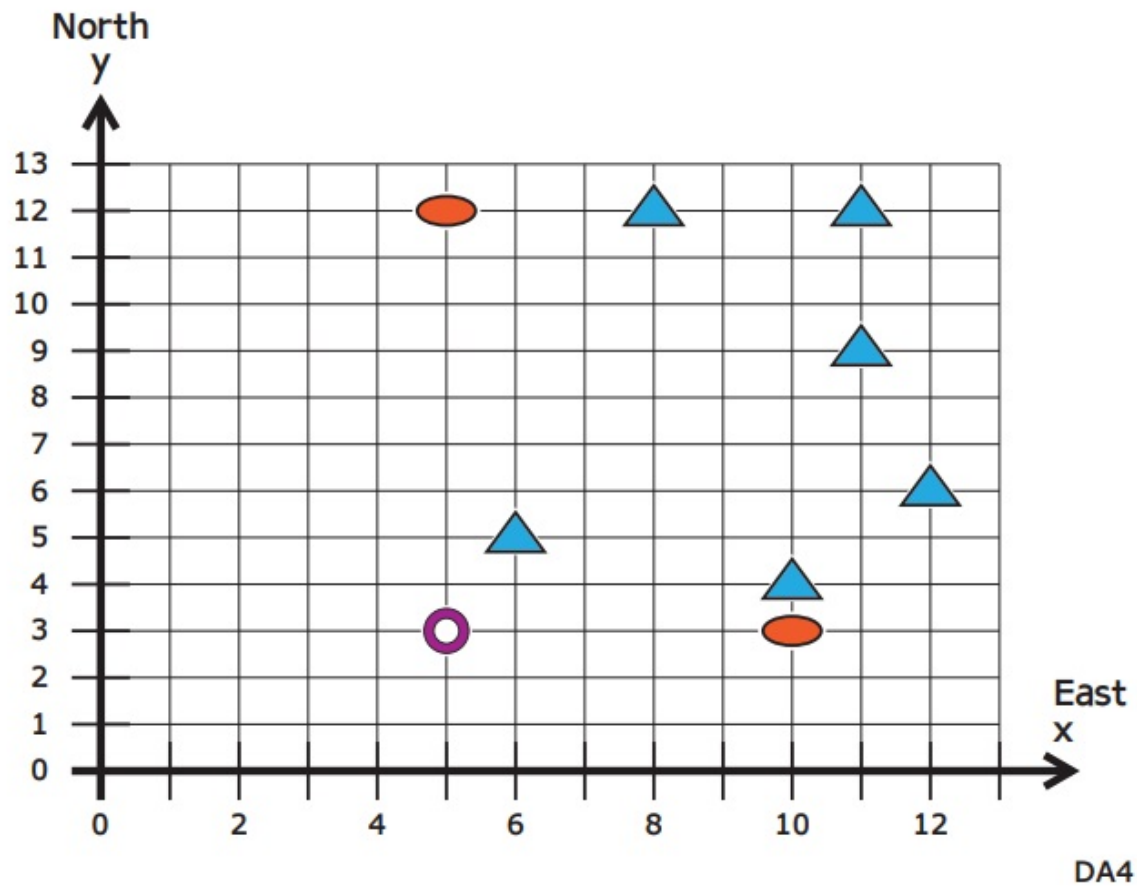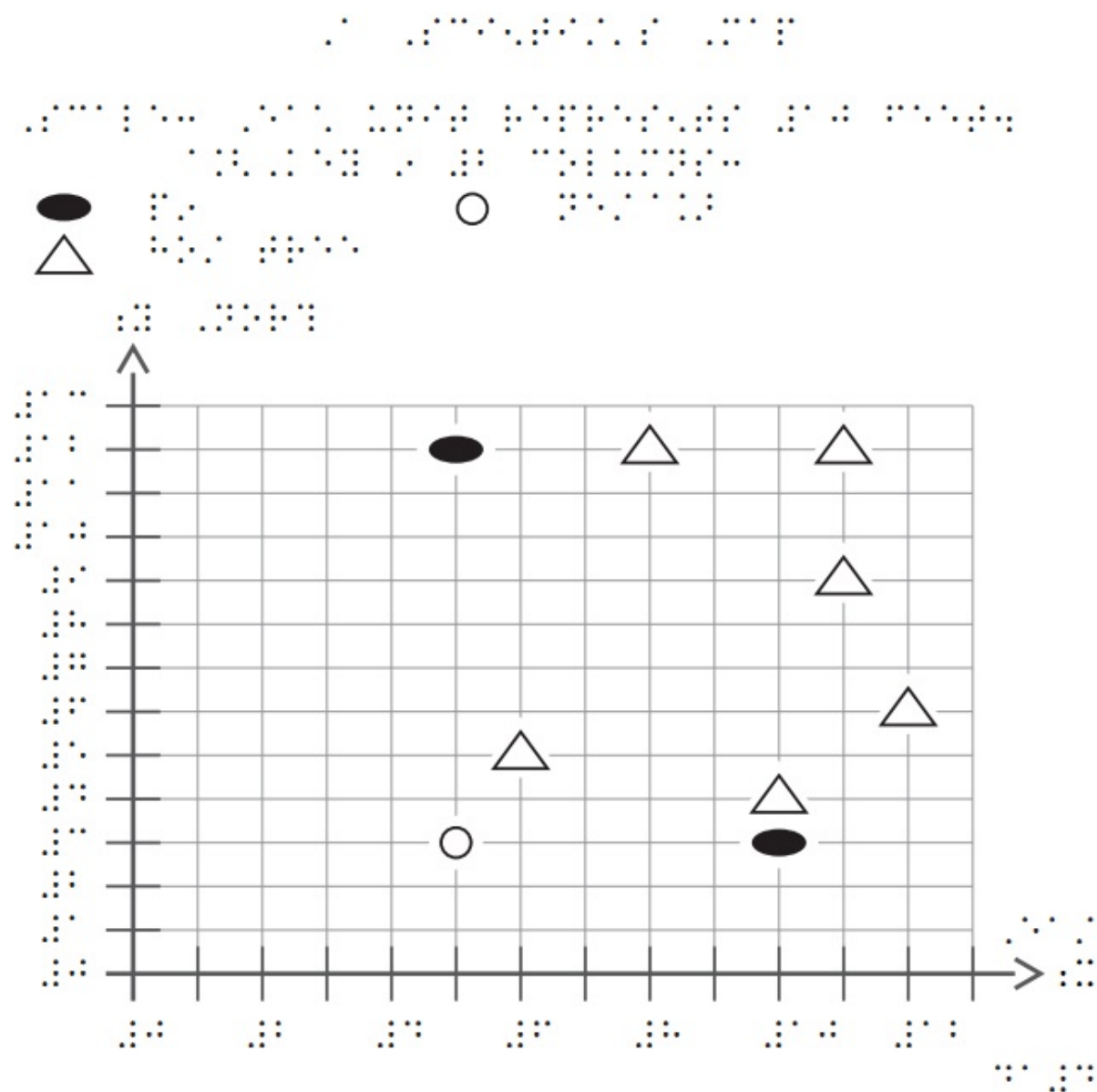
Problem B4

A dinosaur ant travels north from the nest to a pin. It then travels east to the closest host tree. How many total feet does it travel from its nest to its host tree?

A = 90 feet
B = 120 feet
C = 150 feet

Correct Answer: 120 feet

Problem B5 - A

Dinosaur Ant C started at (2, 12). It traveled east to the pin and then south to its nest. Dinosaur Ant D traveled from its host tree at (6, 5) west and then south to the nest. How many more units did Dinosaur Ant C travel compared to Dinosaur Ant D?

A = 3 units
B = 9 units
C = 12 units

Correct Answer: 9 units

Problem B5 - B

There are three host trees located at (8, 12), (11, 9), and (11, 12). They define the vertices of a square. Which ordered pair is the location of the missing vertex?

A = (10, 8)
B = (9, 8)
C = (8, 9)

Correct Answer: (8, 9)

Problem B5 - C

Scientists released a dinosaur ant at the tree located the greatest distance away from the nest. It traveled west until it reached the pin located at (5, 12). There it turned south and traveled straight to the nest. How many feet was its total journey?

A = 15 feet
B = 115 feet
C = 150 feet

Correct Answer: 150 feet

Problem B6 - A

Scientists did the experiment of releasing dinosaur ants from new locations and seeing if the dinosaur ants could find their way back to their nests. The scientists wanted to learn if the dinosaur ants memorize a path from their nest to their tree, or if they can navigate using landmarks, that is, things they remember passing. Based on the pins on the graph and the location of the nest, what do you think the results suggest about the travel skills of dinosaur ants? Why do you think so? Record your answer.

Problem B6 - B

If a dinosaur ant was caught at dawn and released 1,000 feet away from its nest, do you think it would be able to navigate its way back successfully to its nest before the sun came up and it became too warm? Why do you think so? Record your answer.

Problem B6 - C

If a dinosaur ant headed for its host tree one evening but its path was blocked by a fallen tree, do you think the ant would still be able to find its host tree? Why do you think so? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use coordinate planes in your school work?"
A = Super, I can work with almost any coordinate plane.
B = Ok, but I need more practice.

C = Not good, coordinate planes are confusing.

What I Learned

What is one thing you learned about reading and interpreting coordinate planes? Record your answer.

Conclusion

The Dinosaur Ant species has existed for millions of years. Scientists are studying this ancient insect species to learn more about how it navigates in low light without getting lost. In this unit, you learned that insect scientists use coordinate graphs in their research. Coordinate graphs are useful in many other fields including astronomy and city planning. When you want to show where something is located, a coordinate graph can often do the job for you. Tap the next button to see your Score Report for this unit.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Dinosaur Ant: Coordinate Planes 1.

- Have the student construct a coordinate plane with data either found on the Internet or in a book or data you or the student make up. In constructing the coordinate plane, the student may wish to use the APH Product **Graphic Aid for Mathematics**, Catalog No: 1-00460-01, the APH product **Tactile Graphic Line Slate**, Catalog No: 1-00100-00, and/or a variety of large print or embossed graph paper. APH even offers bold-line tactile graph sheets, which combine tactile and print. The following website features videos of graphing on the coordinate plane using the Graphic Aid for Mathematics: https://www.tsbvi.edu/videos-webinars/mathematics.
- Have the student map out the location of objects in the classroom on a coordinate plane.
- Have the student create different shapes or a simple picture on a coordinate plane by figuring out the coordinates needed and then connecting the points.
- Have the student play the APH product, **TREKS: The Game of Compass Directions**, Catalog Number: 1-08910-00.
- Create a story whose ending is figured out by plotting points on a coordinate plane and then connecting the points (e.g., a story about a character traveling and the points create a shape or simple picture).
- Have the student research the Dinosaur Ant to learn additional facts about this endangered species.
- Have the student research other species that travel to host trees for food.
- Have the student research the similarities and differences between dinosaur ants and ants in the student's community (e.g., fire ants, carpenter ants).
- Dinosaur ants measure 9.5 to 11 mm. Have the student look at a metric ruler to see the length of 1 cm (equivalent of 10 mm.). Have the student measure objects in the room (e.g., a book, a pen) and determine how many dinosaur ants it would take to go along the length of the object.
- Have the student locate videos of the dinosaur ants to watch in order to see this species in its natural habitat.
- Have the student locate Australia on a map or globe. The student can calculate the travel distance from the United States to Australia.

Grevy's Zebra

Vocabulary

Coordinate plane: A coordinate plane is formed when two number lines intersect at a right angle. A coordinate plane is sometimes referred to as a Cartesian graph or coordinate graph.

Gridline: Gridlines are a series of numbered horizontal and vertical lines that divide a coordinate plane into squares to form a grid.

Intersection: An example of an intersection is the point at which two lines cross.

Key: The key tells the meaning of symbols on the coordinate plane through color, texture, or abbreviations. Another term for "key" is "legend."

North arrow: A north arrow is used to show cardinal directions. The reader needs to understand where east, west, and south are located based on the direction the north arrow is pointing. Some coordinate planes use a compass rose that shows north, south, east, and west.

Ordered pair: The two numbers in an ordered pair represent an ordered point on the coordinate plane. The first number is the x-coordinate and the second number is the y-coordinate. The ordered pair is written (x, y).

Quadrants: There are 4 quadrants on a coordinate plane. They are defined by the intersection of the x-axis and the y-axis. **Quadrant I** is the top right section, Quadrant II the top left section, Quadrant III the bottom left section, and Quadrant IV the bottom right section.

Right angle: A right angle is an angle that measures 90°, for example, the angle formed at the intersection of two perpendicular lines.

Scale: The scale is the distance between units shown on the coordinate plane.

Symbol: A symbol stands for something else. For example, on a coordinate plane, a textured or colored circle can be used to represent a place.

Units: Units are tick marks (or extended gridlines) equally spaced on the x-axis or y-axis of the coordinate plane. Tick marks don't always have stated values but help in estimating distances.

X-axis: The x-axis is the horizontal number line of the coordinate plane.

X-coordinate: The x-coordinate is the first number in the ordered pair. It is the value on the x-axis. When plotting the x-coordinate you move left or right on the x-axis.

Y-axis: The y-axis is the vertical number line of the coordinate plane.

Y-coordinate: The y-coordinate is the second number in the ordered pair. It is the value on the y-axis. When plotting the y-coordinate you move up or down on the y-axis.

Meet the Grevy's Zebra

The Grevy's zebra is one of three zebra species in Africa. The other two species are the plains zebra and mountain zebra. The Grevy's zebra is the largest of the zebras. The stripes on its body are thinner than the stripes on the backs of the other two zebra species. Each Grevy's zebra has a unique pattern of stripes, like a fingerprint. This helps scientists keep track of individual zebras using a special computer program, like facial recognition software for people. The stripes on their bodies may help zebras survive. This is because the stripes make it harder for predators like lions and hyenas to see them. Zebras are even harder for predators to see when several of them stand together.

Graphic GZ1 is on the following 2 pages in print and simbraille.

For braille readers, the opening Nemeth Code indicator is used after the closing transcriber's note symbol following the key. The Nemeth Code terminator follows the graph.

Get Ready for Some Questions

In this unit, several of the "sheets" are really two pages. One is a key and the other a four quadrant coordinate plane. Be sure to have both sheets when answering questions. Get GZ1 out from your notebook. Take time to scan the page from top to bottom and left to right so you are familiar with the information on the page. You are going to use GZ1 to answer 2 questions. You'll see GZ1 on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the four quadrant coordinate plane on GZ1, tap the next button.

Grevy's Zebra Typical Habitat

Scale: 1 unit represents 1 mile.

Key:
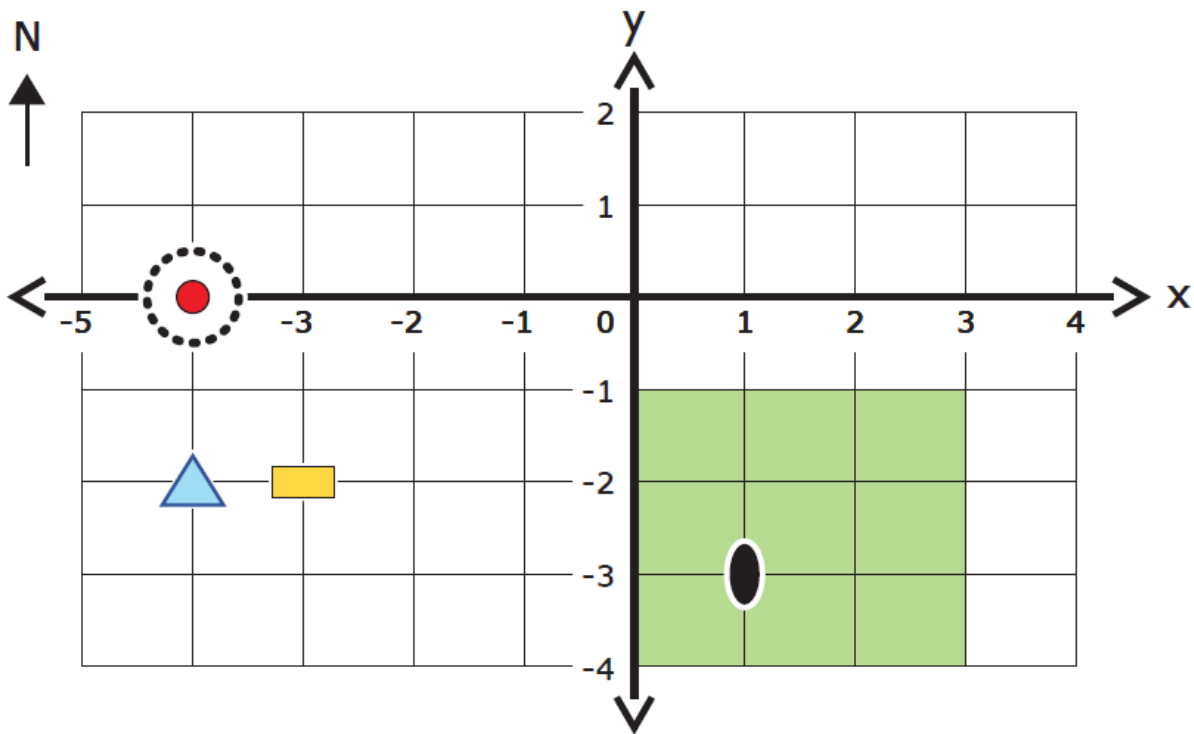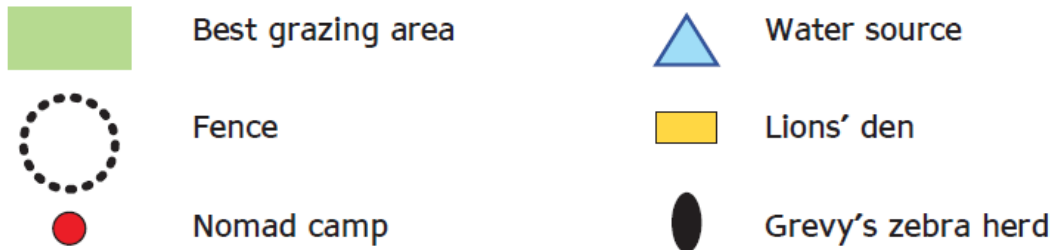
GZ1
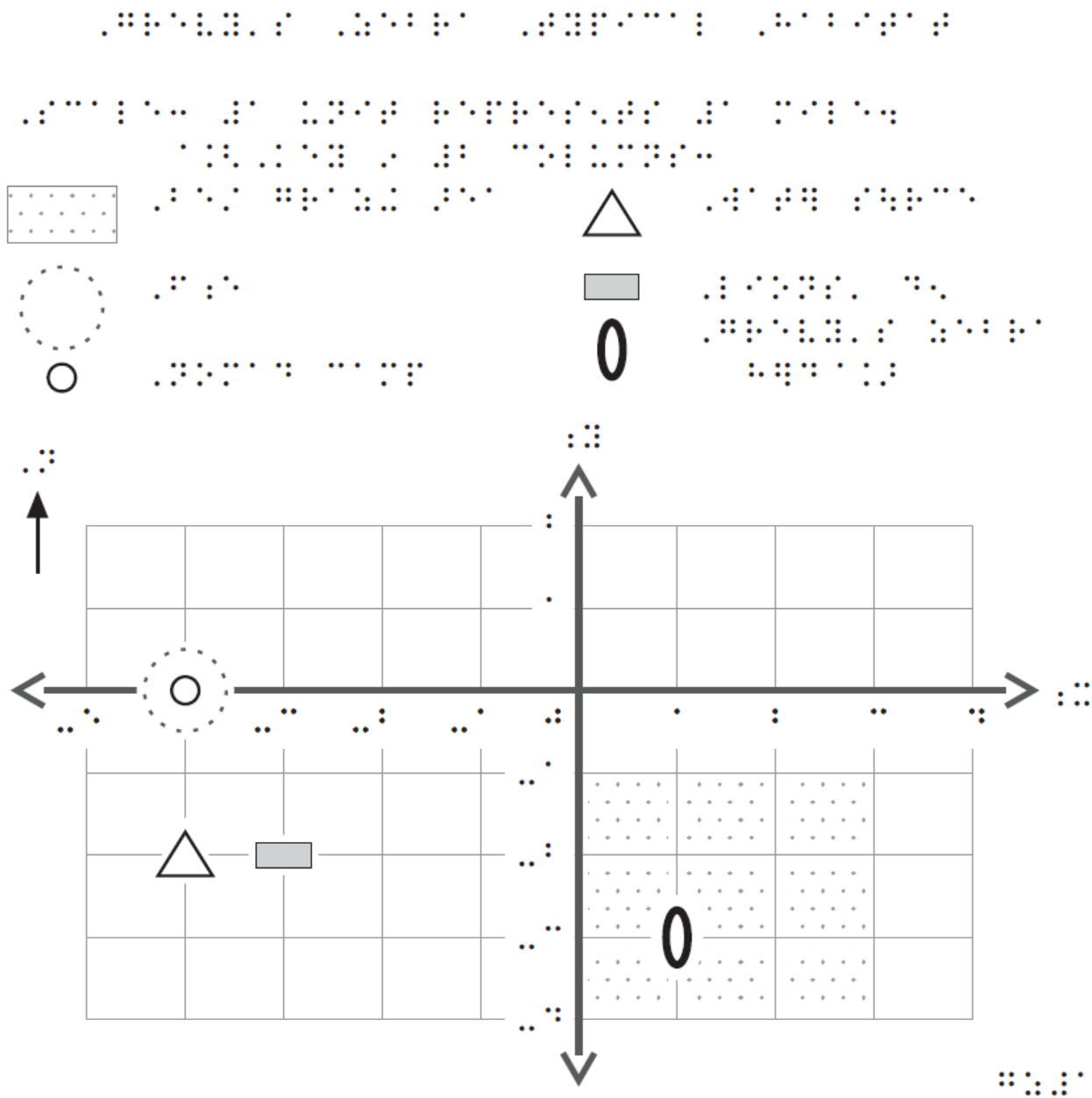
Getting Started 1

Describe this coordinate plane and tell what each part is. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the Grevy's zebra from this coordinate plane? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

> Graphic GZ2 is on the following 4 pages in print and simbraille.

> *For braille readers, the opening Nemeth Code indicator is used after the key on a line by itself before the coordinate plane. The Nemeth Code terminator follows the coordinate plane.*

Get Ready for the Warm Up

You are going to use sheets GZ1 and GZ2 to build your skills with coordinate planes. GZ1 is one sheet and GZ2 has 2 sheets. Get the sheets out of your notebook. Be sure to check your answer to each question about coordinate planes. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The Dinosaur Ant unit had examples of coordinate planes with positive numbers on the x-axis and y-axis. In this unit, the x-axis and y-axis include both positive and negative numbers. Scientists have found that Grevy's zebras must travel for many miles each day to get enough grass to eat. Finding water is a daily challenge for them. Zebras have been seen using their hooves to dig down in a dry riverbed to find water*.* Tap the next button to continue.

Warm Up 1

The four quadrants of a coordinate plane are often labeled with Roman numerals. The labels sometimes are outside of the coordinate plane and sometimes inside it. If you are using VoiceOver, the Roman numerals will not be pronounced properly. Ask your teacher to read them aloud. On Sheet GZ2 what are the Roman numerals shown?

A = I, II, III, IV
B = V, VI, VII, X
C = I, II, III, V

Correct Answer: I, II, III, IV

Locations of Grevy's Zebras Relative to Water Source

Scale: 1 unit represents 2 miles.

Key:

- ⭕ Female Grevy's zebra with no foal
- 🔴 Mother Grevy's zebra with a foal
- 🟨 Male Grevy's zebra
- 🔻 Water source

GZ2

GZ2

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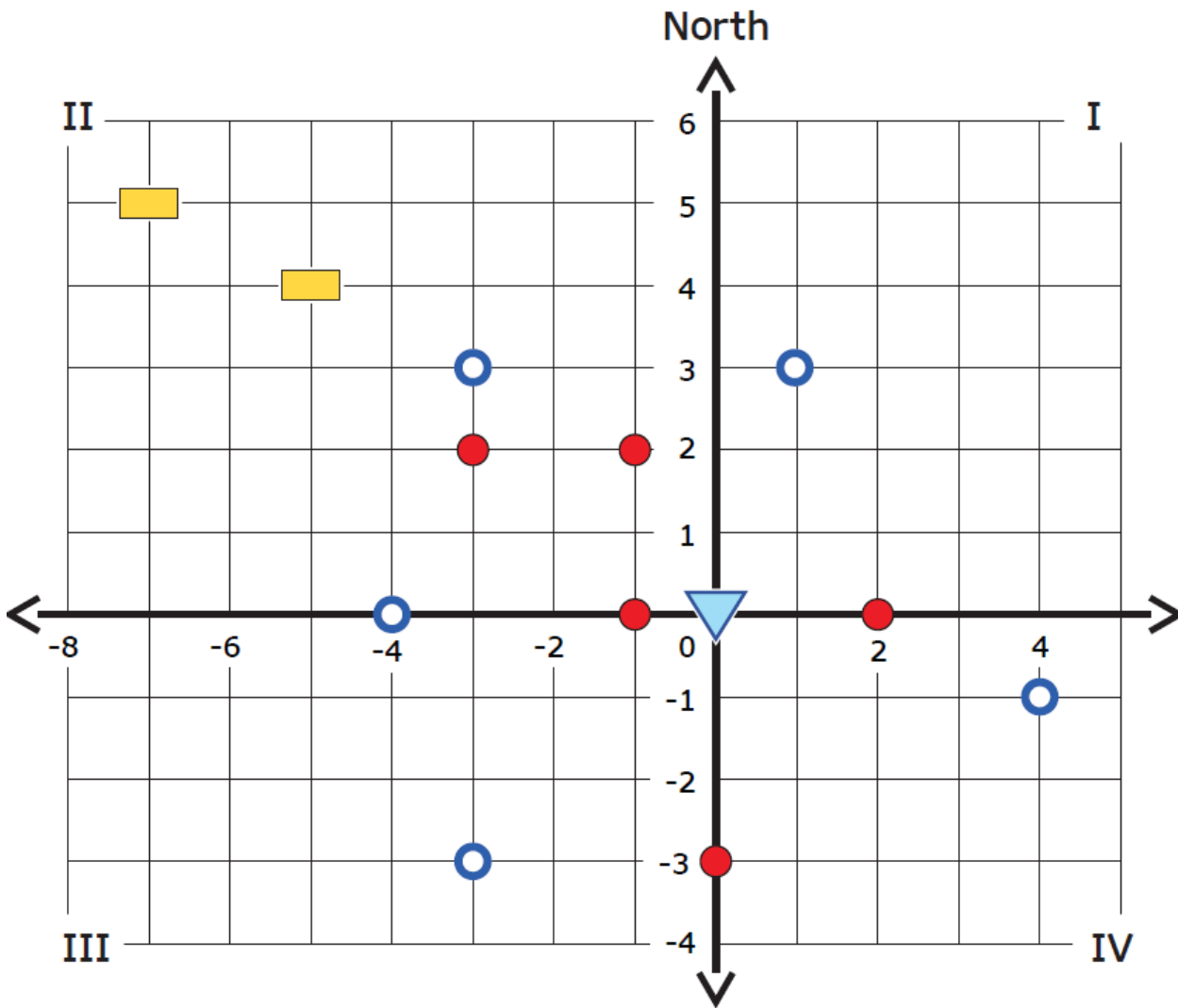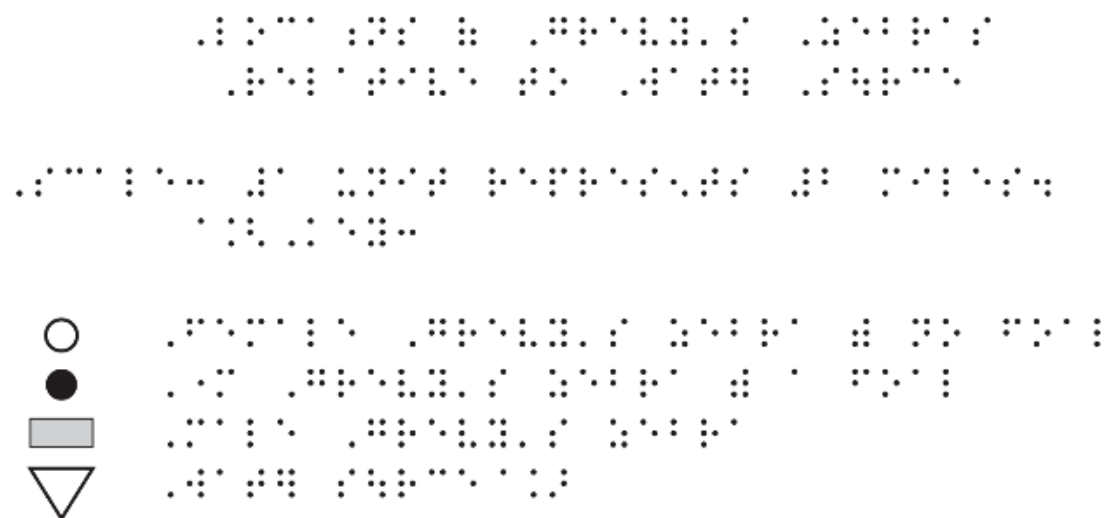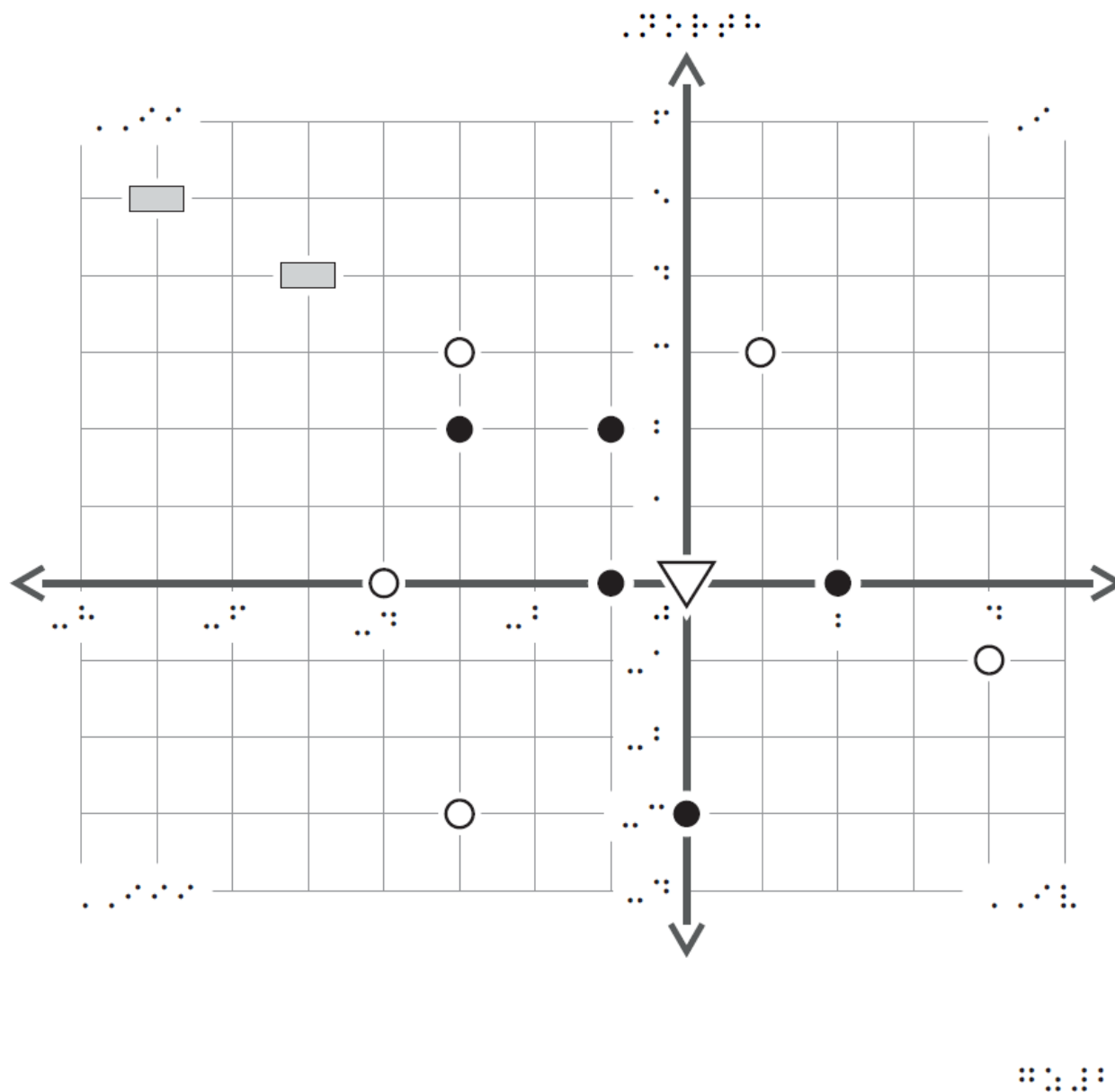
Warm Up 2

Look at sheet GZ1. Do you see how on a coordinate plane with four quadrants, the x-axis and y-axis are in the middle of the coordinate plane? The x-axis and y-axis are what divide the coordinate plane into the four quadrants. Even when the Roman numerals are not written, the quadrants are referred to by their Roman numerals. Find Quadrant III on the bottom left of the coordinate plane. Which statement is true about the points in Quadrant III?

A = They have a negative x value and a negative y value.
B = They have a positive x value and a negative y value.
C = They have a negative x value and a positive y value.

Correct Answer: They have a negative x value and a negative y value.

Warm Up 3

Sometimes the x-axis or y-axis extends longer than the number labels shown. Look carefully at sheet GZ2. Which statement is true about the x-axis?
A = values go from -7 to 4
B = values go from -8 to 5
C = values go from -8 to 6
Correct Answer: values go from -8 to 5

Warm Up 4

When a question asks you to locate a specific item on a coordinate plane, use the key to find the symbol for the item. On the key for GZ1, find the symbol for the lions' den. Find the lions' den on the coordinate plane. So that you don't miss it, begin at the top of the coordinate plane and use your hands or eyes to scan across the page, then move down and scan again. Be systematic in how you look for the symbol. On sheet GZ1, in which quadrant is the lions' den located?

A = Quadrant II

B = Quadrant III

C = Quadrant IV

Correct Answer: Quadrant III

Warm Up 5

Sheet GZ2 shows the locations of a herd of Grevy's zebras. In which quadrant are most of the zebras grazing?

A = Quadrant II

B = Quadrant III

C = Quadrant IV

Correct Answer: Quadrant II

Warm Up 6

Some coordinate planes have scales and keys. On sheet GZ2, what is the scale?

A = 1 unit represents 1 mile

B = 1 unit represents 2 miles

C = 1 unit represents 5 miles

Correct Answer: 1 unit represents 2 miles

Warm Up 7

Look at the layout of the coordinate plane on sheet GZ1. Notice how the boxes formed by the gridlines are squares. The best grazing area looks like a large square. To find the height, count the number of squares the best grazing area covers vertically. To find the width, count the number of squares the best grazing area covers horizontally. What is the height and width of the best grazing area?

A = 3 high by 3 wide

B = 4 high by 4 wide

C = 3 high by 4 wide
Correct Answer: 3 high by 3 wide

Warm Up 8

To determine a coordinate, you may need to follow gridlines as you move to the axis. Sheet GZ2 in Quadrant IV shows the location of a female Grevy's zebra with no foal. To find the coordinates of her location, go up to the x-axis and remember the coordinate. Go back down to the female zebra and now go left to the y-axis. Remember that coordinate. What are the coordinates of her location?

A = (4, -1)
B = (-4, 0)
C = (5, -2)
Correct Answer: (4, -1)

Warm Up 9

On sheet GZ1, find the Grevy's zebra herd in quadrant IV. The herd travels 5 units to the west and 3 units north. What does it find?

A = the lions' den

B = the water source
C = the nomad camp

Correct Answer: the nomad camp

Warm Up 10

On sheet GZ2 review the scale. Next, find the male zebra located at (-7, 5). If the zebra travels 8 miles east and then 4 miles south, what will it find?

A = another male Grevy's zebra
B = a female Grevy's zebra with no foal
C = a mother Grevy's zebra with a foal
Correct Answer: a female Grevy's zebra with no foal

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried some coordinate graphs with four quadrants, how well do you understand this topic?

A = Very well, I know this material already.

B = Pretty well, I've worked with these types of coordinate graphs before, but I could use some practice.

C = Not very well, I need more practice.

Graphic GZ3 is on the following 4 pages in print and simbraille.

For braille readers, the opening Nemeth Code indicator is used after the key and is placed on a line by itself before the coordinate plane. The Nemeth Code terminator follows the coordinate plane.

Introduction Problem Set A

In problem set A, you will answer five multiple choice and one open ended question about data on sheet GZ3. It is two pages with the key on one page and the coordinate plane on the other page. Take both sheets of GZ3 out of your notebook. Male zebras can go for 5 days without drinking water. Female Grevy's zebras with nursing foals must drink water every day so their bodies can produce enough milk for their foal. Foals get all the water they need from their mother's milk. Bringing a foal to a water source is dangerous because of predators like lions and hyenas. When a mother zebra goes to drink water, she leaves her foal with another zebra. Usually, a male zebra is nearby to help watch the foal.

Scale: 1 unit represents 1 mile.

Key:

🟧	desert
🟩	sparse grass
🟩	thick grass
⬬	pond
▽	male zebra
🔴	zebra mother
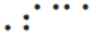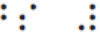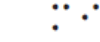
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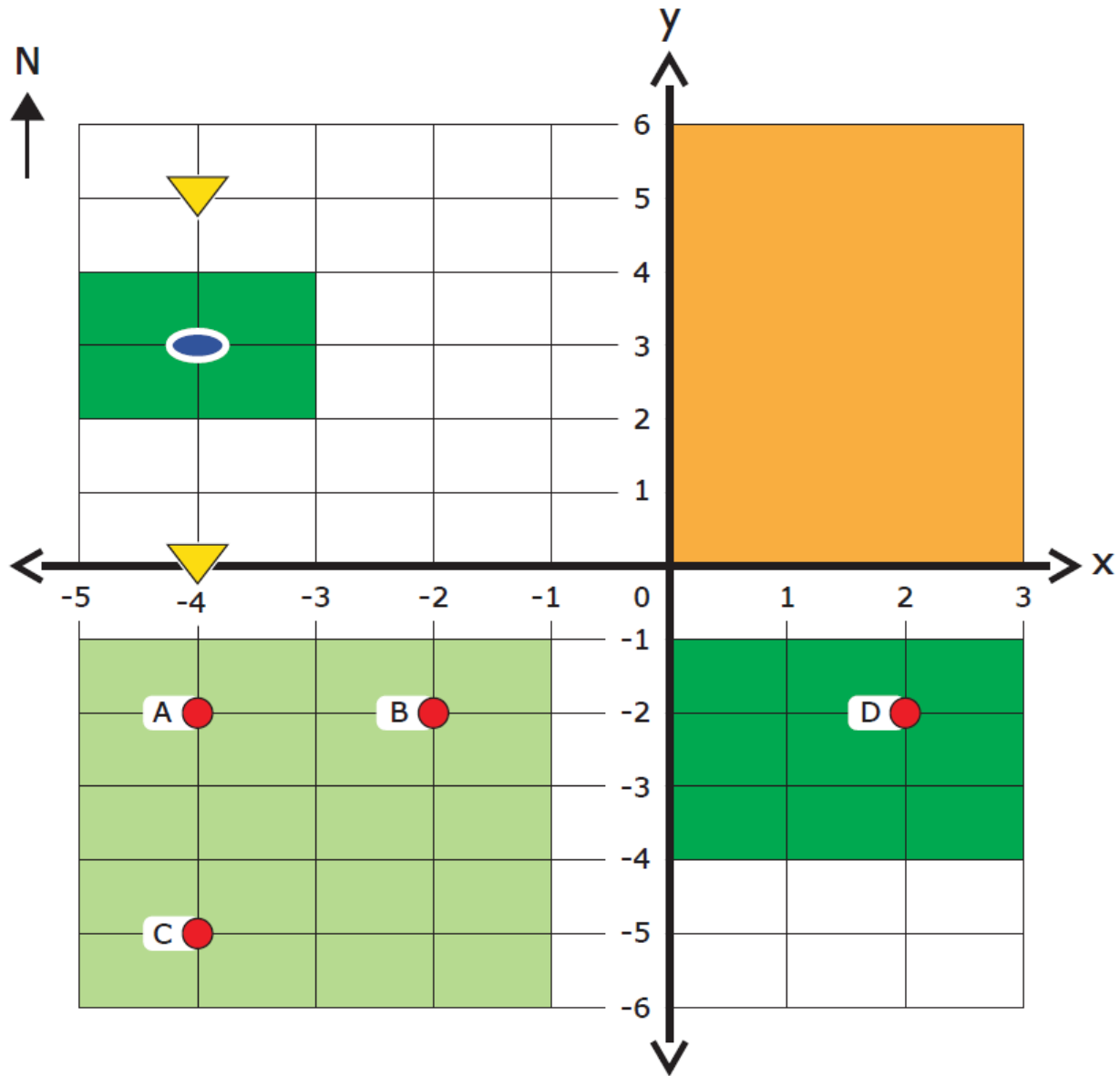
GZ3

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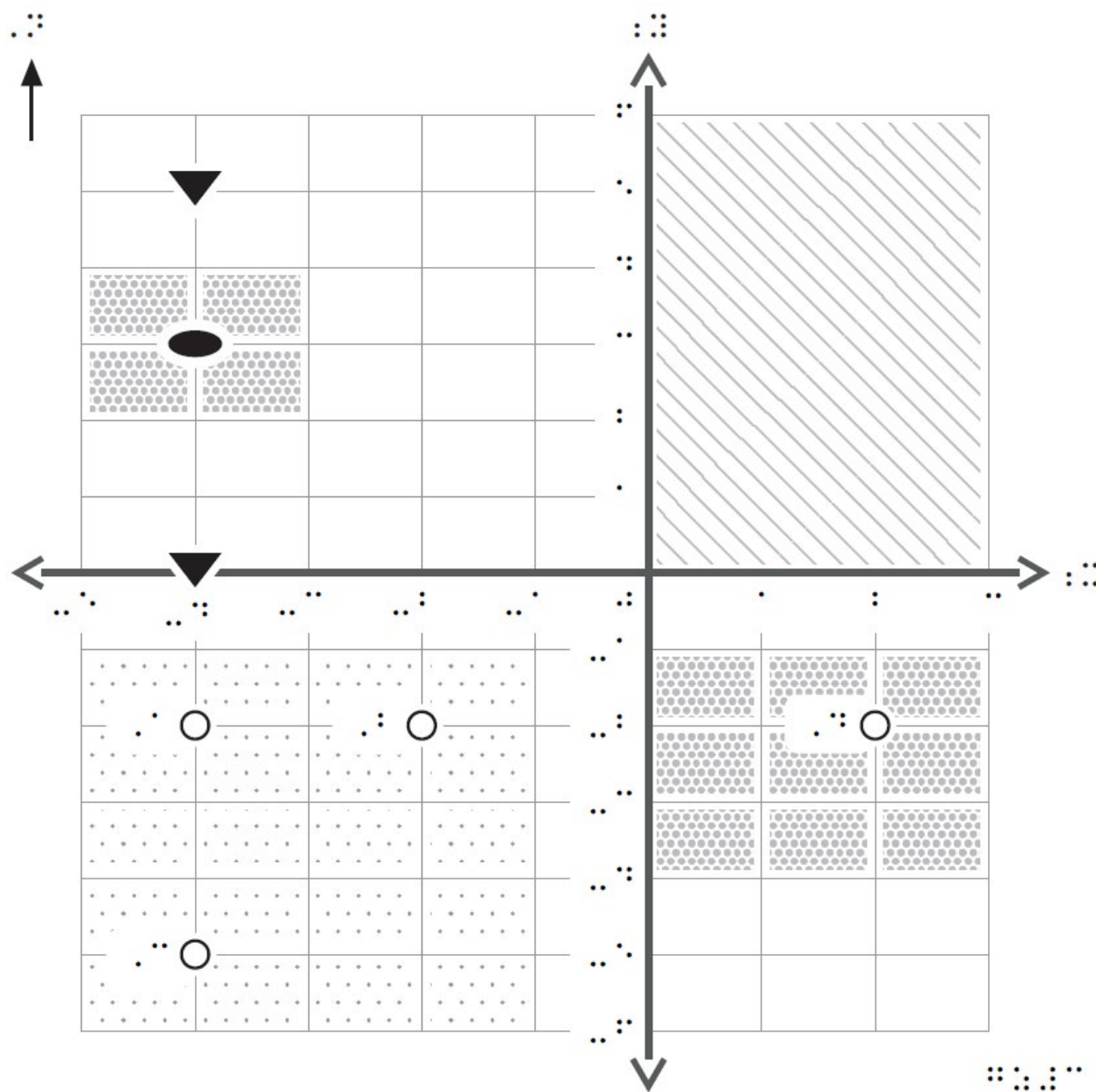
Problem A1: What ordered pair describes the location of the pond?

A = (4, 3)
B = (-4, 3)
C = (-4, -3)
Correct Answer: (-4, 3)

Problem A2:

What is located at (-4, -2)?

A = a male zebra
B = zebra mother A
C = zebra mother C
Correct Answer: zebra mother A

Problem A3: Zebra mother C and her foal travel in a straight line to Zebra mother A's location. Zebra mother C leaves her foal with Zebra mother A and travels to the pond. How far in total does Zebra mother C travel?
A = 3 miles
B = 5 miles
C = 8 miles

Correct Answer: 8 miles

Problem A4:

What ordered pair shows where Zebra mother D is located?

A = (2, -2)

B = (-2, -2)
C = (-2, 2)

Correct Answer: (2, -2)

Problem A5 - A

The locations of Zebra mothers A, B, and C form three of the four vertices of a rectangle. What ordered pair is the fourth vertex?

A = (-3, -6)

B = (-2, -5)
C = (-5, -2)

Correct Answer: (-2, -5)

Problem A5 - B

Zebra mother C travels to location (-2, -2) and leaves her foal there while she goes to the pond to drink. From the pond, assuming she follows the gridlines, how many miles does she have to travel to get her foal?

A = 7 miles
B = 11 miles
C = 12 miles

Correct Answer: 7 miles

Problem A5 - C

Zebra mother A is in quadrant III. Zebra mother D is in quadrant IV. If Zebra mother D leaves her foal with Zebra mother A and then travels to the pond to drink water. How many miles does she have to travel?

A = 5 miles
B = 6 miles
C = 11 miles

Correct Answer: 11 miles

Problem A6 - A

Imagine that the pond is a point where the x and y coordinates are reversed so that it is located in Quadrant IV. In what quadrants do you expect the zebra mothers or male zebras to be? Why do you think that is where they will go? Record your answer.

Problem A6 - B

Lions and hyenas are the main predators of Grevy's zebras. Look where the zebras are positioned on the coordinate plane. In what quadrant do you think a predator will hide so it is close by to attack a mother zebra's foal if she goes to the pond? Why do you think this is where the predator will hide? Record your answer.

Problem A6 - C

There are two male zebras shown on sheet GZ3. One is acting as a guard for the herd. What is the location of the zebra you think is acting as the guard? Why do you think it is this zebra and not the other? Record your answer.

> Graphic GZ3 is on the following 2 pages in print and simbraille.

> *For braille readers, the opening Nemeth Code indicator is used after the closing transcriber's note symbol following the key. The Nemeth Code terminator follows the coordinate plane.*

Introduction Problem Set B

In problem set B, you will answer five multiple choice and one open ended question about data on sheet GZ4. Take sheet GZ4 out of your notebook. The Grevy's zebra is popular among tourists to Africa who want to see its stripes. However, it is not easy to see the zebras in the wild. The Grevy's zebra species is restricted to wildlife parks and conservation areas. It moves from place to place looking for water and fresh vegetation to graze on. Some parks let tourists stay overnight and go out with a guide. Guides are familiar with the area and look for signs to help them know where the zebras might be traveling. Piles of manure, also called scat, the guides find help them know that there are zebras ahead!

Problem B1

The tourists leave the lodge and go to the lake to look for Grevy's zebras. They travel from:

A = quadrant I to quadrant III
B = quadrant II to quadrant III
C = quadrant I to quadrant II

Correct Answer: quadrant I to quadrant II

Problem B2

The coordinate plane shows a map of a wildlife park where tourists can stay. The tourists can go out with a guide to see Grevy's zebras and other animals. What ordered pair describes the location of the lodge where tourists stay when visiting the park?

A = (7, 2)
B = (3, 8)
C = (2, 7)

Correct Answer: (2, 7)

Problem B3

The guide finds scat, zebra manure, at (-4, -2). She knows that the zebras will be going to the lake to drink. From (-4, -2) she drives the tourists towards the lake. Where will she find the next scat on the way to the lake?

A = (0, -4)
B = (-4, 0)

C = (-4, 4)

Correct Answer: (-4, 0)

Map of Wildlife Park

Scale: 1 unit represents 3 kilometers.

Key:

▲ Tourist Lodge

⬤ Zebra scat
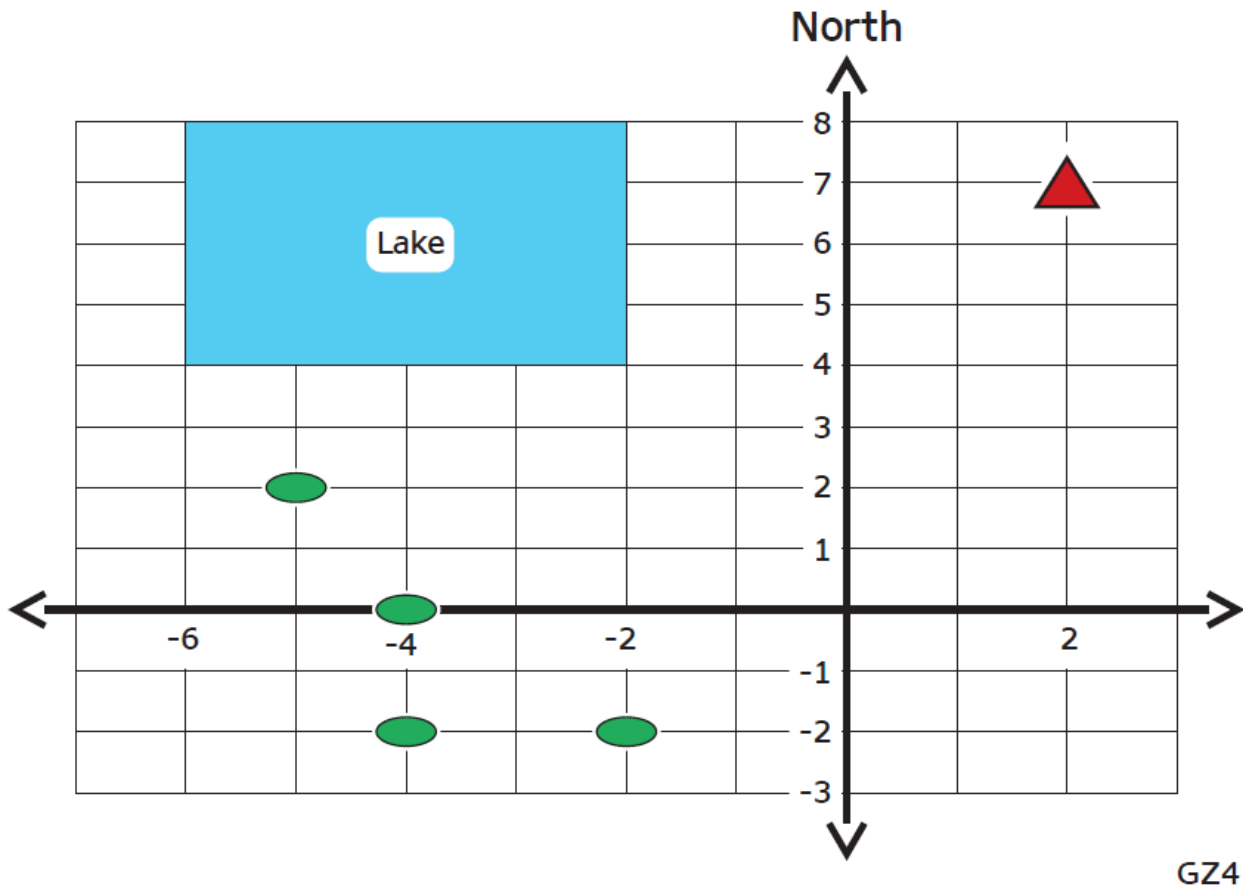
GZ4

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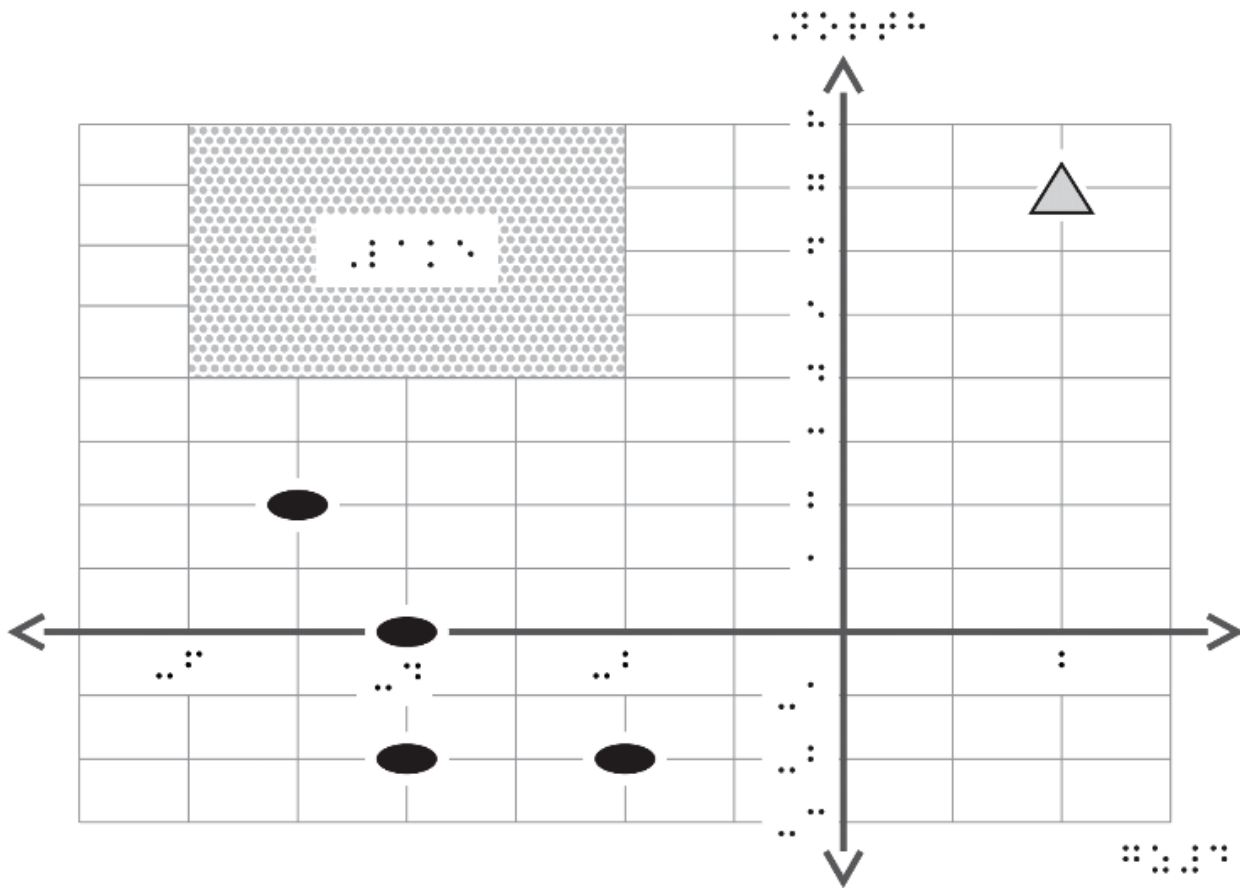
Problem B4

What ordered pair is the location of the zebra scat in quadrant II?

A = (-2, -2)
B = (2, -5)
C = (-5, 2)

Correct Answer: (-5, 2)

Problem B5 - A

The guide starts a tour at the lodge. They drive 21 kilometers south, then turn and drive west until they find zebra scat. How far did they drive from where they turned west to the point where they found zebra scat?

A = 6 kilometers
B = 12 kilometers
C = 18 kilometers

Correct Answer: 18 kilometers

Problem B5 - B

What are the dimensions of the lake?

A = 4 kilometers long and 4 kilometers wide

B = 24 kilometers long and 21 kilometers wide
C = 12 kilometers long and 12 kilometers wide

Correct Answer: 12 kilometers long and 12 kilometers wide

Problem B5 - C

By examining the zebra scat, the guide can tell how many days old it is. The guide says the zebras were first at location (-2, -2), then at (-4, -2) and then they headed north to (-4, 0). If they continue in the same direction, where do you expect the next scat to be?

A = (-4, 2)
B = (-4, 4)
C = (-4, -4)

Correct Answer: (-4, 2)

Problem B6 - A

Tourists come to the park because they want to see zebras, but there is no guarantee that the guide will find the zebras. Some people leave the park disappointed that they did not see zebras. If you were in charge of the park, what would you do to increase the chances that everyone will see a Grevy's zebra? Why do you think your idea will work? Record your answer.

Problem B6 - B

Some tourists do not want to stay in the lodge and have to drive to find the Grevy's zebras. They want to set up a campsite where they should be able to see the zebras. At what coordinates should they put up their campsite? Why do you think this is a good location? Record your answer.

Problem B6 - C

If you work as a guide in the park, where will you usually expect to find the Grevy's zebras? Why do you think they will be in this location? Record your answer.

Check In

Now that you have completed the unit, how do you feel about your ability to use four-quadrant coordinate graphs in your schoolwork?
A = Super, I can work with almost any four-quadrant coordinate graph.
B = Ok, but I need more practice.

C = Not good, four-quadrant coordinate graphs are confusing.

What I Learned

What strategies work best for you so that you can get information from coordinate planes that have four quadrants? Record your answer.

Conclusion

The Grevy's zebra is one of three species of zebras in Africa. Their stripes allow them to blend into the environment making it harder for predators to hunt them. Zebra mothers work together to protect their foals from predators. Guides who are trained to look for signs can tell if zebras are nearby. Tap the next button to see your score report.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Grevy's Zebra: Coordinate Planes 2.

- Have the student construct a coordinate plane with data either found on the Internet or in a book or data you or the student make up. In constructing the coordinate plane, the student may wish to use the APH Product **Graphic Aid for Mathematics**, Catalog No: 1-00460-01, the APH product **Tactile Graphic Line Slate**, Catalog No: 1-00100-00, and/or a variety of large print or embossed graph paper. APH even offers bold-line tactile graph sheets, which combine tactile and print. The following website features videos of graphing on the coordinate plane using the Graphic Aid for Mathematics: https://www.tsbvi.edu/videos-webinars/mathematics.
- Have the student play the APH product, **TREKS: The Game of Compass Directions**, Catalog Number: 1-08910-00.
- Provide the student with a coordinate plane and several points plotted. Tell the student that you made a mistake and plotted the points backwards (y, x) instead of (x, y). Have the student try to fix your mistake and replot the points.
- Have the student research the Grevy's zebra to learn additional facts about this endangered species.
- Have the student locate videos of the Grevy's zebra to watch in order to see this species in its natural habitat.
- Have the student locate Africa on a map or globe. The student can calculate the travel distance from the United States to specific countries in Africa.
- Have the student research other species that leave their young with another member of a group in order to protect the young animal.

Giant Land Snail

Vocabulary

Data set: a list of number or values that represent observations

Median: the number in the middle of a sorted set of numbers.

Quartile: values that divide a list of ordered numbers into quarters.

First or lower quartile: On a box and whisker plot, the first quartile separates the lowest 25% of the data set from the rest of the data set. It is the point on the left side of the box.

Second quartile or Median: On a box and whisker plot, the median is the line inside the box. It separates the lower 50% of the data set from the upper 50% of the data set.

Third or upper quartile: On a box and whisker plot, the third quartile separates the highest 25% of the data set from the rest of the data set. It is the point on the ride side of the box.

Meet the Giant Land Snail

The Giant Land Snail is as big as an adult's fist and can weigh more than a pound. This mollusk species was originally found in East Africa but has spread around the world. The Giant Land Snail is an invasive species and is considered a pest because it is destructive. It eats almost anything, destroying native plants. It will even eat the plaster walls of houses to get calcium to grow its shell. Giant Land Snails first appeared in the United States in 1966, when a boy brought three into the country to keep as pets and his grandmother turned them loose in her garden. Today the snails have infested many regions and people spend millions of dollars to get rid of them. Many Giant Land Snails carry a parasite that can make humans very sick. So, if you encounter a snail that is bigger than a baseball, do not pick it up with your bare hands! Tap the next button to continue.

Graphic LS1 is on the following 2 pages in print and simbraille.

For braille readers, the opening Nemeth Code indicator is used after the data and is placed on a line by itself. The Nemeth Code terminator follows the box plot.

Get Ready for Some Questions

Get sheet LS1 out from your notebook. First, scan the entire box plot to get familiar with where the information is placed on the page. If you are a braille reader, use both of your hands as you scan. Whether using your eyes or hands, start at the top of the page and move down to the bottom going from left to right so you don't miss any information. You are going to use Sheet LS1 to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the box plot on sheet LS1 tap the next button.

Getting Started 1

Describe the box plot and tell what each part is. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the Giant Land Snail from this box plot? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Weight of 10 Giant Land Snails

Data: 5, 6, 7, 7, 8, 9, 10, 12, 15, 16

Ounces

LS1

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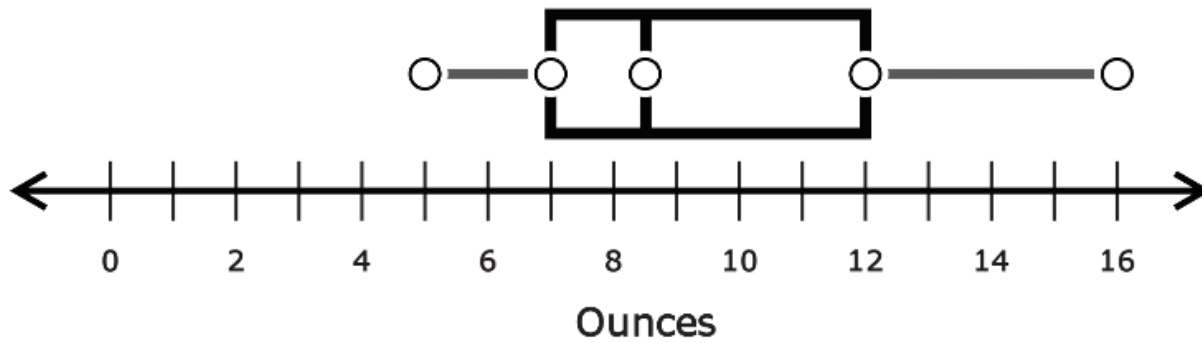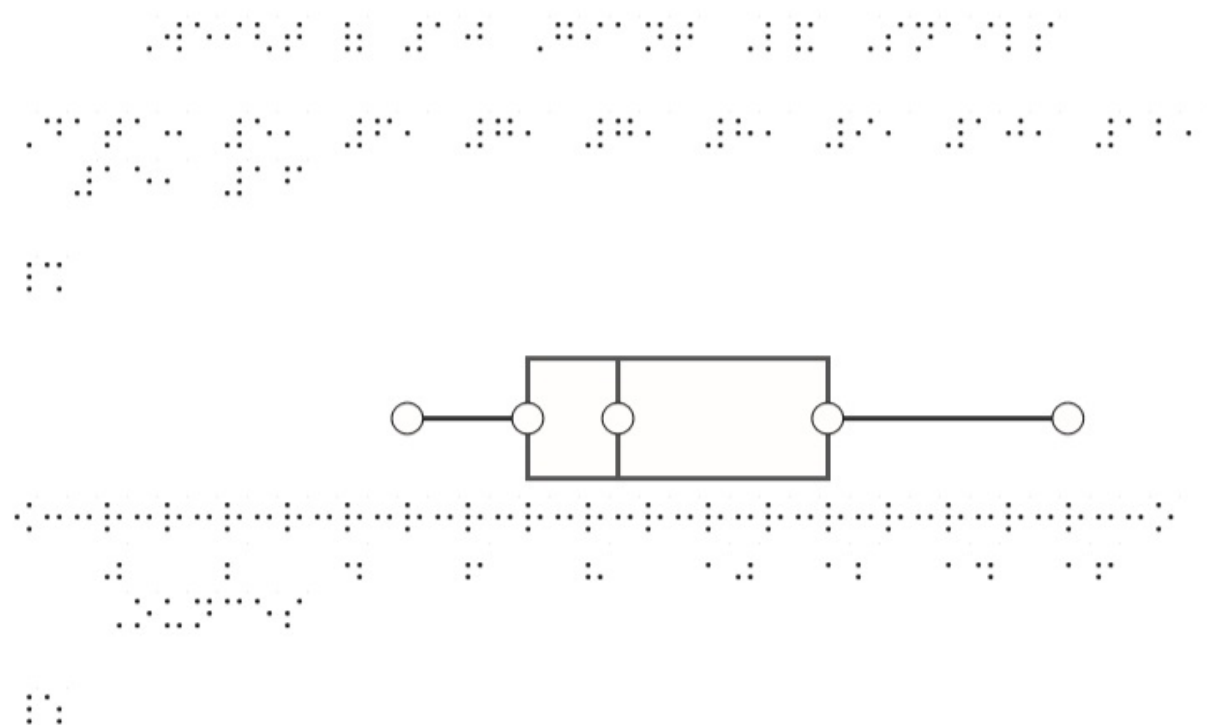
Graphic LS2 is on the following 2 pages in print and simbraille.

For braille readers, the opening Nemeth Code indicator is used after the title and is placed on a line by itself. The Nemeth Code terminator follows the box plot.

Get Ready for the Warm Up

You are going to use sheets LS1 and LS2 to build your skills with box plots. Get both sheets out of your notebook. Be sure to check your answer to each question about box plots. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about Giant Land Snails comes from research done by scientists. Giant Land Snails have become pests in many areas. One snail can live up to 9 years. They reproduce quickly. Giant land snails reproduce by laying eggs. One Giant Land Snail can produce over 1,000 eggs in a year. A few Giant Land Snails can quickly become a big problem. Tap the next button to continue.

Warm Up 1

A box plot is often called a box and whisker plot. In this unit, we will use the term box plot because it is shorter. A box plot is a graph that summarizes a set of data. Sheet LS1 includes the weight in ounces of 10 Giant Land Snails. Find the set of weights. Are the weights listed in order? Do they go from lightest to heaviest or in some other order?
A = Yes, they go from lightest to heaviest.
B = Yes, they go from heaviest to lightest.
C = No, they are in random order.
Correct Answer: Yes, they go from lightest to heaviest.

Warm Up 2

The median is the middle value of a set of numbers. When there is an even amount of numbers, add the two middle numbers and divide by 2 to get the median. On sheet LS1, what are the two middle numbers?

A = 8, 9
B = 9, 10
C = 10, 12
Correct Answer: 8, 9

Shell Length for 15 Giant Land Snails

inches

LS2

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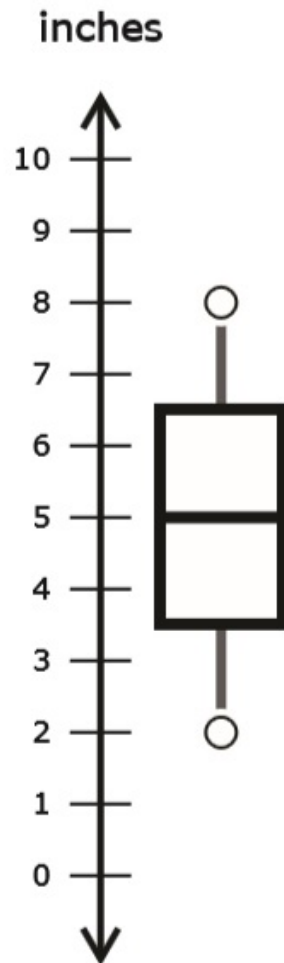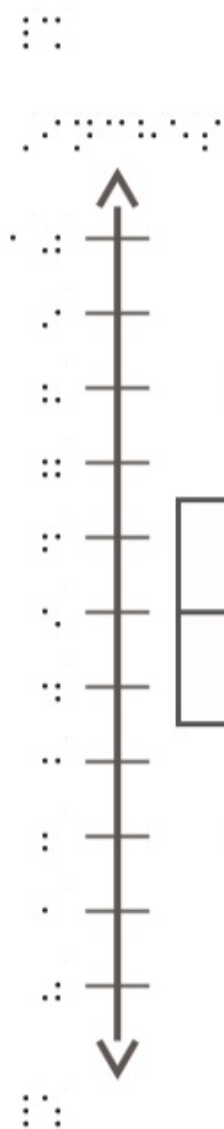
Warm Up 3

On sheet LS1 find the number line. Above the number line, there is a rectangular box. There is a vertical line through the box. If you follow the line down, you'll discover it is located right above 8.5 on the number line. What do you think the line represents?

A = the median weight of the data

B = the biggest weight in the data
C = the smallest weight in the data

Correct Answer: the median weight of the data

Warm Up 4

The box part of the box plot shows what the data set is like when it is divided into four equal parts. The median divides the set of data in two. Each half can also be divided into two by finding its quartiles. The left and right walls of the box show those quartiles. The first quartile is the median of the data points to the *left* of the median. The third quartile is the median of the data points to the *right* of the median. On sheet LS1, find the left side of the box and follow the line down to the value on the number line. Then find the right side of the box and follow the line down to the value on the number line. What are the two values?

A = 6, 2
B = 7, 12
C = 8, 16

Correct Answer: 7, 12

Warm Up 5

The box has lines coming out from its left and right sides. These are the whiskers of the box plot. On sheet LS1 use the number line to see where the whiskers end. The whisker on the left is drawn from the first quartile to the minimum of 5, and the whisker on the right is drawn from the third quartile to the maximum of 16. What do you think the far ends of the whiskers show about the data?

A = The two quartiles in the set of data.
B = The smallest and largest values in the set of data.
C = The median of the data.

Correct Answer: The smallest and largest values in the set of data.

Warm Up 6

To estimate the total weight of all the snails together use the median. Multiply the median by the total number of snails. Using the data on sheet LS1, what is a good estimate for this total? Remember the median is the middle value in a set of data ordered from smallest to largest. It is sometimes close to the average or mean.

A = 8.5 ounces
B = 10 ounces
C = 85 ounces

Correct Answer: 85 ounces

Warm Up 7

Compare sheet LS1 to sheet LS2. One difference between the box plots on the two sheets is that the box plot on sheet LS2 is oriented vertically or up and down. The box plot on sheet LS1 is oriented horizontally or left to right. What is another difference between the two box plots?

A = On sheet LS2 the original data set is not shown.

B = On sheet LS2 there are no whiskers on the box plot.

C = On sheet LS2 there is no median line on the box plot.

Correct Answer: On sheet LS2 the original data set is not shown.

Warm Up 8

On sheet LS2, find the box plot and follow the line that goes through the box to the number line on the left of the box. What is the median shell length?
A = 4 inches
B = 5 inches
C = 6 inches
Correct Answer: 5 inches

Warm Up 9

On sheet LS2 look at the points at the end of the whiskers which are at the bottom and top of the box plot. These points line up with numbers on the number line. They tell you the shortest and the longest shell in the data set. The numbers you just found are the range. What are the lengths of the shortest and longest shells?

A = 2 inches and 7 inches
B = 3 inches and 8 inches
C = 2 inches and 8 inches

Correct Answer: 2 inches and 8 inches

Warm Up 10

On sheet LS2 look at the box on the box plot. The box shows half or 50 percent of the data set. The top of the box is at 6.5 inches on the number line and the bottom of the box is at 3.5 inches on the number line. What do these numbers tell you about the 15 shells that were measured?

A = Half of the shells are between 3.5 and 6.5 inches long.

B = None of the shells are between 3.5 and 6.5 inches long.
C = All of the shells are between 3.5 and 6.5 inches long.
Correct Answer: Half of the shells are between 3.5 and 6.5 inches long.

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried some box plots, how well do you understand this topic?

A = Very well, I know this material already.

B = Pretty well; I've worked on this kind of graph before, but I could use some practice.

C = Not very well; I need more practice.

Graphic LS3 is on the following 2 pages in print and simbraille.

For braille readers, the opening Nemeth Code indicator is used after the data and is placed on a line by itself. The Nemeth Code terminator follows the box plot.

Introduction Problem Set A

In problem set A, you will answer 5 multiple choice and one open ended question about data on sheet LS3. Take sheet LS3 out of your notebook. Some areas invaded by Giant Land Snails use dogs specially trained to find Giant Land Snails. The dogs use their sense of smell to locate snails that may be hard for people to see. This is because the snails hide behind plants, in thick grass, or even inside walls. One city used a dog detection team to investigate a neighborhood that invaded by Giant Land Snails. The team went door to door and checked each property, including the house, its yard, and any shed or garage on the property. They kept a record of the number of Giant Land Snails found on 21 properties. The box plot on sheet LS3 shows the results.

Number of Giant African Land Snails Per Property

Data: 0, 8, 12, 20, 30, 35, 40, 60, 80
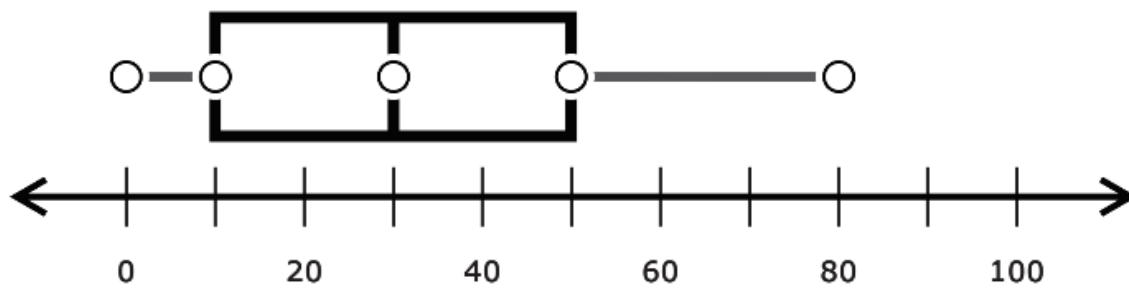
LS3

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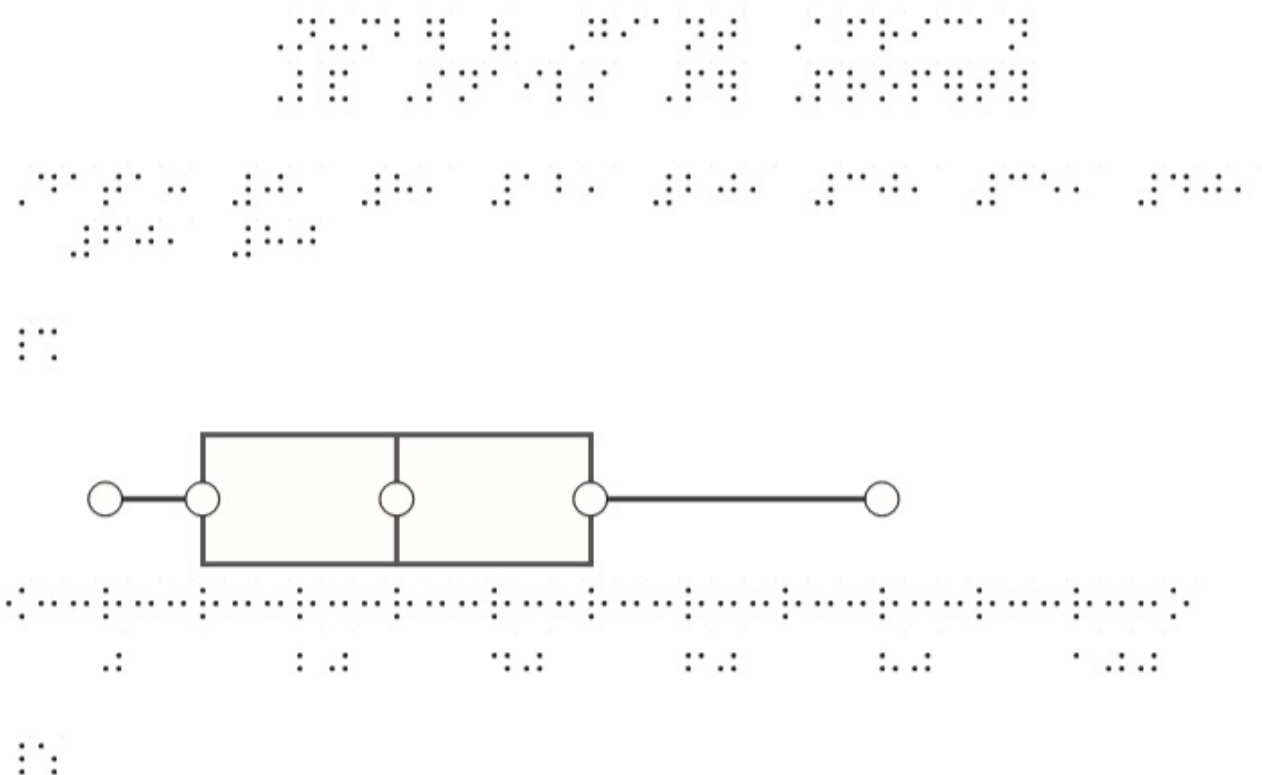
Problem A1

According to the box plot, what is the median number of Giant Land Snails located on a property searched in the dog detection program?

A = 10 snails
B = 30 snails
C = 50 snails
Correct Answer: 30 snails

Problem A2

Which of the following statements is correct?

A = Every property had some snails.
B = None of the properties had any snails.

C = On some of the properties, no snails were found.
Correct Answer: On some of the properties, no snails were found

Problem A3

How many snails did the dog detection team find on the property with the most snails?
A = 30 snails
B = 50 snails
C = 80 snails

Correct Answer: 80 snails

Problem A4

Remember, the range of a set of numbers goes from the lowest number to the highest number. Looking at the box plot, what is the range of snails found on the middle half of the properties?

A = 10 to 50 snails

B = 20 to 30 snails
C = 30 to 50 snails

Correct Answer: 10 to 50 snails

Problem A5 - A

The dog detection team visited 21 properties. Which of the following is the best estimate of the total number of Giant Land Snails that the dogs located? Hint: Take the number of properties times the median number of snails to get your answer.

A = 30 snails

B = 630 snails
C = 1,680 snails

Correct Answer: 630 snails

Problem A5 - B

What is the difference in Giant Land Snail infestation for the middle 50% of the properties visited by the dog detection team? Hint: Difference means subtraction.

A = 40 snails
B = 50 snails
C = 60 snails

Correct Answer: 40 snails

Problem A5 - C

What is the difference between the number of Giant Land Snails on the property with the most snails and the property with the least snails?

A = 30 snails
B = 40 snails
C = 80 snails

Correct Answer: 80 snails

Problem A6 - A

The box plot shows that there is at least one property with no Giant Land Snails. Given the rest of the data about the neighborhood, how likely do you think it is that there really were Giant Land Snails at that property, but the dogs just missed them? Record your answer.

Problem A6 - B

Imagine that the city says you can have any property in this neighborhood that you want to live in for free. The city tells you that you cannot check the house first for Giant Land Snails. Will you agree to live in the house? Why do you decide to live or not live in the house? Record your answer.

Problem A6 - C

A family tells you they are thinking about moving to this neighborhood. They tell you they do not like snails. Do you recommend to the family that they move to this neighborhood based on the data in the box plot? Why would you make that recommendation? Record your answer.

Graphic LS4 is on the following 2 pages in print and simbraille.

For braille readers, the opening Nemeth Code indicator is used after the data and is placed on a line by itself. The Nemeth Code terminator follows the box plot.

Introduction Problem Set B

In problem set B you will answer 5 multiple choice and one open-ended question about data on sheet LS4. Take sheet LS4 out of your notebook.

In its native habitat of Eastern Africa, the Giant Land Snail is considered good to eat. One traditional recipe is to soak the Giant Land Snail to remove the slime, cut it into strips, and then cook it with peppers and tomatoes. A restaurant owner wants to add something new to his appetizer menu. He finds a source of frozen Giant Land Snail meat that is safe to eat. Then he tries putting Giant Land Snails on the menu. After 2 weeks, he compares the number of Giant Land Snail plates and the number of chicken wing baskets ordered per night. Sheet LS4 shows the results.

Problem B1

What is the median number of Giant Land Snail plates and chicken wing baskets ordered per night?
A = 4 Giant Land Snail plates and 4 chicken wing baskets
B = 6 Giant Land Snail plates and 13 chicken wing baskets
C = 10 Giant Land Snail plates and 20 chicken wing baskets

Correct Answer: 4 Giant Land Snail plate and 4 chicken wing baskets

Number of Orders Per Night
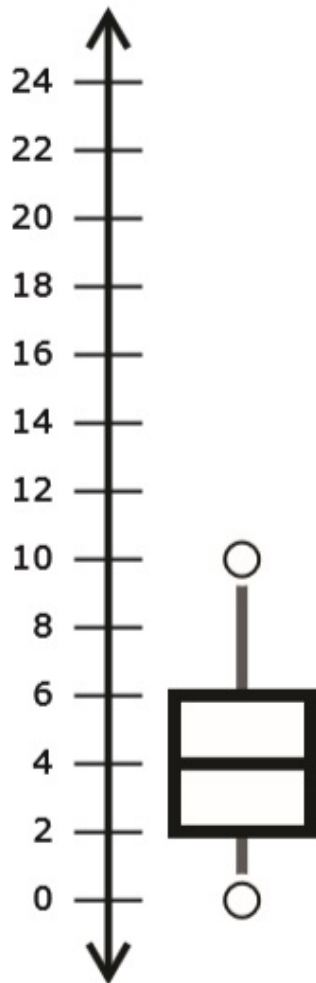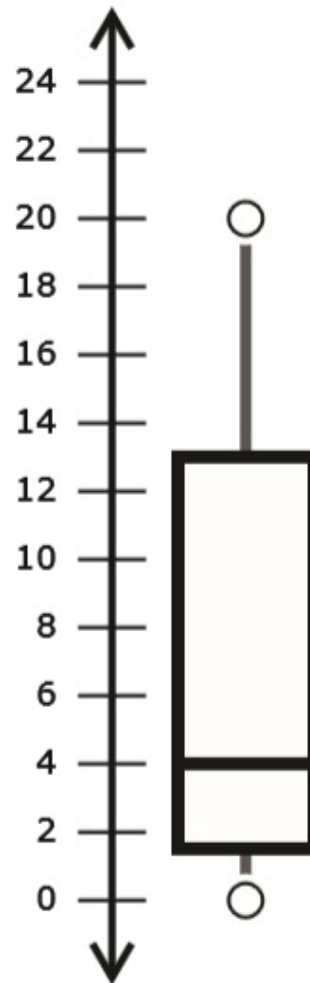
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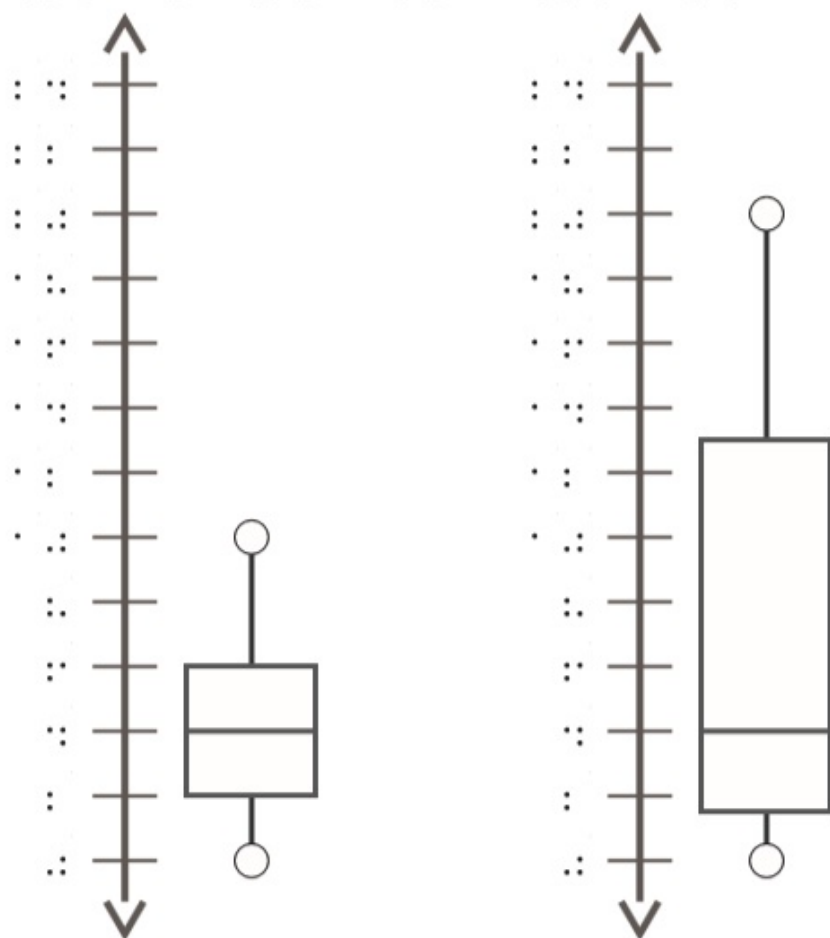
Problem B2

What is the maximum number of chicken wing baskets ordered per night?

A = 4 baskets

B = 10 baskets
C = 20 baskets

Correct Answer: 20 baskets

Problem B3

Did everyone order chicken wing baskets?

A = No, the lower whisker ends at 0 so some people didn't order a chicken wing basket.
B = Yes, the lower quartile is at 1.5 so everyone ordered at least one chicken wing basket.
C = There isn't enough information in the box plot to tell.

Correct Answer: No, the lower whisker ends at 0 so some people didn't order a chicken wing basket.

Problem B4

Look at the upper 50% of the data for Giant Land Snail plates ordered. What is the range of orders for this upper 50%?

A = 2 to 6 plates
B = 4 to 6 plates
C = 4 to 10 plates

Correct Answer: 4 to 10 plates

Problem B5 - A

Use the median to estimate the total number of Giant Land Snail plates and chicken wing baskets ordered after 14 days. What is the difference between the total number of Giant Land Snail plates and the total number of chicken wing baskets and why might your answer be misleading?

A = 10, it makes it look like there were more orders for Giant Land Snail plates than chicken wing baskets.
B = 0 makes it look like there are the same number of orders of Giant Land Snail plates as chicken wing baskets.
C = 0, it makes it look like there were no orders for Giant Land Snail plates or chicken wing baskets.

Correct Answer: 0 makes it look like there are the same number of orders of Giant Land Snail plates as chicken wing baskets.

Problem B5 - B

The box plot shows the orders of Giant Land Snail plates per night over 14 days. What is the best estimate of the total number of Giant Land Snail orders in 14 days?

A = 4 Giant Land Snail plates

B = 56 Giant Land Snail plates
C = 140 Giant Land Snail plates

Correct Answer: 56 Giant Land Snail plates

Problem B5 - C

How does the maximum number of chicken wing baskets ordered per night compare to the maximum number of Giant Land Snail plates?

A = The maximum number is the same for both.
B = The maximum is twice as big for chicken wing baskets.
C = The maximum is three times as big for chicken wing baskets.

Correct Answer: The maximum is twice as big for chicken wing baskets.

Problem B6 - A

The restaurant owner thinks that people just are not used to eating Giant Land Snails yet. He thinks that if he keeps them on the menu, orders of Giant Land Snail plate will someday match orders for chicken wing baskets. Based on the information in the box plots, do you think he is right? Explain why you think so. Record your answer.

Problem B6 - B

Imagine that you are the cook for the restaurant. You see a group arrive. As they sit down and look at the menu, you try to estimate what they will order. This way you can start to prepare their food. Based on the information in the box plots, will you get ready to make a Giant Land Snail plate? Why is this your decision? Record your answer.

Problem B6 - C

Based on the information in the box plots, do you recommend that the restaurant owner keep Giant Land Snails on the menu? Explain why you think so. Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use box plots in your school work?
A = Super, I can work with any box plot.
B = Ok, but I need more practice.

C = Not good, box plots are confusing.

What I Learned

What strategies work best for you so that you can get information from box plots? Record your answer.

Conclusion

If you've done the unit about the cane toad, the Giant Land Snail might seem similar. Both species were introduced to a new area and quickly became invasive pests. It is now illegal to bring a Giant Land Snail to the United States or to keep one as a pet. Tap the next button to see your score report for this unit.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Giant Land Snail: Box Plots.

- Have the student construct a box plot with data either found on the Internet or in a book or data you or the student make up. In constructing the box plot, the student may wish to use the APH **Draftsman Tactile Drawing Board, ruler, and stylus**, Catalog No: 1-08857-00 and the APH **Feel 'n Peel Stickers: Nemeth Braille-Print Numbers 0-100**, Catalog No: 1-08876-00.
- Have the student collect data from a group of classmates and then organize the data set to create a box plot.
- Have the student research other snail species and compare them to the giant land snail. What similarities and differences do the species have?
- Have the student research the giant land snail to learn additional facts about this invasive species.
- Have the student locate videos of the giant land snail to watch in order to see this species in its natural habitat.
- Have the student locate Africa on a map or globe. The student can calculate the travel distance from the United States to specific countries in Africa.

African Penguin

Vocabulary

Boundary: Boundaries on a map are drawn to show divisions between states, countries, political groups, or land and large bodies of water. For example, a solid or dashed line may be included in the key to show the boundary.

Estimate: To estimate means to find the approximate value of something. For example, on a map, using the scale, the reader may need to estimate the distance between two points.

Key: The key tells the categories/regions on the map. Another term for "key" is "legend". In addition, it usually differentiates each category/region, through color, texture, abbreviations, or distinctively shaped data points.

North arrow: A north arrow is used to show cardinal directions. The reader needs to understand where east, west, and south are located based on the direction the north arrow is pointing. Some maps use a compass rose that shows north, south, east, and west.

Scale: The scale is the ratio between the distance on the map and the actual distance on the ground.

Symbol: A symbol stand for something else. For example, on a map key a textured dot generally is the symbol for a city.

Meet the African Penguin

The African penguin is a species of penguin found on the southern African coast. Most live in the countries of Namibia and South Africa. They are very social and vocal birds. People say the African penguin's call sounds like a donkey's bray. African penguins do not fly. They have streamlined bodies, short tails, webbed feet, and wings like flippers to help them when diving into the water for food. Most of the African penguin's diet is fish and squid. They weigh an average of 6 pounds and are 2 feet tall. The African penguin has pink patches of skin above its eyes and a black facial mask. The back of the African penguin is black and its belly is white, with spots and a black band. The African penguin is endangered. Causes for the decline in the African penguin population include a decrease in its habitat and increase in pollution.

Graphic AP1 is on the following 2 pages in print and simbraille.

Get Ready for Some Questions

Get sheet AP1 out from your notebook. You are going to use it to answer 2 questions. You'll see it on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the map on sheet AP1, tap the next button to continue.

Getting Started 1

Describe the information on the map. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the African penguin from this map? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

African Penguin Colonies

Key:

———	Political Boundary
● (green)	Island Colonies
● (red)	Mainland Colonies
⁙	Largest Colony
▲	Potential New Colony
✕	Extinct Colony
CT	Cape Town
PE	Port Elizabeth
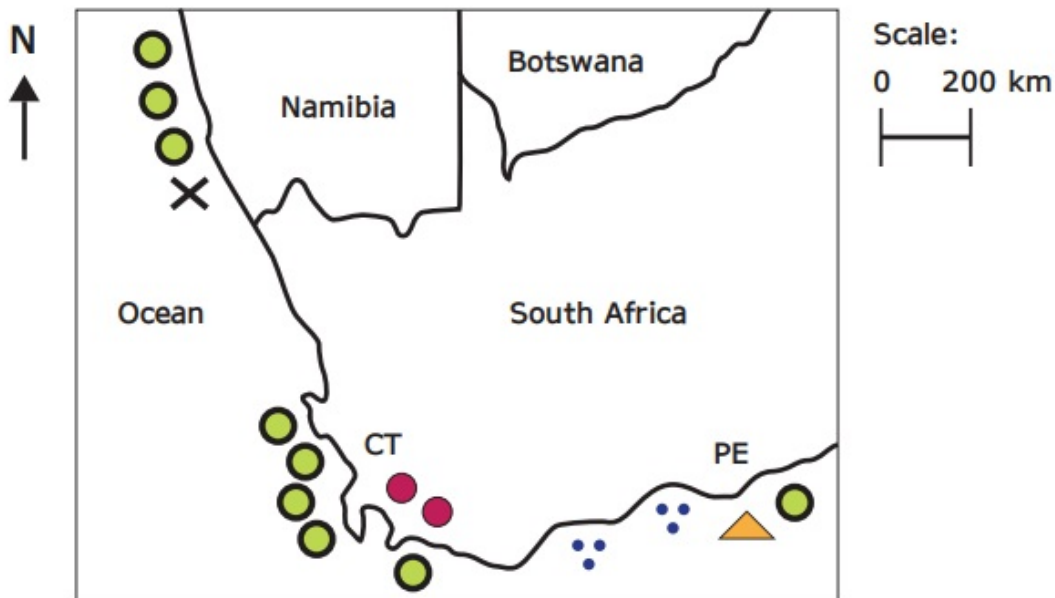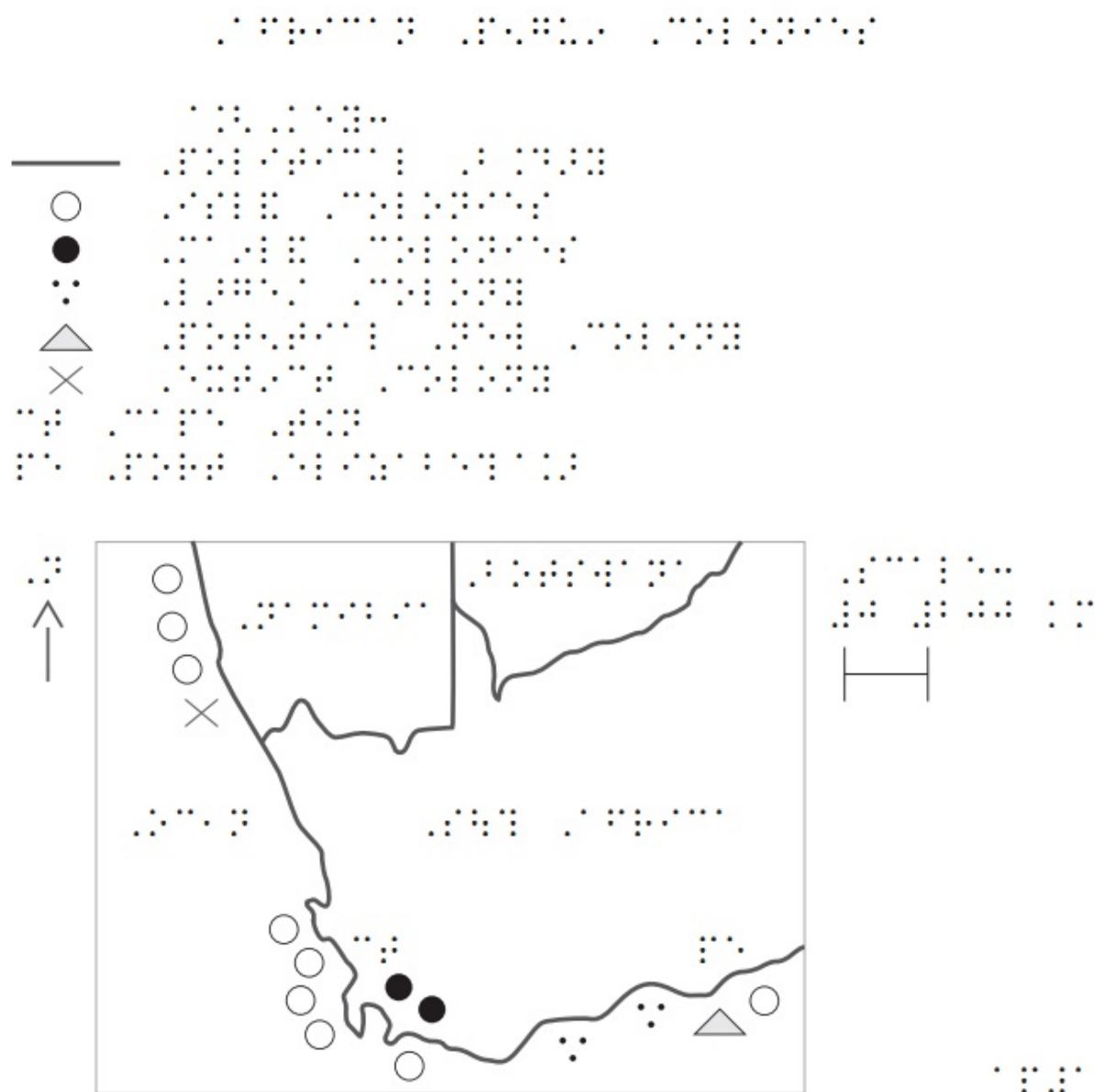
Graphic AP2 is on the following 4 pages in print and simbraille.

Get Ready for the Warm Up

You are going to use sheets AP1 and AP2 to build your skills with understanding maps. Get both sheets out of your notebook. Be sure to check your answer to each question about the map. If you get an answer wrong, ask your teacher to help you figure out what you missed. You will answer 10 warm up questions. The information you are learning about the African penguin comes from research done by scientists. There are around 30 African penguin colonies on the southwestern coast of Africa. In 2010, the estimated number of African penguins was 55,000. The African penguin population has declined by 2% per year since 2010. At this rate of decline, the African penguin is expected to be extinct in the wild by 2026. One of the reasons for the decline of the African penguin population is the way they breed and their challenge to create a safe nest for their eggs. There are many conservation groups working to help the African penguin. Some conservationists use tourism as a way to make people aware of how environmental conditions are causing the African penguin population to decline. By viewing the African penguin in their protected, natural habitat, tourists can see ways to improve the chances of the birds' survival. Tap the next button to continue.

Warm Up 1

Many maps have keys. It is important to look at the key to understand what symbols are on the map. On sheet AP1, there are 5 symbols describing African penguin colonies. Look at the map to locate all the places where the symbols are found. Look on sheet AP1. In what 2 countries are there African penguin colonies?
A = Botswana and South Africa
B = Namibia and South Africa
C = Namibia and Botswana

Correct Answer = Namibia and South Africa

Namibia and South Africa's Garden Route Tour

Key:

——————— Political Boundary

▬▬▬▬▬ River

▪▪▪▪▪▪▪▪ Garden Route

🔴 Overnight Stop

AL   Addo Elephant National Park

CT   Cape Town

ET   Etosha National Park

HR   Hermanus National Park

PE   Port Elizabeth

SW   Swakopmund

WN   Windhoek

AP2

Namibia

ET

WN

SW

Botswana

Limpopo
River

South Africa

Orange
River

Atlantic
Ocean

Indian
Ocean

AL

HR

CT

PE

AP2

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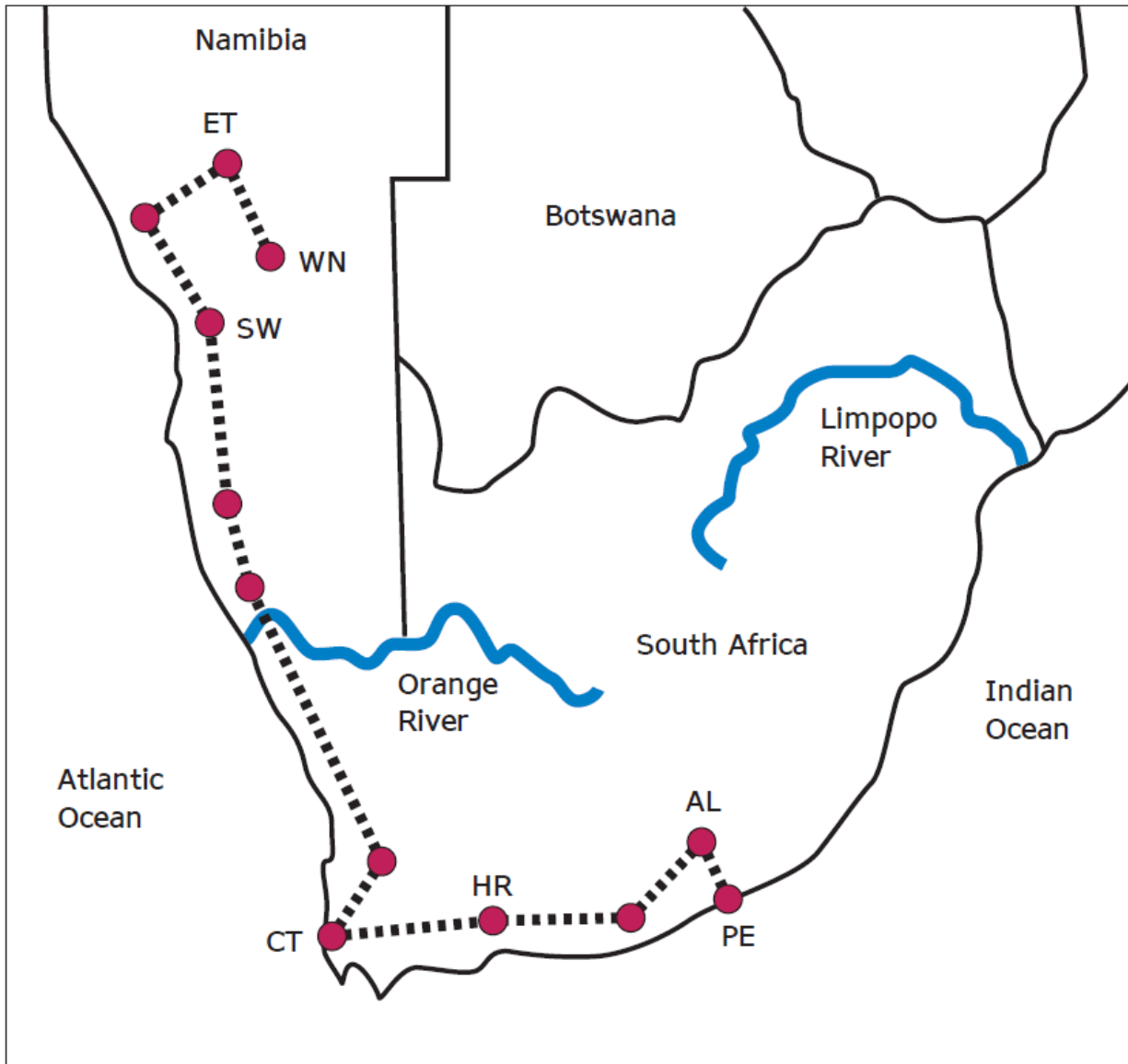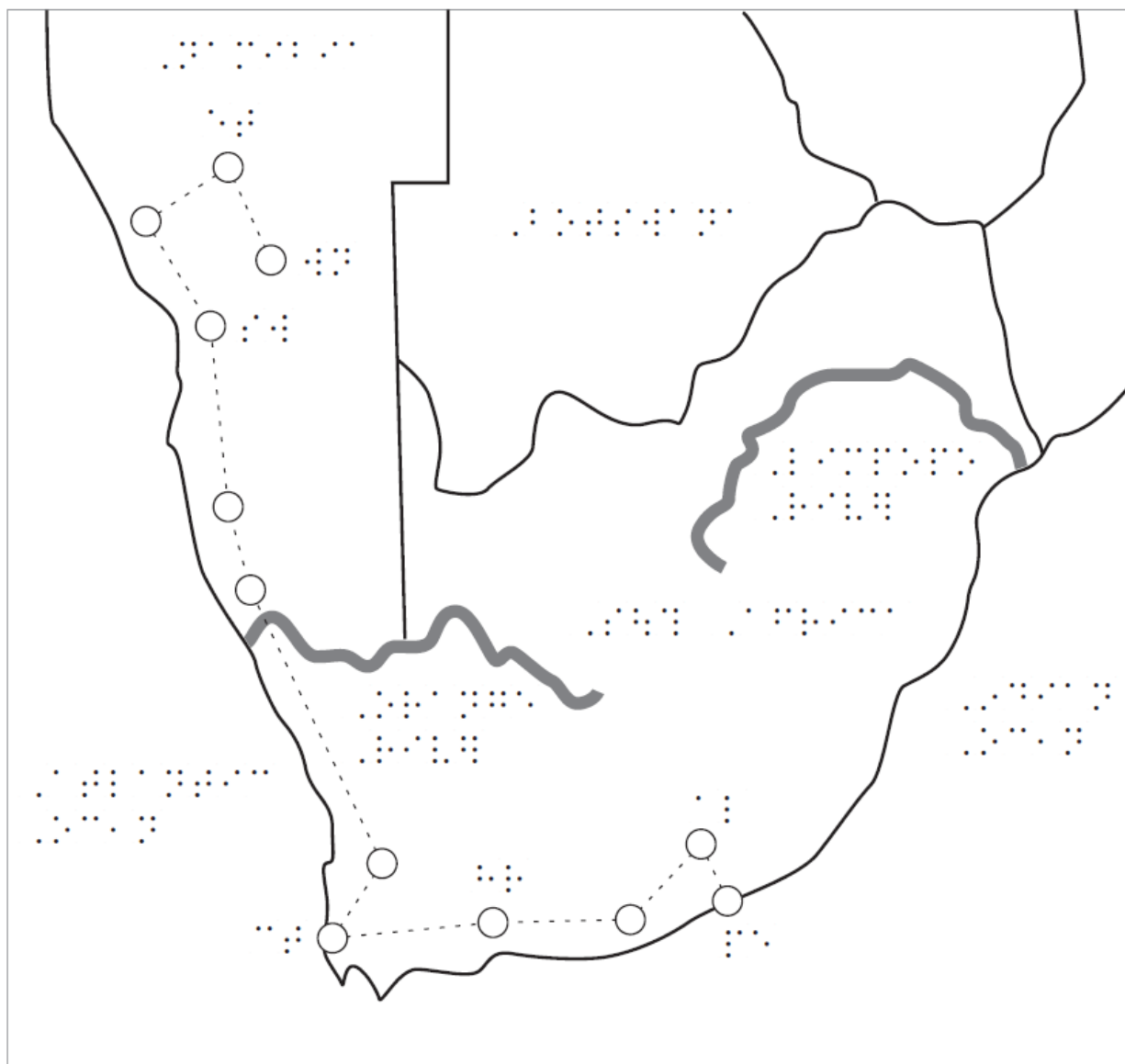
Warm Up 2

When you look at a map, you need to be systematic so you don't miss information. You might want to start at the top and go across from left to right as you move down the map. Or, you might want to start from a center point and work outward. The important thing is to have a plan so you don't miss anything. There are around 30 African penguin colonies in Namibia and South Africa. On sheet AP1, how many of the African penguin colonies shown are not potential or extinct?

A = 11 colonies
B = 13 colonies
C = 15 colonies

Correct Answer = 13 colonies

Warm Up 3

Most African penguins live in island colonies, but there are some mainland colonies in South Africa. On the map on sheet AP1, how many mainland African penguin colonies are shown?

A = 2 colonies

B = 5 colonies

C = 10 colonies

Correct Answer = 2 colonies

Warm Up 4

Some maps show routes, or lines of travel. On sheet AP2, find the Garden Route. Many tourists follow this multi-day route. Find where the tour starts in Windhoek. Follow the route that mainly goes south down the coast. In which country will travelers visit Hermanus National Park?

A = Namibia
B = South Africa
C = Cape Town

Correct Answer = South Africa

Warm Up 5

Sometimes the name of something shown on the map or in the key can give you information. Look at the names of the places along the Garden Route on sheet AP2. What animals can travelers expect to see as they travel the Garden Route?

A = monkeys
B = elephants
C = lions

Correct Answer = elephants

Warm Up 6

Scientists and conservationists have located two potential sites for new African penguin colonies. On sheet AP1, what direction does the scientist need to travel to go from the potential new sites to the mainland colonies?
A = north
B = south
C = west

Correct Answer = west

Warm Up 7

Look at sheet AP2 and find the Orange River. It is the natural and political boundary between Namibia and South Africa. After leaving Windhoek, how many possible overnight stops will a traveler on the Garden Route have in Namibia before arriving at the Orange River?

A = 2 overnight stops

B = 5 overnight stops

C = 12 overnight stops

Correct Answer = 5 overnight stops

Warm Up 8

Use the map on sheet AP2 and locate Swakopmund on the Garden Route. Besides African penguins, travelers can also go whale watching along the Garden Route. A traveler sees a pod of southern right whales in a town 4 stops south of Swakopmund. What is the name of the town where the traveler saw a pod of southern right whales?
A = Port Elizabeth
B = Cape Town
C = Hermanus

Correct Answer = Cape Town

Warm Up 9

On sheet AP1 find the Island Colonies along the coast of Namibia. If an African penguin travels from the northern Island Colony to the southern Island Colony, approximately how many kilometers does it travel? To find the distance, first locate the scale in the key and measure it. Notice what the scale unit represents. One way to do this is to use a ruler. Another way is to use your finger or another object. Next, locate the Island Colonies and measure the distance they cover along the coast. What is your estimate of the length?

A = 100 km
B = 300 km
C = 800 km

Correct Answer = 300 km

Warm Up 10

Some tourists like to watch birds at wetlands created where the river meets the ocean. On the map on sheet AP2, what ocean and river create one of the wetlands?
A = Orange River and Indian Ocean
B = Limpopo River and Atlantic Ocean
C = Orange River and Atlantic Ocean

Correct Answer = Orange River and Atlantic Ocean

> *Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.*

Select Difficulty

Now that you've tried some maps, how well do you understand this topic?

A = Very well, I know this material already.

B = Pretty well; I've worked on maps before, but I could use some practice.

C = Not very well; I need more practice.

Introduction Problem Set A

In problem set A, you will answer 5 multiple choice and one open ended question about data on sheet AP3. Take sheet AP3 out of your notebook. There are many factors causing the decline of the African penguin population. One of the most-deadly causes was a bad oil spill in 2000. A boat called the MV Treasure was carrying 150,000 tons of oil from China to Brazil when it sank off the coast of South Africa. More than 20,000 African penguins living on the Robben and Dassen Islands, north of Cape Town, were covered with oil. Volunteers worked to carefully clean the oil off the penguins so they did not die. Though 90% of the African penguins lived, the oil killed off their food sources and destroyed a lot of their habitat.

Problem A1

Look at the places where there is oil on the map. What part of the island has the most oil?

A = north
B = south
C = west

Correct Answer: south

Oil Spill Effects on Dassen Island

Key:

🟥	Fenced Area
⬛	Oil
——	Land Outline
▪▪▪▪▪▪▪	Wall
⭕	Cape Nature Conservation Base
🟧	Lighthouse

AP3

N

Map Scale:

0   400 m

Boom Point

House Bay

Waterloo Bay

West Bay

Lime-Kiln
Bay

Ichaboe
Point

Whale Bay

AP3

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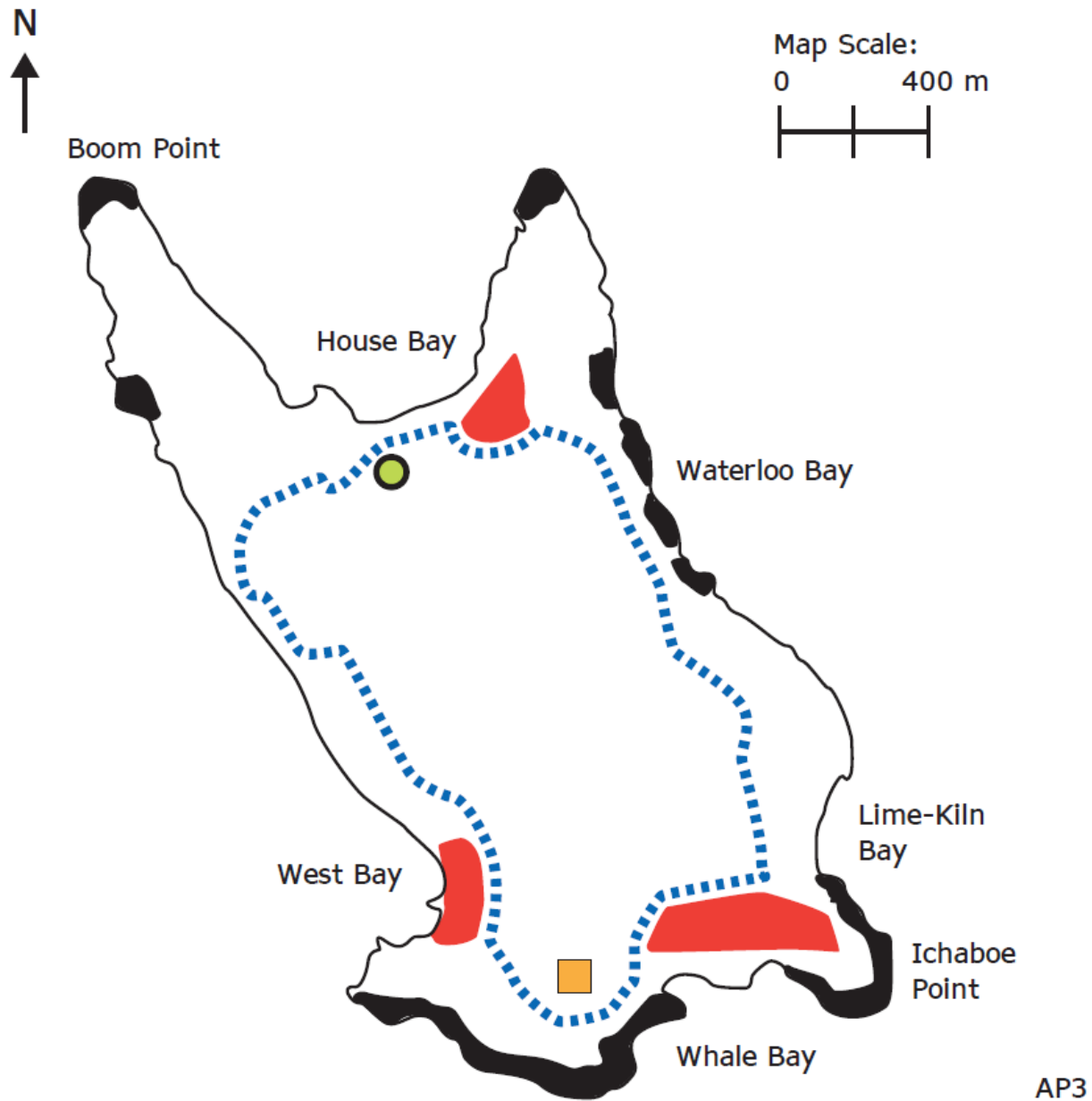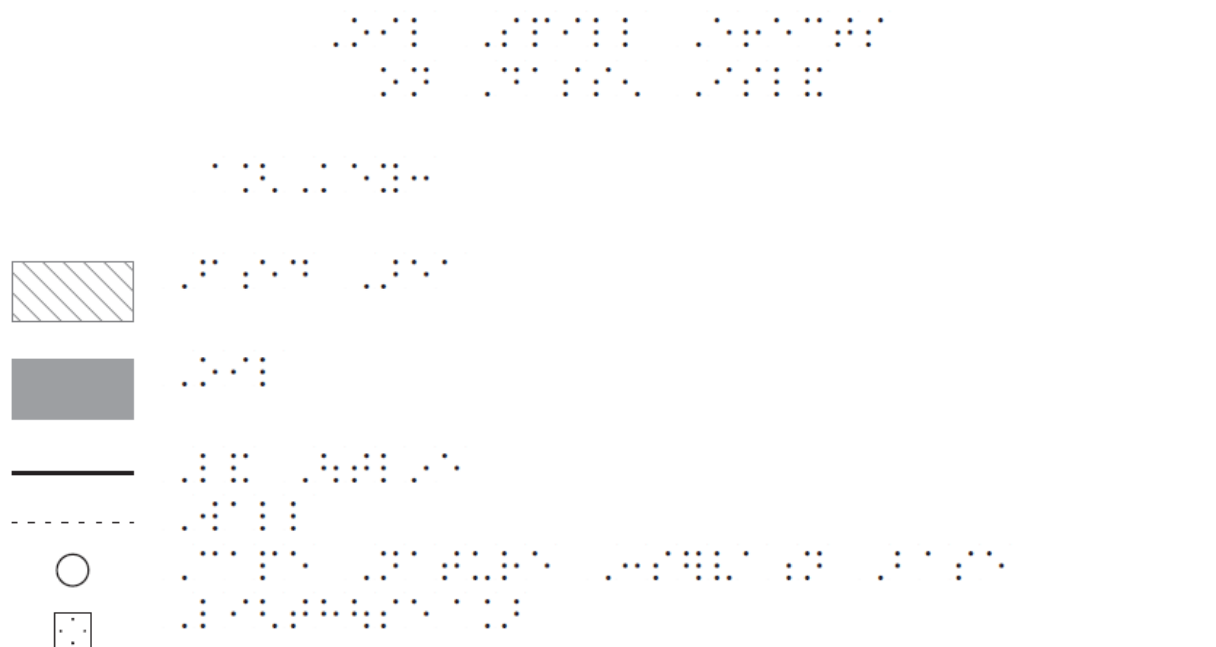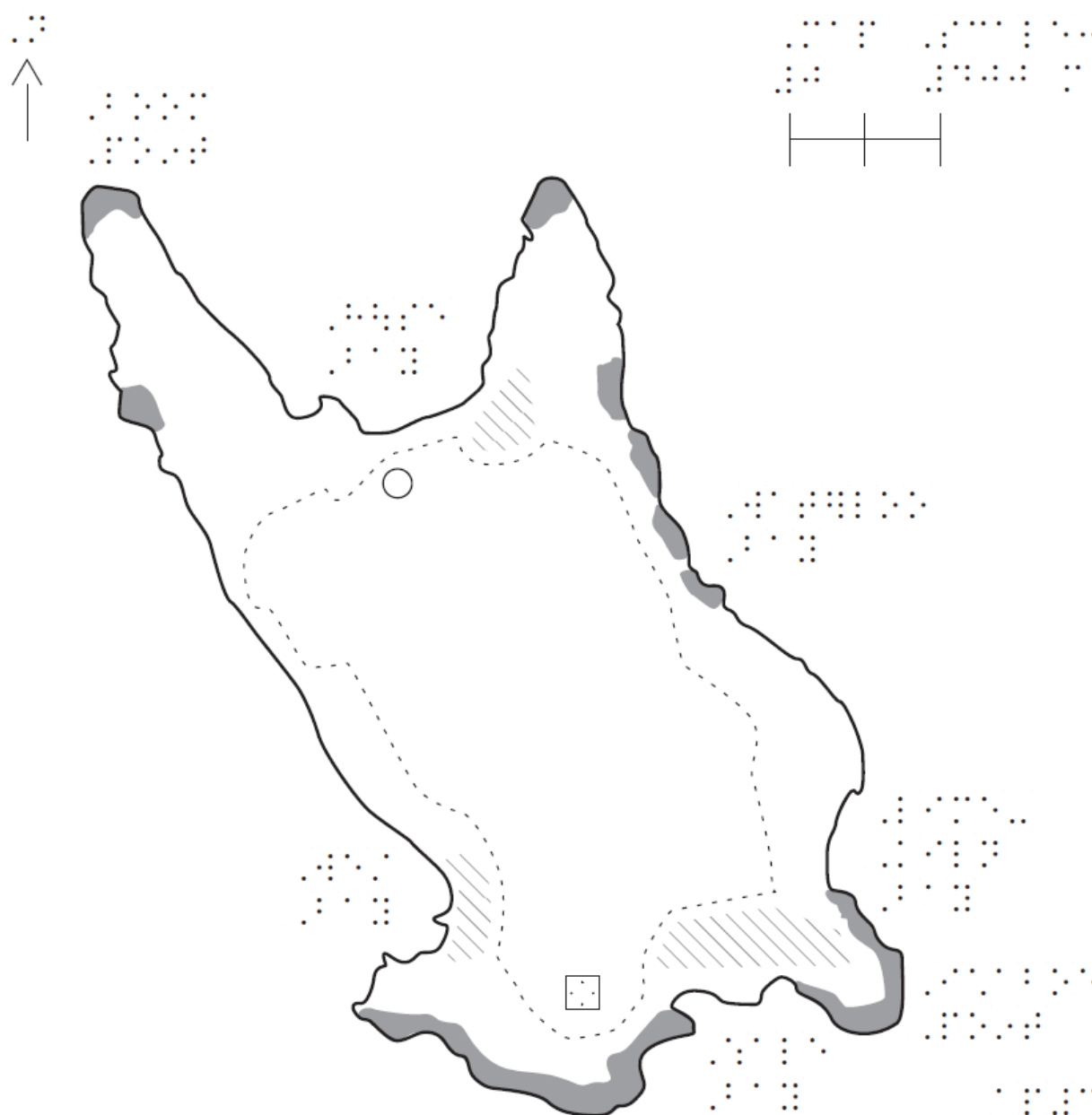
Problem A2

A bay is a body of water that is partially surrounded by land. There are 5 bays that surround Dassen Island. Which two bays on Dassen Island have no oil on their shores?

A = Whale Bay and Lime-Kiln Bay

B = West Bay and House Bay

C = House Bay and Waterloo Bay

Correct Answer: West Bay and House Bay

Problem A3

The farthest location the oil spill reached on Dassen Island was at Boom Point. Boom Point is located on which part of the island?

A = northwest

B = northeast

C = southwest

Correct Answer: northwest

Problem A4

On June 26, 2000, three days after the MV Treasure oil spill, scientists and volunteers began to fence off parts of Dassen Island. They did not want the African penguins to go into the sea once the oil had reached the shore of the island. How many fenced areas are on Dassen Island?

A = 2 fenced areas

B = 3 fenced areas
C = 4 fenced areas

Correct Answer: 3 fenced areas

Problem A5 - A

A helicopter picks up volunteers at Ichaboe and flies to the lighthouse to pick up more volunteers. It then flies to the Cape Nature Conservation Base. Estimate how far the helicopter traveled.

A = 800 m
B = 1600 m

C = 2400 m

Correct Answer: 2400 m

Problem A5 - B

Estimate how far away the lighthouse is from the Cape Nature Conservation Base.

A = 400 m
B = 1600 m
C = 6000 m

Correct Answer: 1600 m

Problem A5 - C

Using the scale, estimate how far away the lighthouse is from the Cape Nature Conservation Base.

A = 400 m
B = 1600 m
C = 6000 m

Correct Answer: 1600 m

Problem A6 - A

From what you know about the path of the oil, which bay would an African penguin have the best chance of not getting covered in oil? Why do you think so? Record your answer.

Problem A6 - B

After the MV Treasure sank, do you think an African penguin living in House Bay would be safe from the boat's oil? Why do you think so? Record your answer.

Problem A6 - C

The MV Treasure sank south of the Dassen Island. The ocean current carried the oil from the boat north. Which area of Dassen Island do you think had the fewest African penguins covered in oil? Why do you think so? Record your answer.

Graphic AP4 is on the following 2 pages in print and simbraille.

Introduction Problem Set B

In problem set B, you will answer 5 multiple choice and one open ended question about the city map on sheet AP4. Take sheet AP4 out of your notebook. The African penguin is a common penguin breed on exhibit in larger aquariums and zoos around the world. Bayworld Oceanarium in Port Elizabeth is home to South Africa's second largest captive African penguin population. In addition to the aquarium attraction, Bayworld also has a historical museum and reptile themed snake park.

Problem B1

The map shows the neighborhood and businesses near Bayworld. Locate Bayworld on the map. Which street is south of Bayworld?

A = Beach Rd

B = La Roche Dr

C = Brookenshill Dr

Correct Answer: Brookenshill Dr

Problem B2

Another popular family attraction in Port Elizabeth is Splash Waterworld, a waterpark. If your family leaves Bayworld out of the Beach Road exit and walks to Splash Waterworld, in general, what direction does your family need to walk?

A = west

B = north

C = south

Correct Answer: north

Problem B3

An intersection is when two streets cross or intersect. The Burger Hut is located by the intersection of Windmere Rd and Mansions Ave. On which corner of the intersection is Burger Hut located?

A = northwest corner

B = southeast corner

C = southwest corner

Correct Answer: southwest corner

Bayworld Area in Port Elizabeth

Key:

🔴 point of interest   HT   Hotel
BR   Burger Hut   PB   Public Beach
BW   Bayworld   SM   Smiley Ice Cream
BY   Bay Cafe   SW   Splash Waterworld

N

Humewood Rd

Beach Rd

Ocean Ave

SM 🔴   🔴 SW

Strand Ave

PB

🔴 HT

Sprayview Ave

🔴 BY

Indian Ocean

Mansions Ave

BR 🔴

La Roche Dr

BW 🔴

Brookenshill Dr

Windmere Rd

AP4

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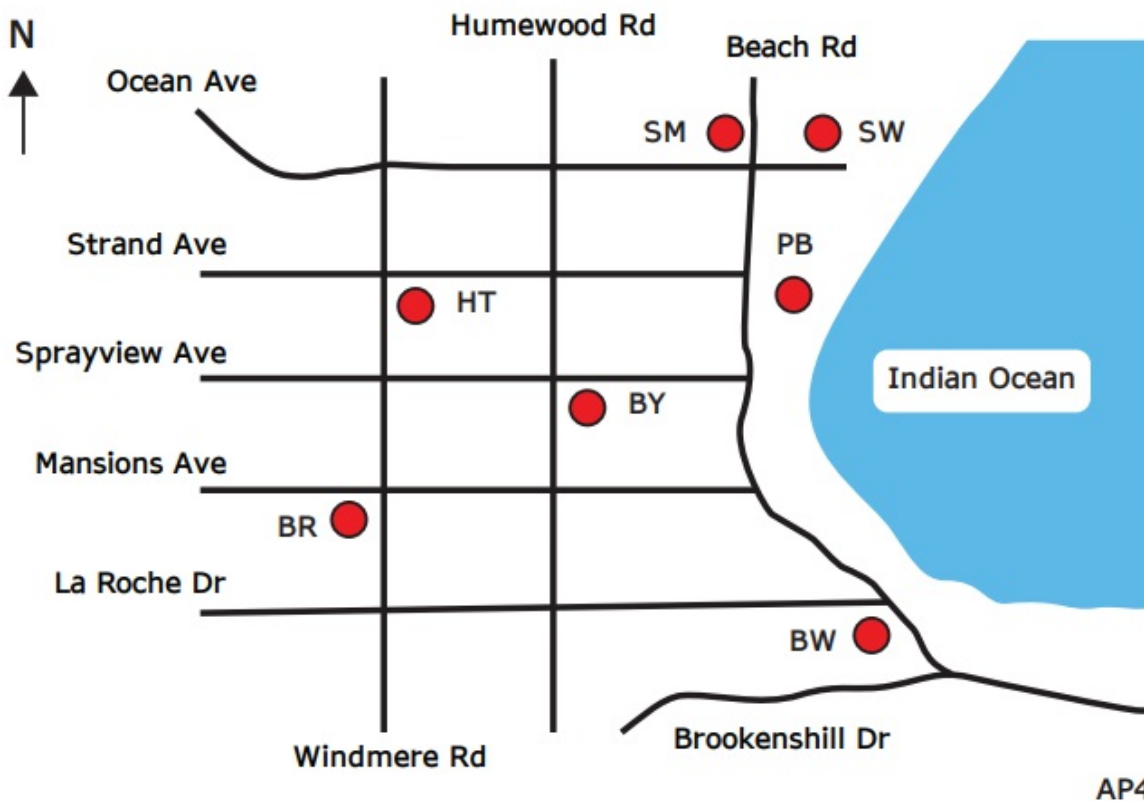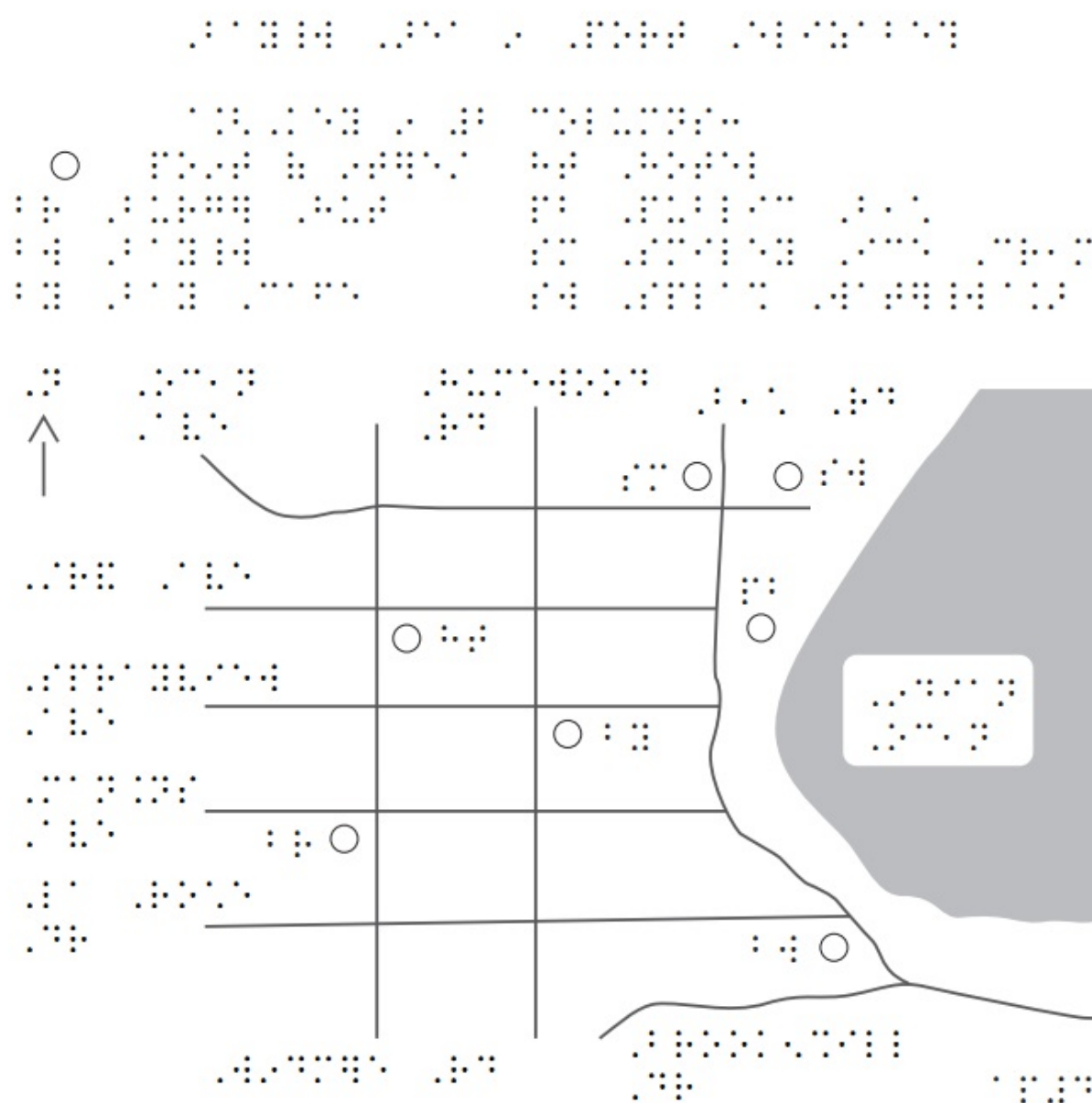
Problem B4

Find the hotel located on the southeast corner of Windmere Rd and Strand Ave. Which of the following is a possible route to walk from the hotel to Bayworld?

A = Walk east on Strand Ave, then walk south on Beach Rd

B = Walk north on Windmere Rd, then walk east on Ocean Ave

C = Walk south on Windmere Rd, then west on La Roche Dr

Correct Answer: Walk east on Strand Ave, then go south on Beach Rd

Problem B5 - A

Strand Ave and Ocean Ave go in the same direction. They both go east to west. What are two other streets that go east and west?

A = Mansions Ave and Windmere Rd
B = La Roche Dr and Beach Rd
C = Sprayview Ave and Mansions Ave

Correct Answer: Sprayview Ave and Mansions Ave

Problem B5 - B

After a long day at Splash Waterworld, many families like to walk to Smiley Ice Cream. At which corner and intersection is Smiley Ice Cream located?

A = The southwest corner of Ocean Ave and Beach Rd
B = The northwest corner of Ocean Ave and Beach Rd
C = The northeast corner of Strand Ave and Beach Rd

Correct Answer: The northwest corner of Ocean Ave and Beach Rd

Problem B5 - C

There are many popular restaurants in Port Elizabeth. At which intersection is the Bay Cafe located?

A = The intersection of Windmere Rd and Strand Ave
B = The intersection of Humewood Rd and Sprayview Ave
C = The intersection of La Roche Dr and Beach Rd

Correct Answer: The intersection of Humewood Rd and Sprayview Ave

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Problem B6 - A

Another visitor to Port Elizabeth asks you how to walk from the hotel to Bayworld with a stop for food on the way. What are the directions you will tell the visitor? Why did you pick this route? Record your answer.

Problem B6 - B

Another visitor to Port Elizabeth asks you how to walk from the hotel to Splash Waterworld. What are the directions you will tell the visitor? Why did you pick this route? Record your answer.

Problem B6 - C

Another visitor to Port Elizabeth asks you how to walk from the hotel to the public beach. What are the directions you will tell the visitor? Why did you pick this route? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use maps in your school work?"

A = Super, I can work with almost any map.

B = Ok, but I need more practice.

C = Not good, maps are confusing.

What I Learned

What strategies work best for you so that you can get information from maps? Record your answer.

Conclusion

African penguin colonies are in coastal areas in South Africa and Namibia. Many conservation organizations are doing a lot of work to increase the African penguin population and protect their habitat. In this unit, you used maps to learn about where the African penguin lives in the wild and in captivity. Maps are useful when you want to show where something is located or to find a specific location. Many people use map features on their phones or computers to get directions on how to get somewhere. Tap the next button to see your Score Report for this unit.

Follow-Up Activities

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Tasmanian Devil: Bar Graphs 1.

- Have the student construct a bar graph with data either found on the Internet or in a book or data you or the student make up. In constructing the bar graph, the student may wish to use a variety of large print or embossed graph paper available from APH. APH even offers bold-line tactile graph sheets, which combine tactile and print. Alternatively, the student may wish to use materials from the APH product, **MathBuilders: Unit 8: Manipulative Set** Catalog No: 61-421-091.
- Have the student poll peers and then create a bar graph based on the results.
- Have the student compare and contrast a single category bar graph and single category line graph showing the same data set.
- Create a riddle or puzzle that can only be solved by gathering information from a bar graph you supply the student.
- Have the student research the Tasmanian Devil to learn additional facts about this endangered species.
- Have the student locate videos of the Tasmanian Devil to watch in order to see this species in its natural habitat.
- Have the student locate Australia on a map or globe. The student can calculate the travel distance from the United States to Australia.

Flying Fox

Vocabulary

Column: A vertical listing of information that is part of a table.

Data table: A table that displays information in rows and columns.

Row: A horizontal listing of information that is part of a table.

Meet the Flying Fox

The flying fox is not actually a fox! It is a type of fruit bat that is native to Australia. Its face, pointed ears, and reddish fur make it look like a fox. Fruit bats, like the flying fox, eat fruit, pollen, and flower nectar. Their native habitat has traditionally been eucalyptus tree forests and wild grasslands with flowering plants. However, the climate of Australia is getting hotter and drier and this is causing flying foxes to move into the cities. Bat species like the flying fox have discovered that cities have yards, parks, and gardens with flowers and fruit trees that provide a source of food. Cities also often have large trees that make good homes for sleeping. They have water to drink in fountains and irrigation systems. So flying foxes have been moving out of rural areas and establishing colonies in cities.

>   Graphic FF1 is on the following 4 pages in print and simbraille.

>   *Encourage your student to view both the data table and the line graph. Point out that data is missing from the table and that this has been done deliberately. During this unit, the student will be learning how to fill in the data using information from the graphic.*

Get Ready for Some Questions

In this unit, each "sheet" is really two pages. One is a data table and the other a graph. You will notice that some numbers are missing on the data table. This is because you will be learning how to fill in the missing numbers using the information from the graph or map. Be sure to have both sheets when answering questions. Get FF1 out from your notebook. Take time to scan both pages from top to bottom and left to right so you are familiar with the information on the pages. You are going to use FF1 to answer 2 questions. You'll see FF1 on the screen below each question and can double tap with a single finger to make it fill the screen. When you're ready to answer 2 questions about the flying fox on sheet FF1, tap the next button.

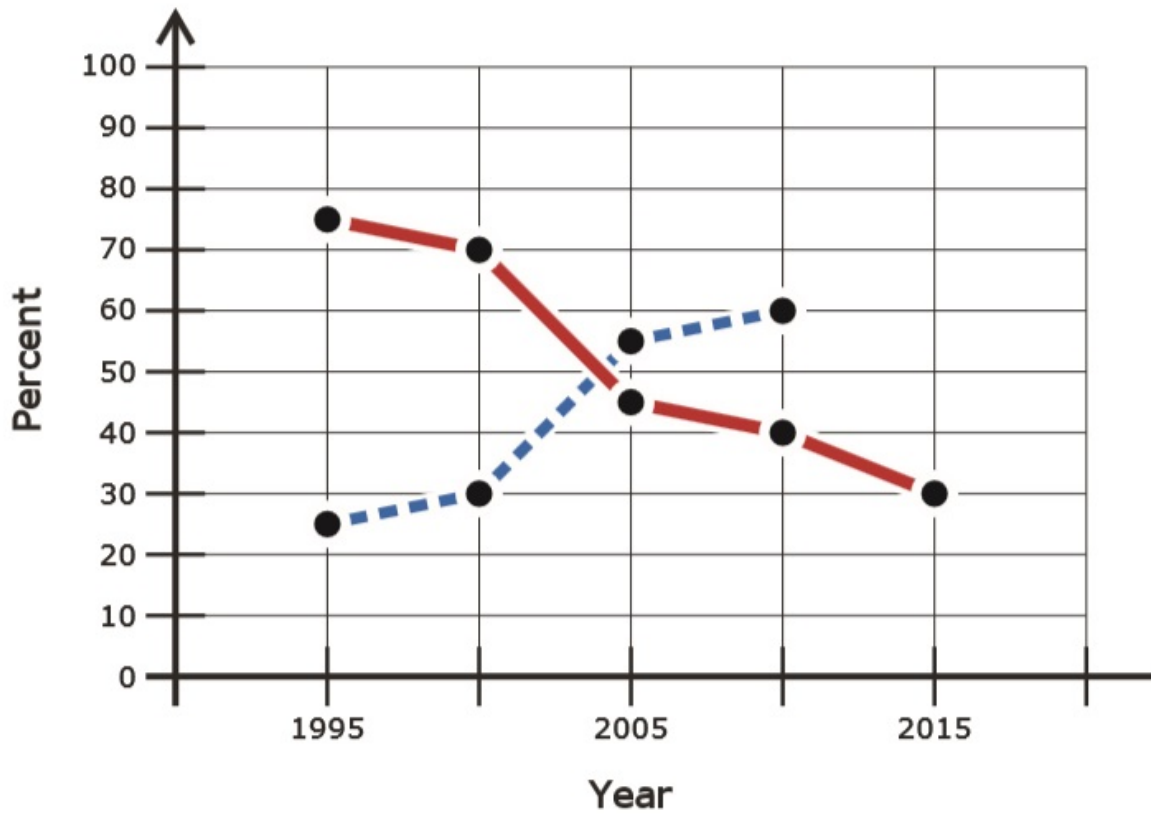## Percent of Flying Foxes Observed

Year	Rural	City
1995	75	
2000	70	30
	45	55
2010	40	60
2015		70

FF1

Percent of Flying Foxes Observed

Key:

— Rural
▪▪▪▪▪ City

FF1

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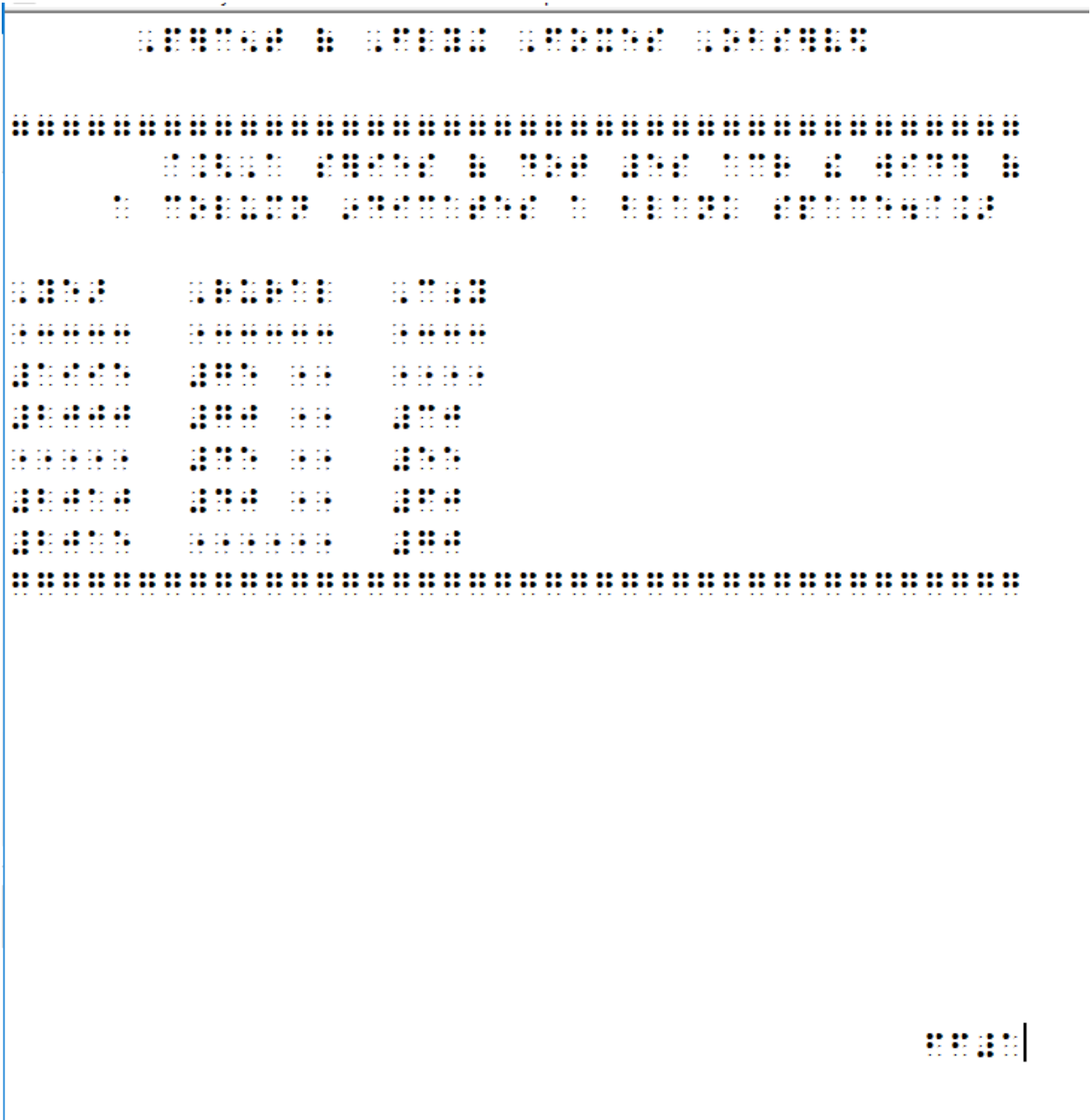
Getting Started 1

Describe this graph and how it shows the data in the table. If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Getting Started 2

What is one thing you know about the flying fox from the data shown in the table and the graph? If you are unsure, please try your best. It's ok if you don't know the answer. Record your answer.

Get Ready for the Warm Up

You are going to use sheets FF1 and FF2 to build your skills with data tables and graphs. Some data is missing from the table. You'll learn how to fill in the missing data using the graph or map. Get both sheets out of your notebook. You will answer 10 warm up questions. Be sure to check your answer to each question. If you get an answer wrong, ask your teacher to help you figure out what you missed. The information you are learning about the flying fox comes from research done by scientists. The flying fox species is an important part of the natural environment. Like bees, when flying foxes feed on flowers they help to spread pollen around. When they land in a fruit tree to feed, they help to spread seeds to new locations. Often, if there are lots of other flying foxes in the same tree, a flying fox will fly away with its fruit so it doesn't get snatched away by another flying fox. Sometimes it may drop the fruit, which is too bad for the flying fox! However, seeds from the fruit end up sprouting in a new place.

Warm Up 1

Sheet FF1 has a data table and a line graph. There are three columns in the data table. Each column has a heading that is in the first row. Line graphs are a good way to show data that changes over time. The data for the line graph comes from the data table. Data tables are arranged in columns and rows. Notice that there is a year missing from the first column of the data table. Look at the x-axis on the line graph. What year is missing in the data table?

A = 1995

B = 2005

C = 2010

Correct answer = 2005

Graphic FF2 is on the following 4 pages in print and simbraille.

Warm Up 2

On sheet FF1, the second and third columns in the data table report the percentages of flying foxes in rural and city areas. Two values are missing. The percentages for each row add up to 100%. In 1995, what percentage of flying foxes was observed in city locations?

A = 25 percent

B = 55 percent

C = 70 percent

Correct answer = 25 percent

Warm Up 3

Look at the line graph and data table on sheet FF1. In 2015, what percentage of flying foxes were observed in city locations?

A = 30 percent

B = 45 percent

C = 70 percent

Correct answer = 70 percent

Warm Up 4

On sheet FF1, which statement best describes the data about the locations of flying fox colonies between 1995 and 2015?

A = Many flying fox colonies moved away from rural areas to cities.

B = Many flying fox colonies moved away from cities to rural areas.

C = Many flying fox colonies remained in the same location.

Correct answer = Many flying fox colonies moved away from rural areas to cities.

Warm Up 5

On sheet FF2, what type of graph is shown?
A = a line graph with distance on the y-axis

B = a bar graph with distance on the x-axis

C = a box plot

Correct answer = a bar graph with distance on the x-axis

Number of Seeds Dropped by Flying Foxes

Distance from Tree (meters)	Trees with few Flying Foxes	Trees with more Flying Foxes
0	30	24
10	3	7
20	1	11
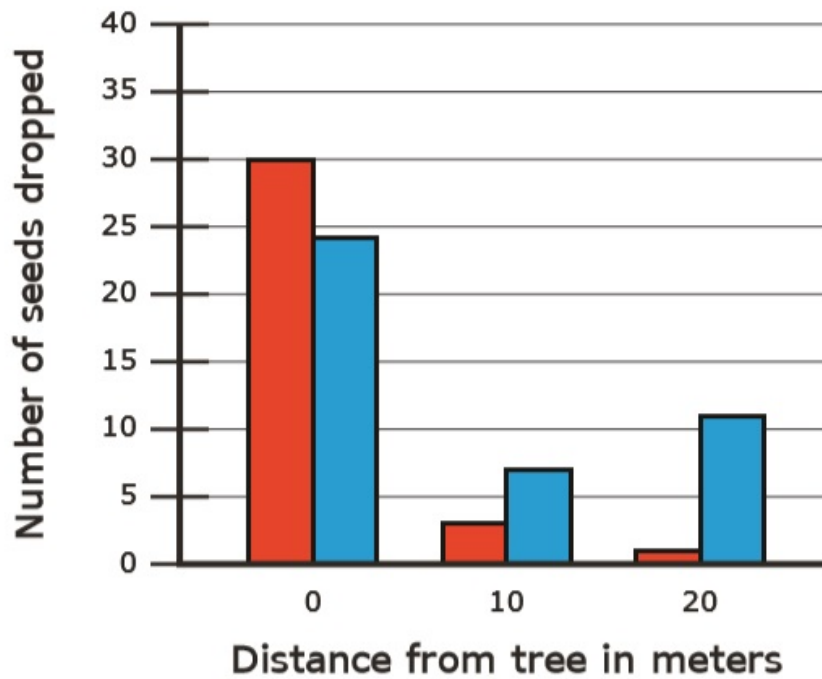
FF2

Number of Seeds Dropped by Flying Foxes

Key:

[red box] Trees with Few Flying Foxes

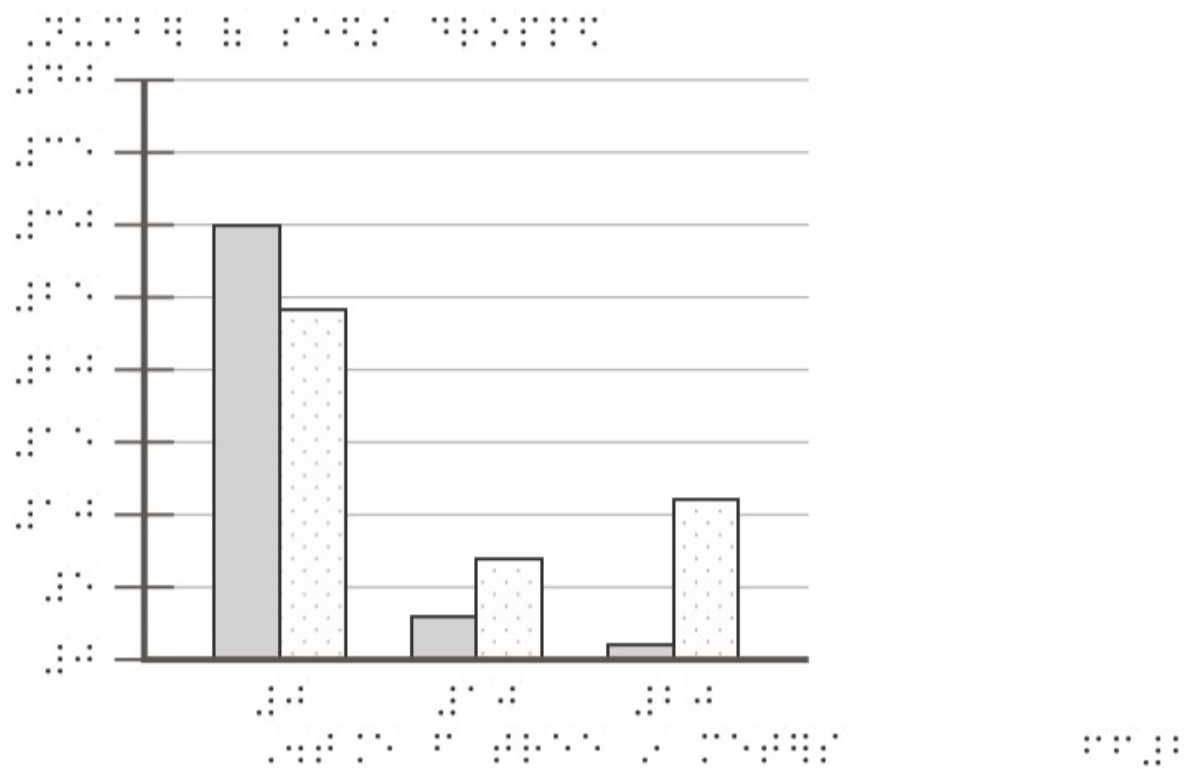[blue box] Trees with More Flying Foxes

FF2

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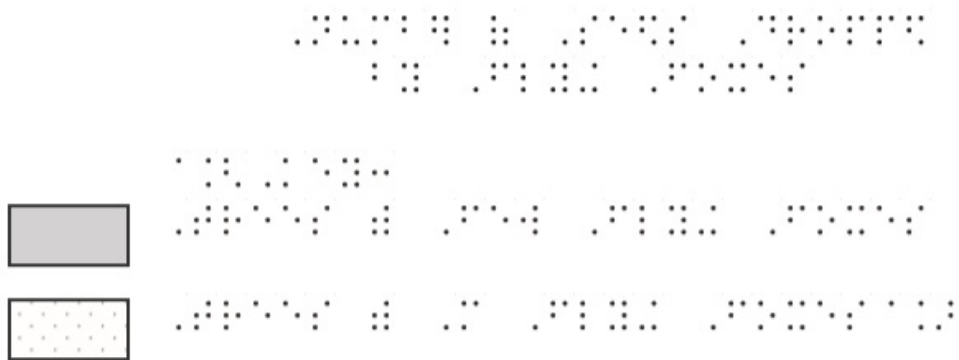
Warm Up 6

On sheet FF2, the data table shows the number of fruit tree seeds dropped by flying foxes as they flew away from a tree. Which statement best summarizes the data?

A = The greatest number of seeds is dropped right under the tree.

B = The greatest number of seeds is dropped 10 meters from the tree.

C = Most seeds are dropped 20 meters from the tree.

Correct answer = The greatest number of seeds is dropped right under the tree.

Warm Up 7

Using the data table and graph on sheet FF2, at what distance is the total number of dropped seeds the lowest?

A = under the tree

B = 10 meters from the tree

C = 20 meters from the tree

Correct answer = 10 meters from the tree

Warm Up 8

Compare the data tables and graphs on sheets FF1 and FF2. Which statement is accurate?

A = Both data tables have values missing.

B = Both graphs show percentages on the y-axis.

C = On the x-axis, the graph on sheet FF1 shows time and the graph on sheet FF2 shows distance.

Correct answer = On the x-axis, the graph on sheet FF1 shows time and the graph on sheet FF2 shows distance.

Warm Up 9

Sometimes it is easier to get information from a data table than from the graph. On the data table on sheet FF2 look at the column titled Trees with More Flying Foxes. What is the difference between the number of seeds dropped directly under the tree and the number of seeds dropped 20 meters from the tree?
A = 13
B = 17
C = 29

Correct Answer: 13

Warm Up 10

Using the data table on sheet FF1, find the percent of flying foxes observed in city locations in 2015. If this value is graphed, will that part of the graph increase, decrease or stay the same?

A = increase
B = decrease
C = stay the same

Correct answer: increase

Depending on the student's selection for Select Difficulty, the student will be branched to the A, B, or C problem for A5, A6, B5 and B6 questions.

Select Difficulty

Now that you've tried working with data tables and graphs, how well do you understand this topic?

A = Very well, I know this material already.

B = Pretty well; I've worked with data tables and graphs, but I could use some practice.

C = Not very well; I need more practice.

Graphic FF3 is on the following 4 pages in print and simbraille.

Introduction Problem Set A

In problem set A, you will answer 5 multiple choice and one open ended question about the data table and graph on sheet FF3. You will notice that you will be working with a coordinate graph and that this coordinate plane has a map. As the climate of Australia becomes hotter and drier, flying foxes are moving into cities. In one city, hundreds of flying foxes settled into the large trees in the city gardens. At sunset, they flew out to forage for food. Scientists tracked the flying foxes to learn about their food sources. They discovered that the flying foxes were traveling to parks and a nearby apple orchard. The flying foxes fed on fruits and flowers. At dawn, they then returned to the trees in the city gardens.

Location of Flying Foxes in the City

Identification Number	X Location	Y Location
1	-3	4
2	-3	6
3	-6	6
4	-5	3
5		3
6	6	4
7	8	
8	-3	3

FF3

Location of Flying Foxes in the City
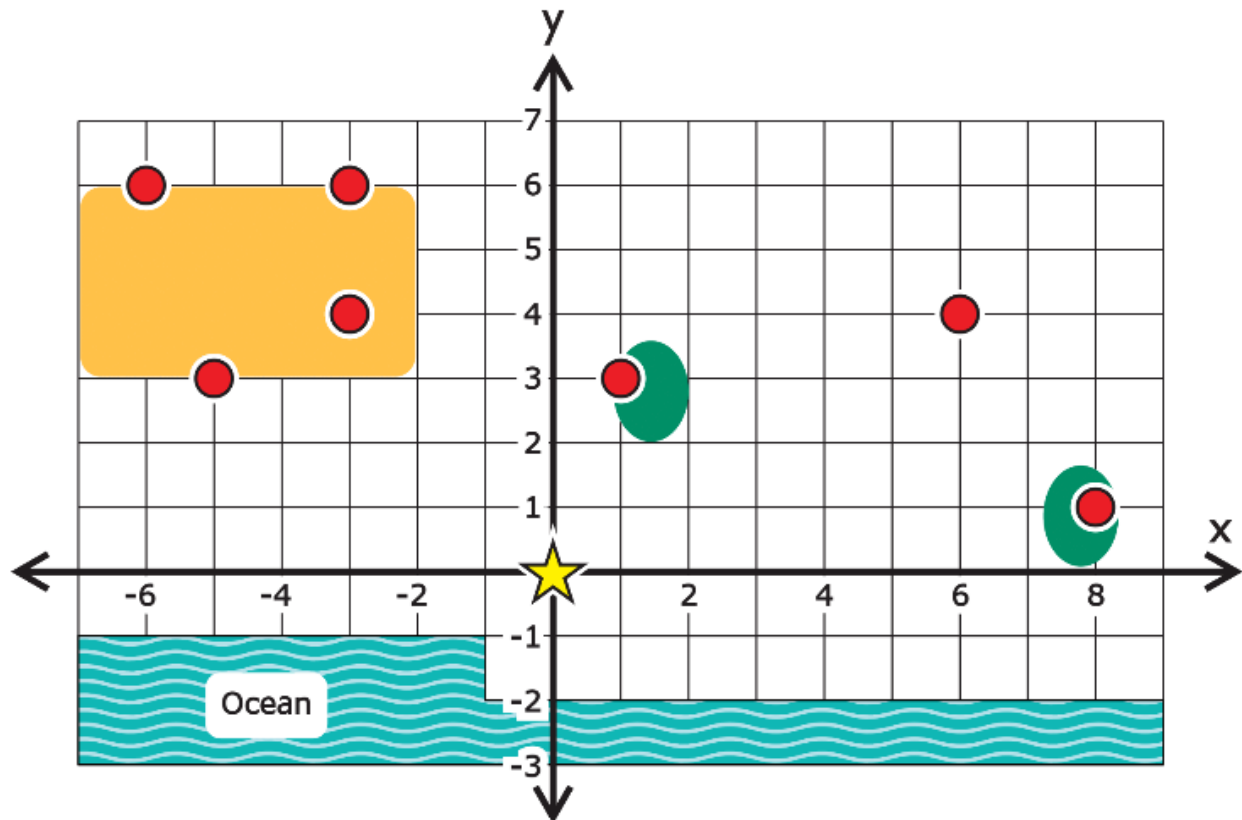
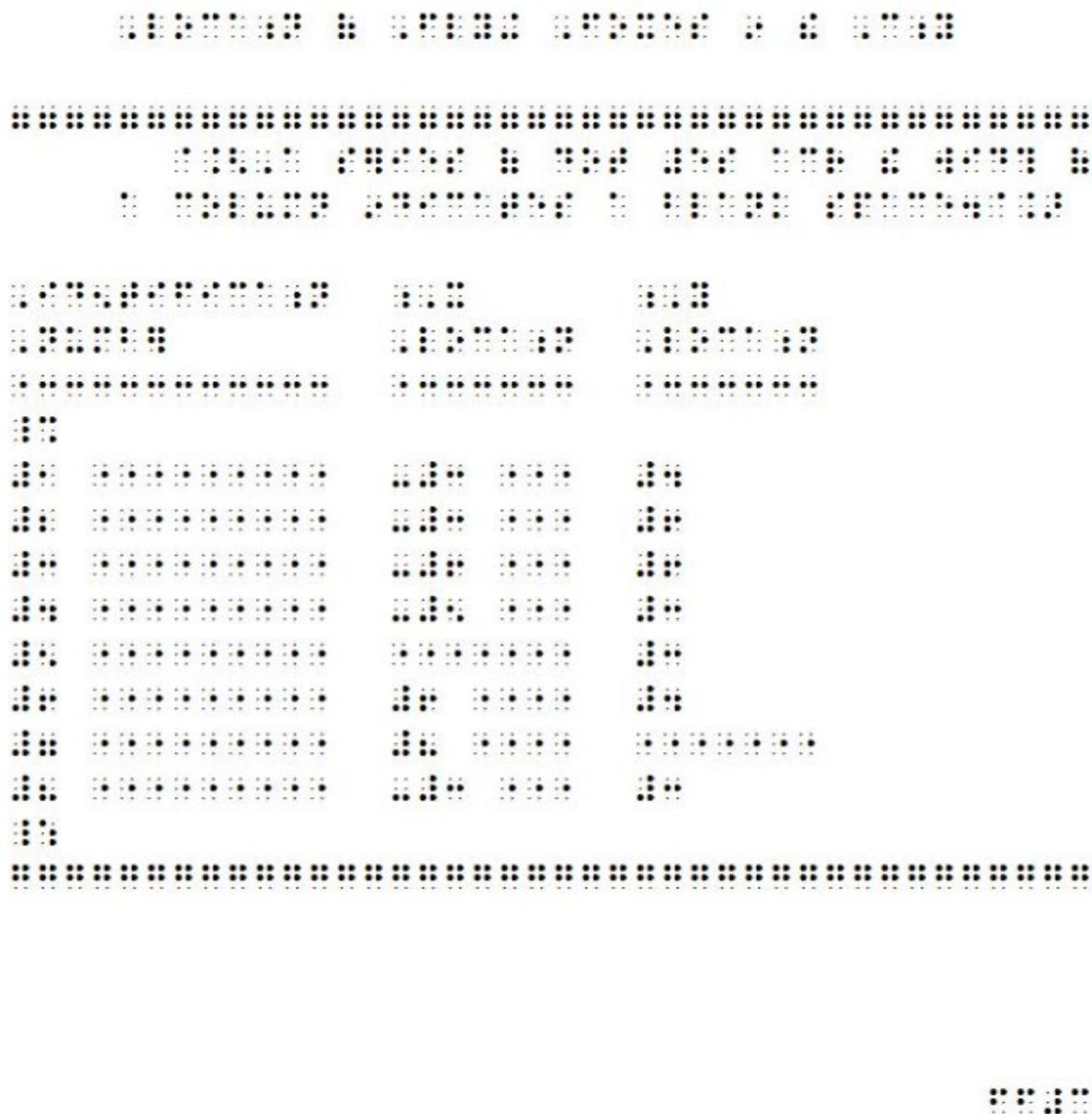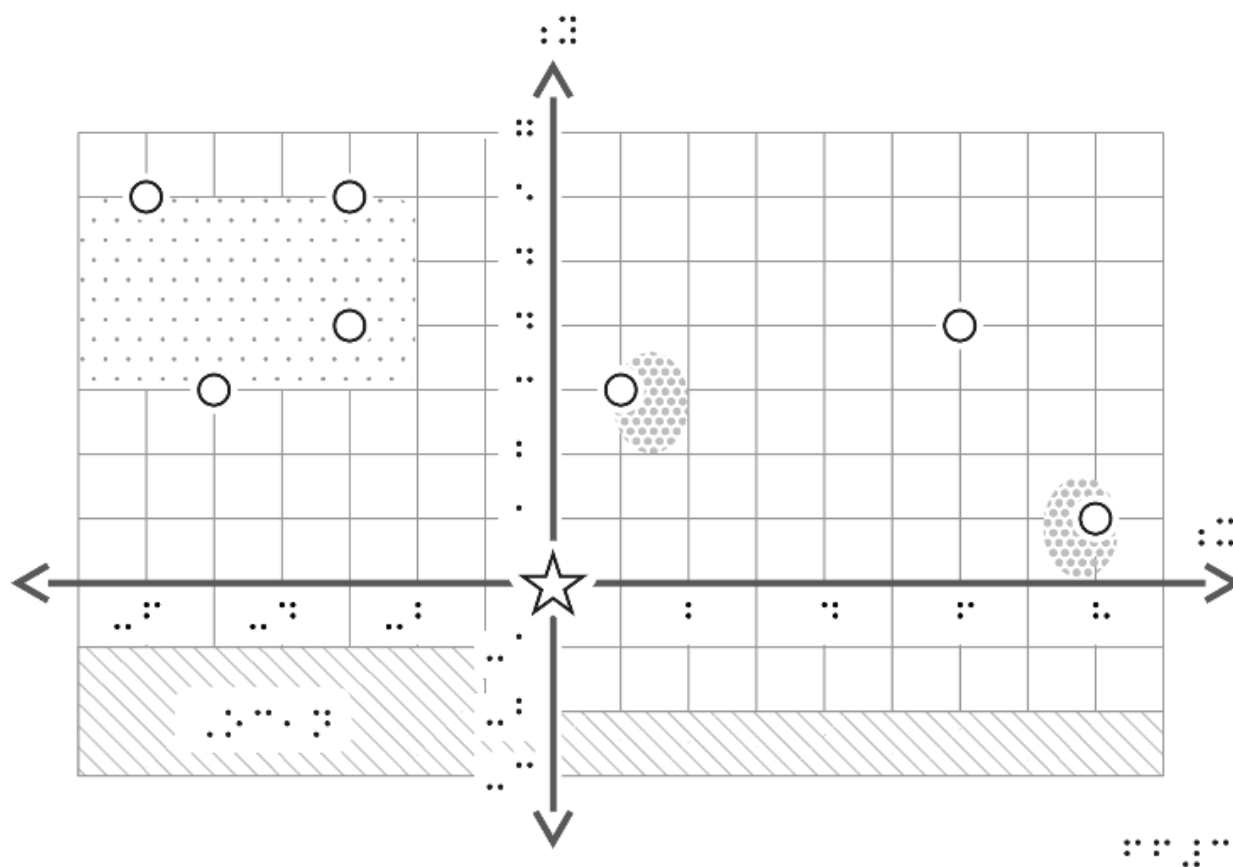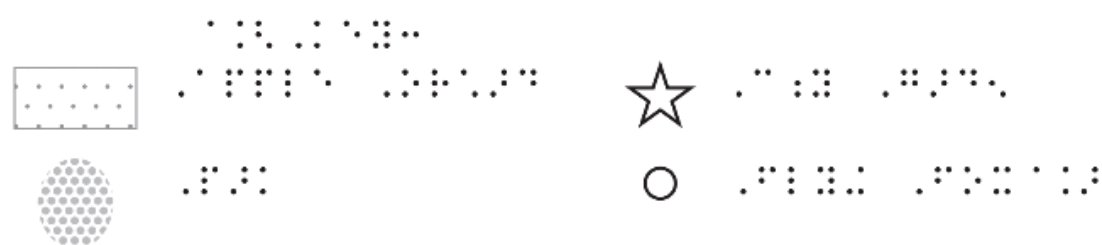Key:

☐ Apple Orchard   ⭐ City Garden

● Park   🔴 Flying Fox

FF3

Problem A1

The data table shows the locations of 8 flying foxes observed foraging in the city. The data table has an incomplete location for Flying Fox 7. Use the coordinate graph to find the missing coordinates for Flying Fox 7. Select the correct ordered pair.

A = (8, 1)

B = (1, 8)

C = (8, -1)

Correct answer = (8, 1)

Problem A2

The data table has an incomplete location for Flying Fox 5. Use the coordinate graph to find the missing coordinates for Flying Fox 5. Select the correct ordered pair.

A = (1, 3)

B = (3, 1)

C = (6, 4)

Correct answer = (1, 3)

Problem A3

The coordinate graph shows the locations of four flying foxes that were observed in an apple orchard. However, the data table shows the locations of five flying foxes in the orchard. If the data table is correct, which flying fox was left off the coordinate graph?

A = Flying fox 2

B = Flying fox 5

C = Flying fox 8

Correct answer = Flying fox 8

Problem A4

According to the coordinate graph, only one flying fox was observed that was not in a park, garden, or orchard. What is that flying fox's identification number?

A = Flying fox 3

B = Flying fox 4

C = Flying fox 6

Correct answer = Flying fox 6

Problem A5 - A

Use the data table to find the most frequent X location and most frequent Y location values. If those values are used to make an ordered pair, what is found at that location?

A = Flying fox 1

B = the city garden

C = Flying fox 8

Correct answer = Flying fox 8

Problem A5 - B

Use the coordinate graph to find the flying fox that is closest to the ocean. According to the data table, what is that flying fox's identification number?

A = Flying fox 1

B = Flying fox 7

C = Flying fox 8

Correct answer = Flying fox 7

Problem A5 - C

What is the identification number of the flying fox that is located the farthest away from the city garden?

A = Flying fox 2

B = Flying fox 3

C = Flying fox 8

Correct answer = Flying fox 3

Problem A6 - A

Another apple orchard is being started with its center at (3, 3). What might this mean for the flying fox locations and population? How did you come up with this answer? Record your answer.

Problem A6 - B

Based on the data, do you expect the next flying fox that is observed to be located in Quadrant 1 or Quadrant 2 of the coordinate graph? How did you decide that? Record your answer.

Problem A6 - C

Based on the data, would you expect the next flying fox that is observed to be located in the apple orchard or in a city park? How did you decide that? Record your answer.

Introduction Problem Set B

In problem set B, you will answer 5 multiple choice and one open ended question about the data table and graph on sheet FF4. As the flying foxes move to cities, they sometimes come into conflict with people who live there. Bat colonies can be noisy, smelly, and messy. Some people worry about diseases that flying foxes can carry and transmit to humans. In one city, a huge flying fox colony settled into the trees in the public botanical garden. The city conducted a survey to find out if people thought the flying foxes should be relocated somewhere outside of the city. People were also asked if they visited the city gardens regularly. The Venn diagram and the data table should show the number of garden visitors and the number who thought the flying foxes should be relocated. However, both have incomplete information. You will need to use your knowledge of interpreting data tables and Venn diagrams to fill in the blanks. For example, on the Venn diagram the 30 represents the number of people who want to relocate flying foxes and did not visit the garden. This number, therefore would go below 40 in the table. Check the column and row labels to be sure you are filling in the 30 in the correct blank. Now fill in the rest of the table before going to Problem B1.

Problem B1

According to the data table, 60 people were regular visitors to the city gardens. What number shown in the data table should go on the Venn diagram to show the number of regular garden visitors who think the flying fox colony should be relocated?

A = 20 garden visitors

B = 40 garden visitors
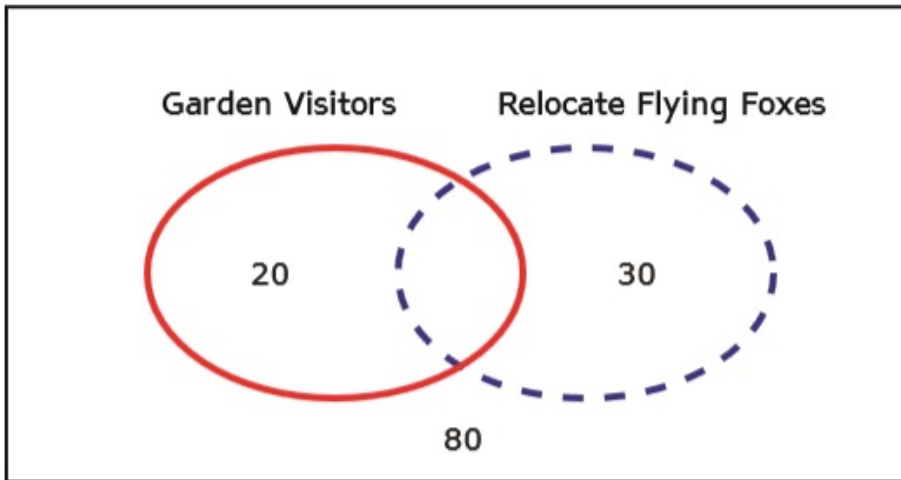
C = 60 garden visitors

Correct answer = 40 garden visitors
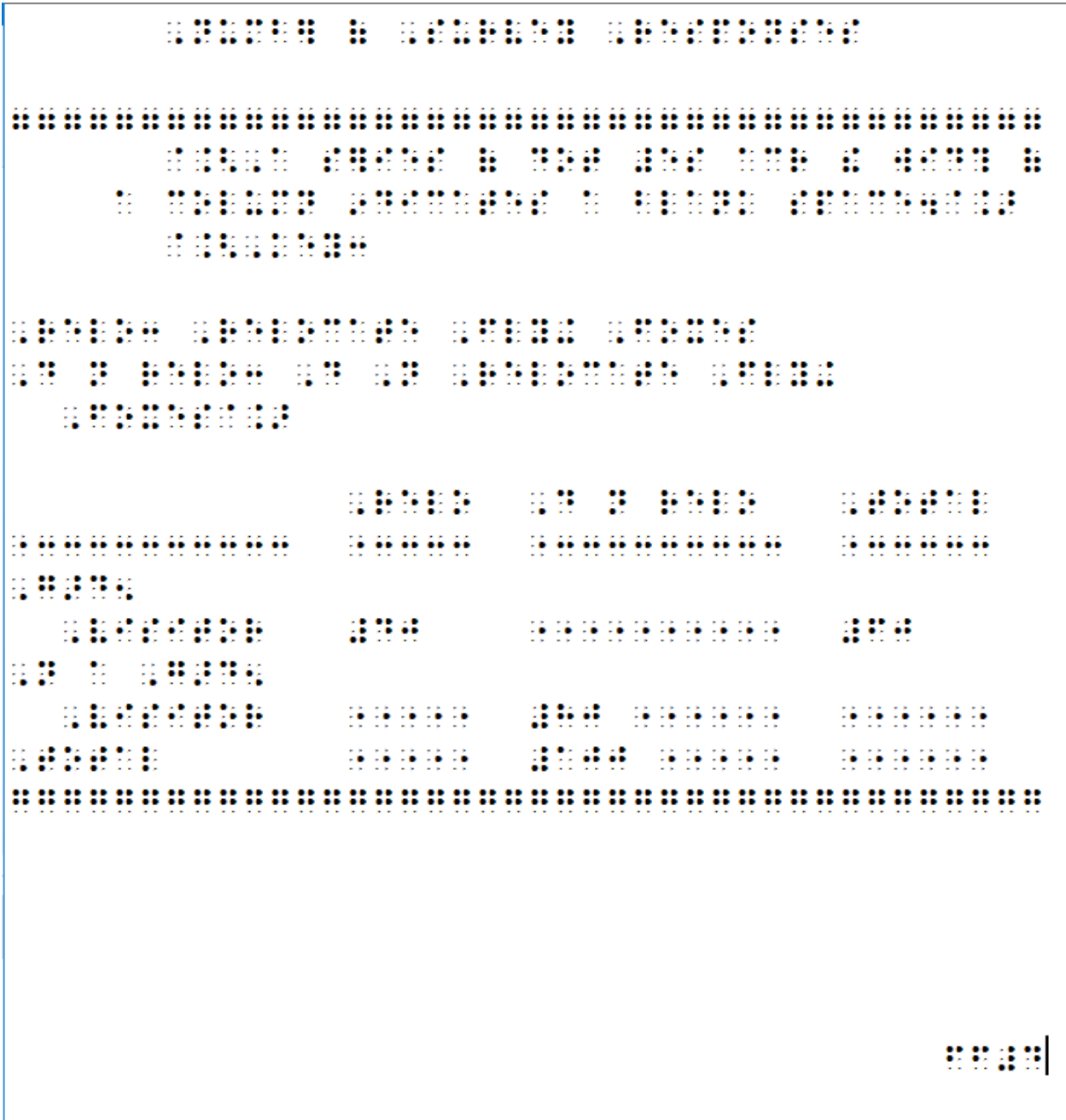
Number of Survey Responses

	Relocate Flying Foxes	Do Not Relocate Flying Foxes	Total
Garden Visitor	40		60
Not a Garden Visitor		80	
Total		100	

FF4

Number of Survey Responses

Garden Visitors   Relocate Flying Foxes

20   30

80
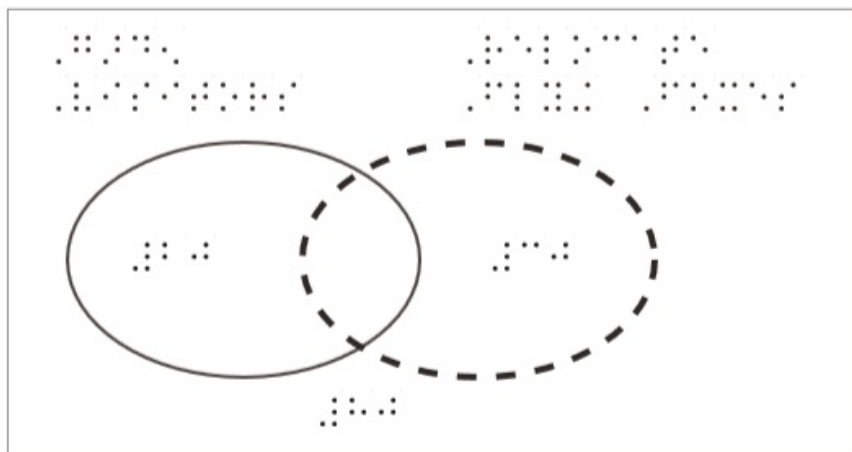
FF4

Problem B2

What number completes the data table column "Do not relocate flying foxes"?

A = garden visitors 20

B = garden visitors 40

C = garden visitors 60

Correct answer = garden visitors 20

Problem B3

What numbers complete the data table row for people who are not regular garden visitors?

A = relocate flying foxes 40, total 60

B = relocate flying foxes 70, total 170

C = relocate flying foxes 30, total 110

Correct answer = relocate flying foxes 30, total 110

Problem B4

What number should go in the data table to show the total number of people surveyed who think the flying fox colony should be relocated?

A = 30 people

B = 40 people

C = 70 people

Correct answer = 70 people

Problem B5 - A

For people who visit the garden regularly, which statement is most accurate?

A = Twice as many think the flying fox colony should be relocated.

B = Twice as many think the flying fox colony should stay in the gardens.

C = Regular garden visitors are evenly divided in their opinion about the flying fox colony.

Correct answer = Twice as many think the flying fox colony should be relocated.

Problem B5 - B

If someone thinks the flying fox colony should not be relocated, is the person likely to be a regular garden visitor?

A = No

B = Yes

C = It is not possible to tell.

Correct answer = No

Problem B5 - C

How many people in total were surveyed?

A = 100 people

B = 110 people

C = 170 people

Correct answer = 170 people

Problem B6 - A

Imagine a third circle added to the Venn diagram for a third question asked of the people surveyed. What would this circle be titled and what would the intersection of all three circles mean? How did you come up with this response? Record your answer.

Problem B6 - B

The survey shows that there are many people who do not visit the city gardens regularly. If the city starts offering concerts and selling ice cream to get more people to visit the gardens, how might this affect the flying fox colony? Why do you think that? Record your answer.

Problem B6 - C

People who visit the city gardens regularly are more likely to think that the flying foxes should be moved somewhere else. Why do you think this is the case? Record your answer.

Check In

Now that you've completed the unit, how do you feel about your ability to use data tables in your school work?

A = Super, I can work with almost any data table.

B = Ok, but I need more practice.

C = Not good, data tables are confusing.

What I Learned

What is one thing you learned about reading and interpreting data tables and graphs? Record your answer.

Conclusion

The flying fox is an example of a species that is adapting to its changing environment. Flying foxes discovered that they could find food, water, and shelter by living in cities. This has brought the flying fox into contact with humans. Some people appreciate the important role that flying foxes play in dispersing seeds and pollinating plants and are willing to live with flying foxes. Others object to the noise, smell, and mess created by hundreds of flying foxes in city trees. When people have a difference of opinion about something, using data and graphs can be a good way to have a discussion and come to a decision about what to do.

Follow-Up

Below are some ideas for follow-up activities you may wish to do with your student to reinforce the concepts in Flying Fox: Data Tables.

- Have the student use data that she collects, locates in a book or finds on the Internet to create a bar graph, line graph, Venn diagram or map. See recommendations in units on these topics for additional ideas and APH products the student may wish to use.
- Have the student use a bar graph, line graph, Venn diagram and/or map to create a data table to represent the information.
- Have the student use data to create another type of graph (e.g., box plot, circle graph).
- Have the student research other bat species and compare them to the flying fox.
- Have the student research the flying fox to learn additional facts about this invasive species.
- Have the student locate videos of the flying fox to watch in order to see this species in its natural habitat.
- Have the student locate Africa on a map or globe. The student can calculate the travel distance from the United States to specific countries in Africa.