Student Activity

Name _____

Date _____

Silenced Songbirds: Solving problems involving area

Focus: Calculate the probable number of Golden-cheeked Warblers in a given area.

The Problem: How many Golden-cheeked Warblers can live in the part of Kerr County shown on the map?

The Golden-cheeked Warbler is an endangered species found in Texas. In fact, this bird will build its nest only in the Hill Country of Texas. The Hill Country Bird Club wants to estimate how many Golden-cheeked Warblers live in the Kerrville area. They have selected a rectangular area of Kerr County for their survey.

The Facts

- One square mile = 640 acres.
- The Hill Country Bird Club estimates that only $\frac{1}{4}$ of the area on the map is suitable for the warblers.
- Each pair of warblers needs about 5 acres of land.
- 1 acre = 43,560 square feet.

The Task

1. Your group will answer the question by marking a map and creating a map legend to show the following:
   - Marked areas showing where the Golden-cheeked Warbler might live
   - The number of square miles in the marked and unmarked areas on the map
   - The number of acres in the marked and unmarked areas on the map
   - The number of Golden-cheeked Warblers that might live in the marked areas

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2. Each person will write a paragraph describing the map. This paragraph should answer the following questions:

   - *What steps did the group follow to solve the problem at the beginning of this activity? How did the group calculate the number of Golden-cheeked Warblers?*

   - *Is the group's answer reasonable? How do you know?*

   - *Bonus question: Texas Parks and Wildlife rangers estimate that there are about 10,000 pairs of Golden-cheeked Warblers left. How many total acres do these birds need? How many total square miles do these birds need? Solve the problem and explain your solution.*

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Things to Consider

Understanding the Problem

Read the *Silenced Songbird* problem page, and then answer these questions.

- *How many Golden-cheeked Warblers live in a 5-acre area?*

- *How many acres are in a square mile?*

- *How many Golden-cheeked Warblers can live in a square mile? How do you know?*

Making a Plan

Before you make your plan, answer these questions.

- *How many square miles are shown on the map? How do you know?*

- *How many square miles on the map could have Golden-cheeked Warblers? How do you know?*

- *How many Golden-cheeked Warblers could live in that many square miles? How do you know?*

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Carrying Out the Plan

Before you begin your map, answer these questions.

- *What is the difference between a mile and a square mile?*

- *How can you show square miles on your map?*

- *How can you mark the areas that could have Golden-cheeked Warblers?*

- *What information needs to be in your map legend? How will you show that information on the map?*

Evaluating the Solution

- *Did you answer the question on the Silenced Songbird page? How do you know?*

- *Does your answer make sense? If each pair of warblers needs 5 acres, are there more warblers or more acres? How do you know?*

- *Does your paragraph explain the information shown on the map?*

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Using the Calculator

Solving problems involving area

Use the TI-15 calculator to solve the following problems:

1 Henry is covering a table top with ceramic tiles. The table is $2\frac{1}{2}$ feet long and $1\frac{1}{4}$ feet wide. What is the area of the table top?

Press	The display shows:
2 [Unit] 1 [n] 2 [d] [×] 1 [Unit] 1 [n] 4 [d] [Enter]	

Does the answer make sense?

Draw the table top on 1-inch grid paper. Let 1 inch = 1 foot.

2 Henry has another problem. The tiles he wants to use are 2 inches square. How many tiles does Henry need to cover the same tabletop? Calculate the number of tiles in 1 square foot.

Press	The display shows:
12 [÷] 2 [Enter]	

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This gives the number of tiles on one side of the square foot since 12 inches = 1 foot. Now multiply the answer by itself to get the number of tiles in one square foot.

Press	The display shows:
6 × 6 Enter	

This answer is the number of 2-inch square tiles in one square foot.

Multiply this answer by the number of square feet in the tabletop (the answer to the first problem).

Press	The display shows:
36 × 3 Unit 1 n/d 8 d Enter	

Is the answer in mixed number form?

Note: The $U\frac{n}{d} \leftrightarrow \frac{n}{d}$ key changes the display between mixed number form and improper fraction form.

Is the answer in simplest terms?

Note the Simp key simplifies the fraction. You may need to simplify more than once. If the display shows $\frac{N}{D} \rightarrow \frac{n}{d}$, you can further simplify the fraction.

Henry can only buy whole tiles. How many tiles does Henry need to buy to complete the tabletop?

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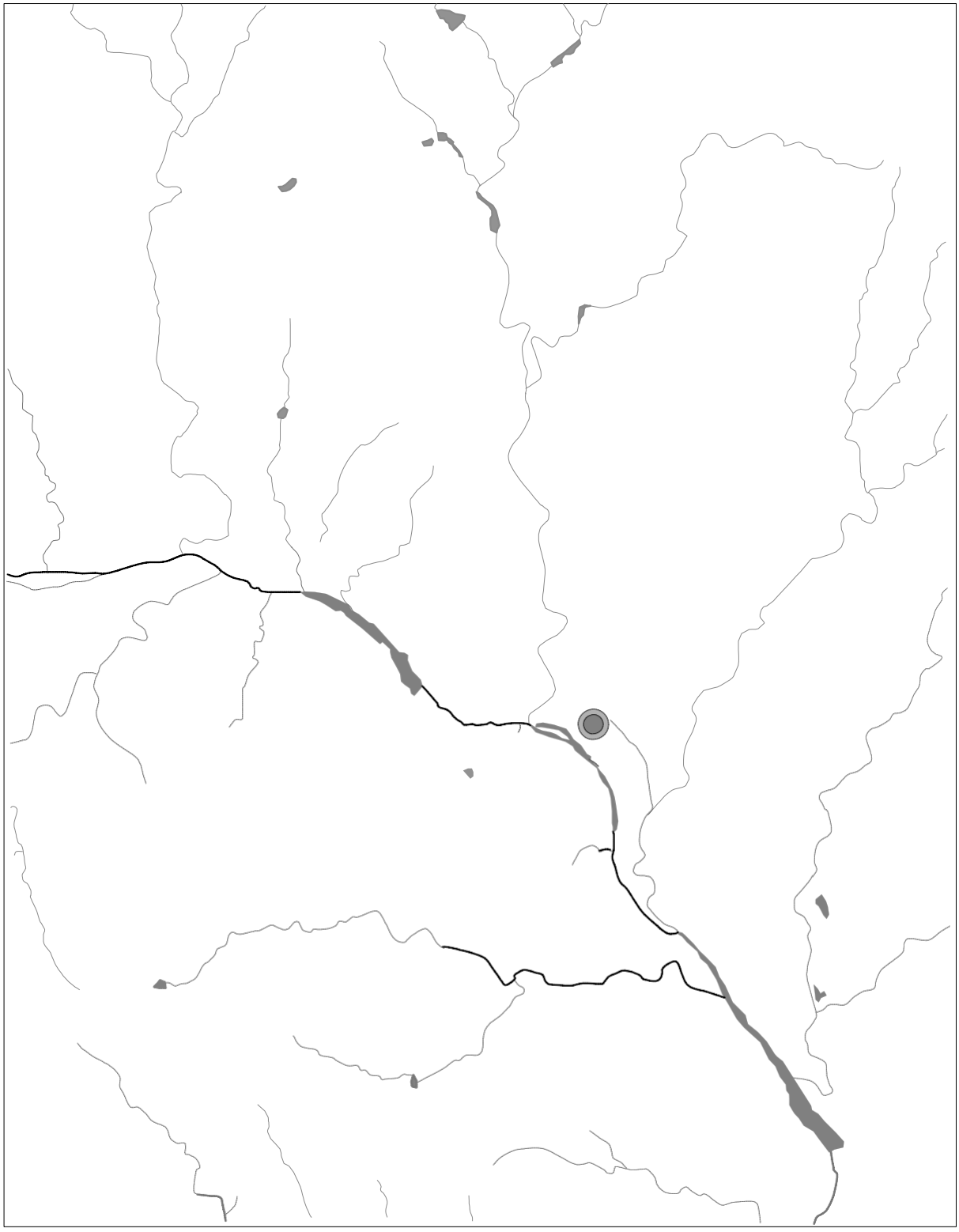

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