$\frac{1}{10} = \frac{10}{100}$ $\frac{1}{10} = \frac{10}{100}$ $\frac{1}{10} = \frac{10}{100}$ $\frac{1}{10} = \frac{10}{100}$

The History of

Telephones

Fractions



Kristy Stark

For teachers' inspection ONLY

Table of Contents

Traveling Back in Time 4

Meeting Mr. Bell and Mr. Watson 8

Changing Phone Designs 14

Exploring the 1960s and 1970s 18

Phones Get Smarter 22

Returning Home 26

Problem Solving 28

Glossary 30

Index 31

Answer Key 32

This is a work of fiction. Characters, businesses, events, and incidents are either the products of the author's imagination or used in a fictitious manner. Any resemblance to actual persons, living or dead, or actual events is purely coincidental.

For teachers' inspection ONLY

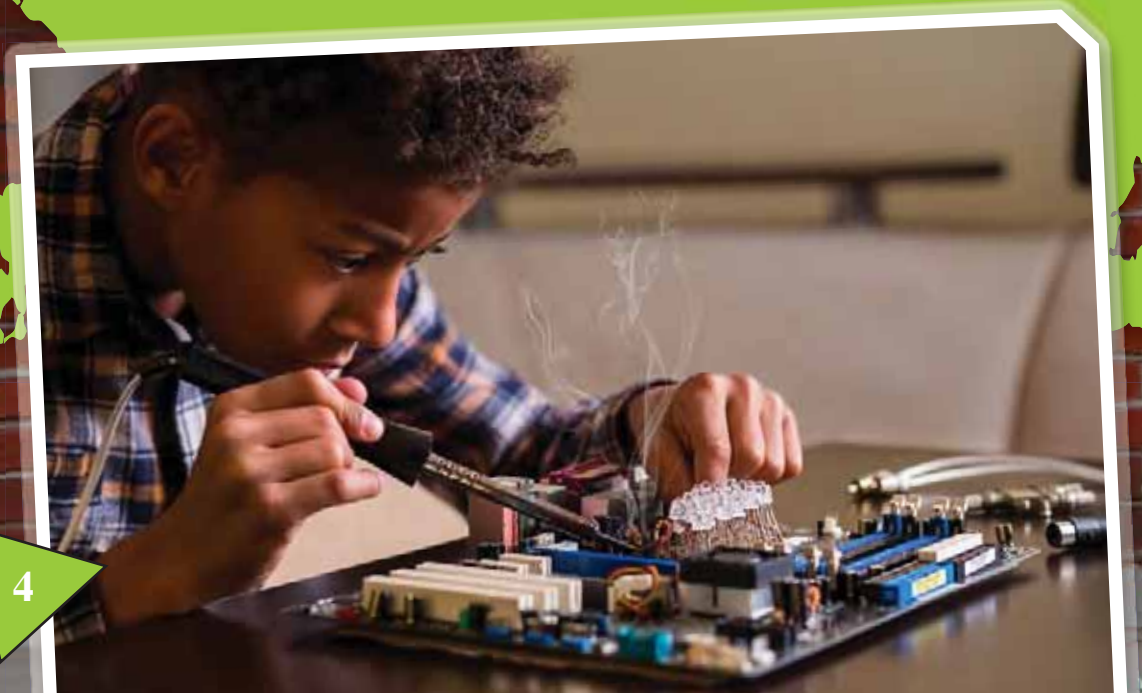
Traveling Back in Time

It is getting late, and the sun is about to set. Bryce hopes he can use the last bit of daylight to finish his work. The old telephone booth is a great find from the junkyard. It is the perfect **contraption** for making a time machine.

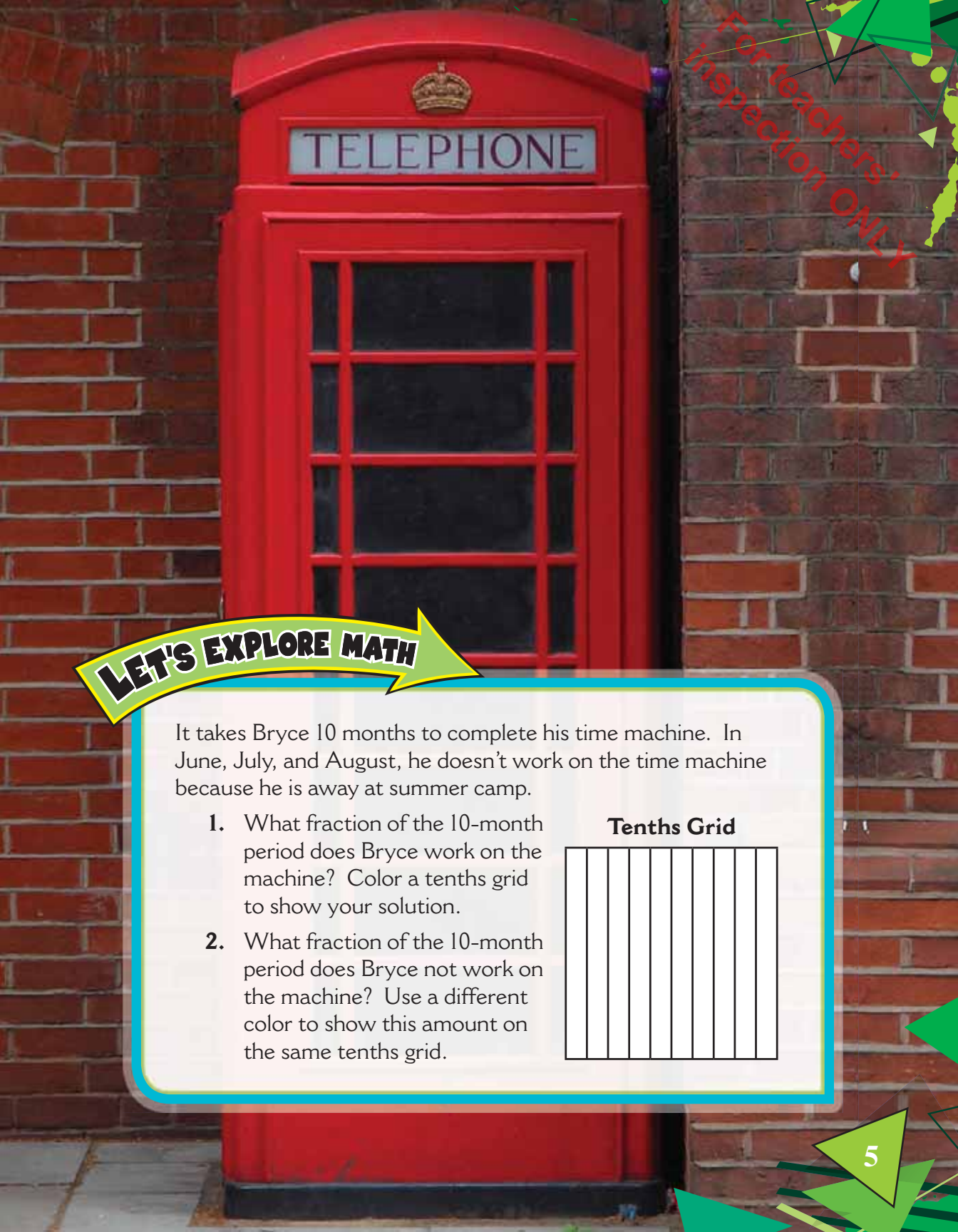
Bryce has been working on his time machine for several months. His scientist parents built their own time machines when they were about his age. They helped him when he needed it, but he was able to do most of the work on his own.

As the sun begins to set, Bryce tightens the final screw on the machine's control panel. "There, that should do it," he says. The only thing left to do is test the machine.

Bryce sits on the seat he bolted to the inside of the telephone booth and buckles his seat belt. Then, he thinks about where he should travel first.



For teachers' inspection ONLY



LET'S EXPLORE MATH

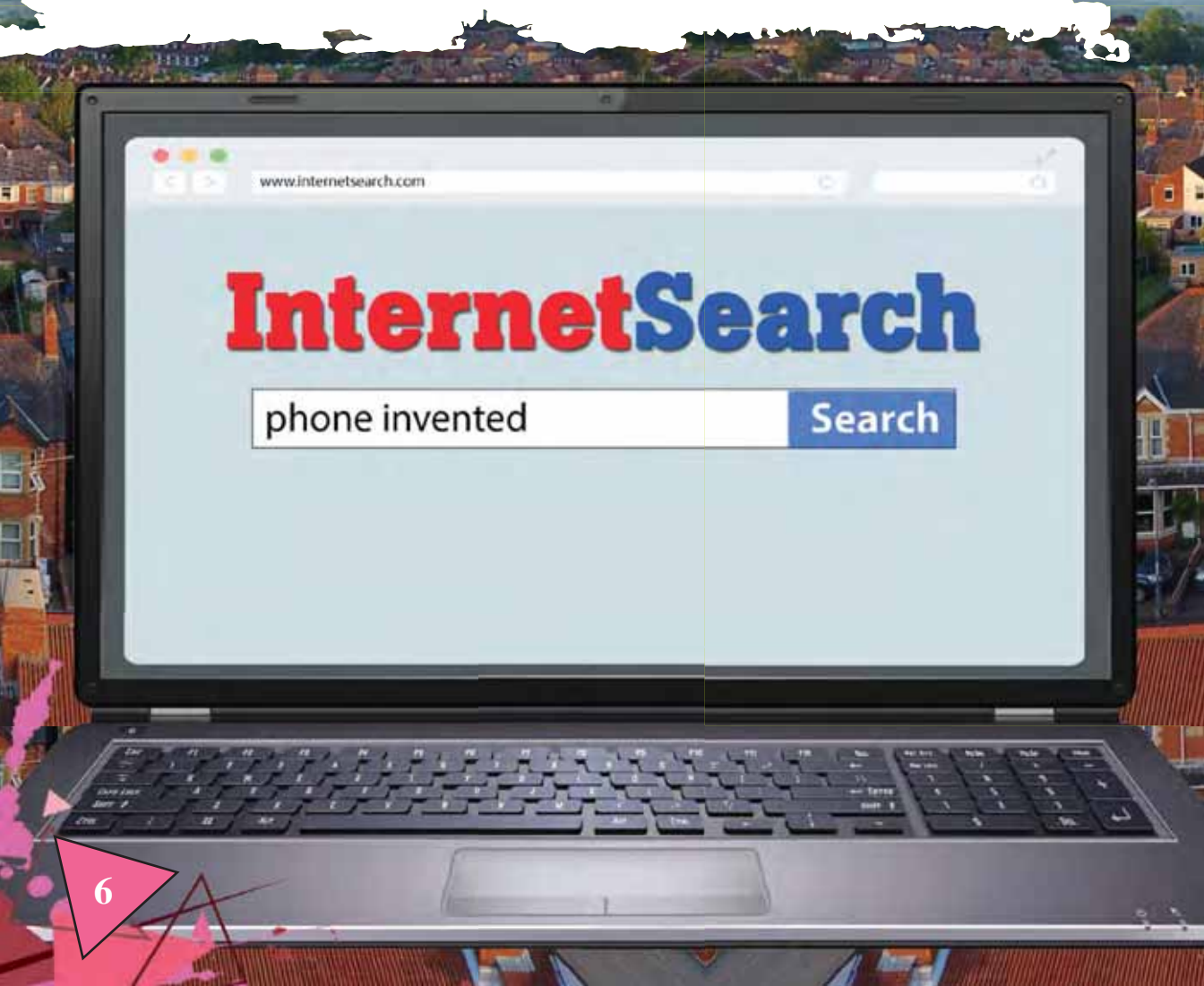
It takes Bryce 10 months to complete his time machine. In June, July, and August, he doesn't work on the time machine because he is away at summer camp.

1. What fraction of the 10-month period does Bryce work on the machine? Color a tenths grid to show your solution.
2. What fraction of the 10-month period does Bryce not work on the machine? Use a different color to show this amount on the same tenths grid.

Tenths Grid

For teachers' inspection ONLY

After a few minutes, Bryce decides there is only one **logical** place to go for his first trip in a phone booth. He wants to go back to when the telephone was first invented. On his computer, he types *phone invented* in the search field. The search engine finds the correct time period. Bryce selects the year to confirm his destination. The time machine makes a soft humming noise as it warms up. Bryce sends his mom and dad a quick text to let them know where he is going.





For teachers' inspection ONLY

At first, nothing happens. He looks down at the screen, confused. Suddenly, the booth starts to rattle and shake. There is a quick flash of light as his house disappears before his eyes. "Okay, 1876, here I come!" Bryce yells excitedly as he feels the phone booth fly through the air.

Meeting Mr. Bell and Mr. Watson

After a few seconds, the phone booth lands in a small room. There is a desk that is covered with tools and papers. Bryce sees a device with a wooden base. It's the first telephone!

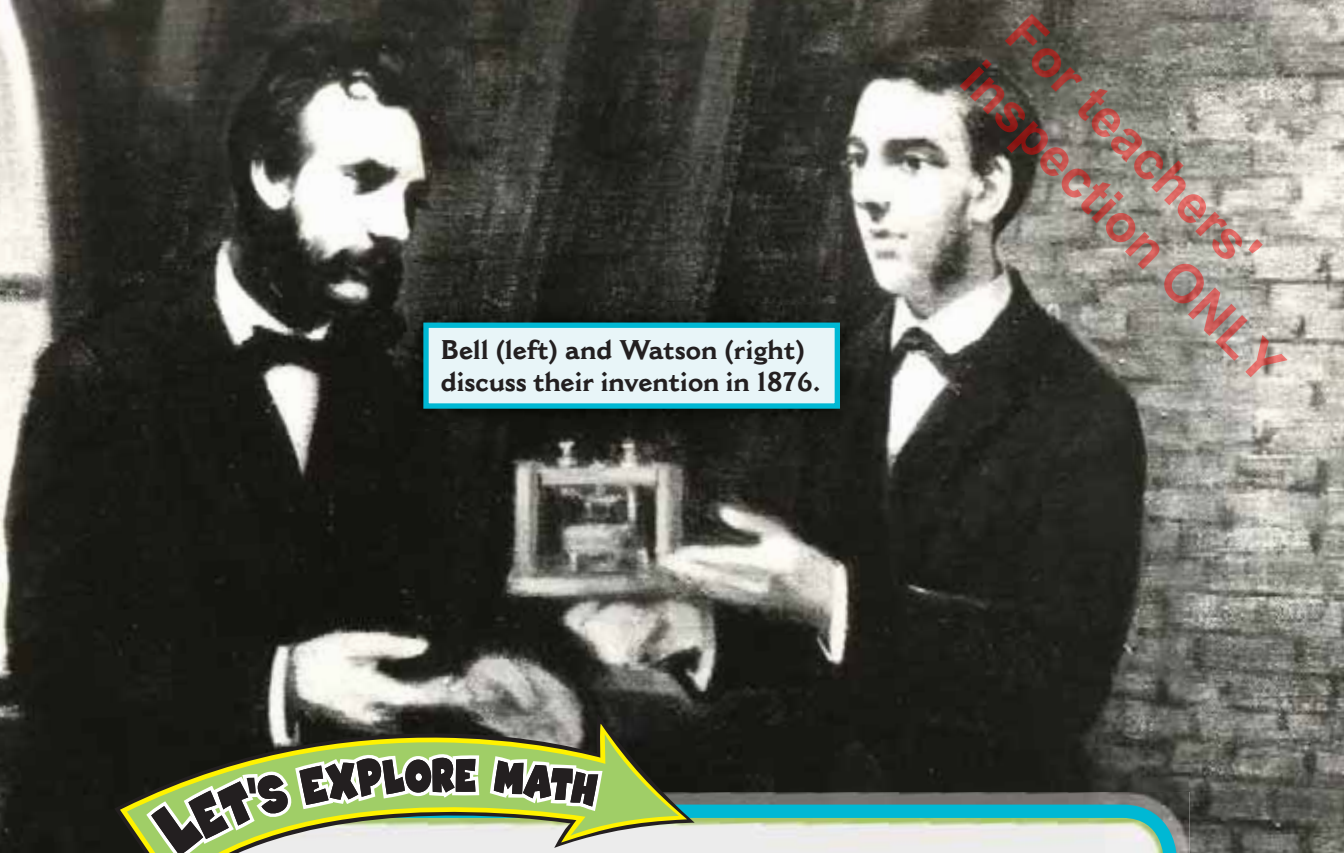
Bryce unbuckles his seat belt. Then, he opens the phone booth's door slowly. He sees two men shaking hands. They look very happy. The men notice Bryce and say hello. They introduce themselves as Alexander Graham Bell and Thomas Watson. Bryce explains that he is from the future. He points to the device on the desk and asks, "Can you tell me about your invention?"

Bell tells Bryce that his idea is based on the electric telegraph, which was invented by Samuel Morse in the 1830s. The telegraph uses a code of long and short **pulses** to send messages through an **electric current**.



For teachers' inspection ONLY

For teachers' inspection ONLY

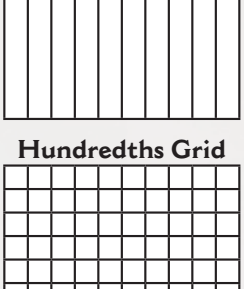


Bell (left) and Watson (right) discuss their invention in 1876.

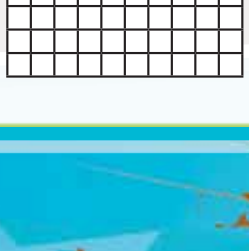
LET'S EXPLORE MATH

Imagine that a telegraph uses 10 pulses to send a message. The message has 6 long pulses and 4 short pulses. The fraction of the message with long pulses is $\frac{6}{10}$.

Tenths Grid



Hundredths Grid



1. Write an equivalent fraction for $\frac{6}{10}$ with a denominator of 100. Color a tenths grid and a hundredths grid to show this amount. $\frac{6}{10} = \frac{\square}{100}$

2. What fraction represents short pulses? Write this fraction in tenths and hundredths. Use a different color to show this amount on the same grids. $\frac{\square}{10} = \frac{\square}{100}$

For teachers' inspection ONLY

Math Talk

1. How are tenths and hundredths related to one whole?
2. What adjustments can you make to a tenths grid to make it a hundredths grid?
3. How can a fraction in tenths be renamed as an equivalent fraction in hundredths?
4. Which fractions in the set are equivalent: $\frac{9}{10}$, $\frac{9}{100}$, $\frac{90}{100}$? How do you know?
5. While working with tenths and hundredths, Alex says, "This reminds me of working with dimes and pennies." What do you think he means by that?
6. What strategies can you use to find the sum of a fraction with a denominator of 10 and a fraction with a denominator of 100?