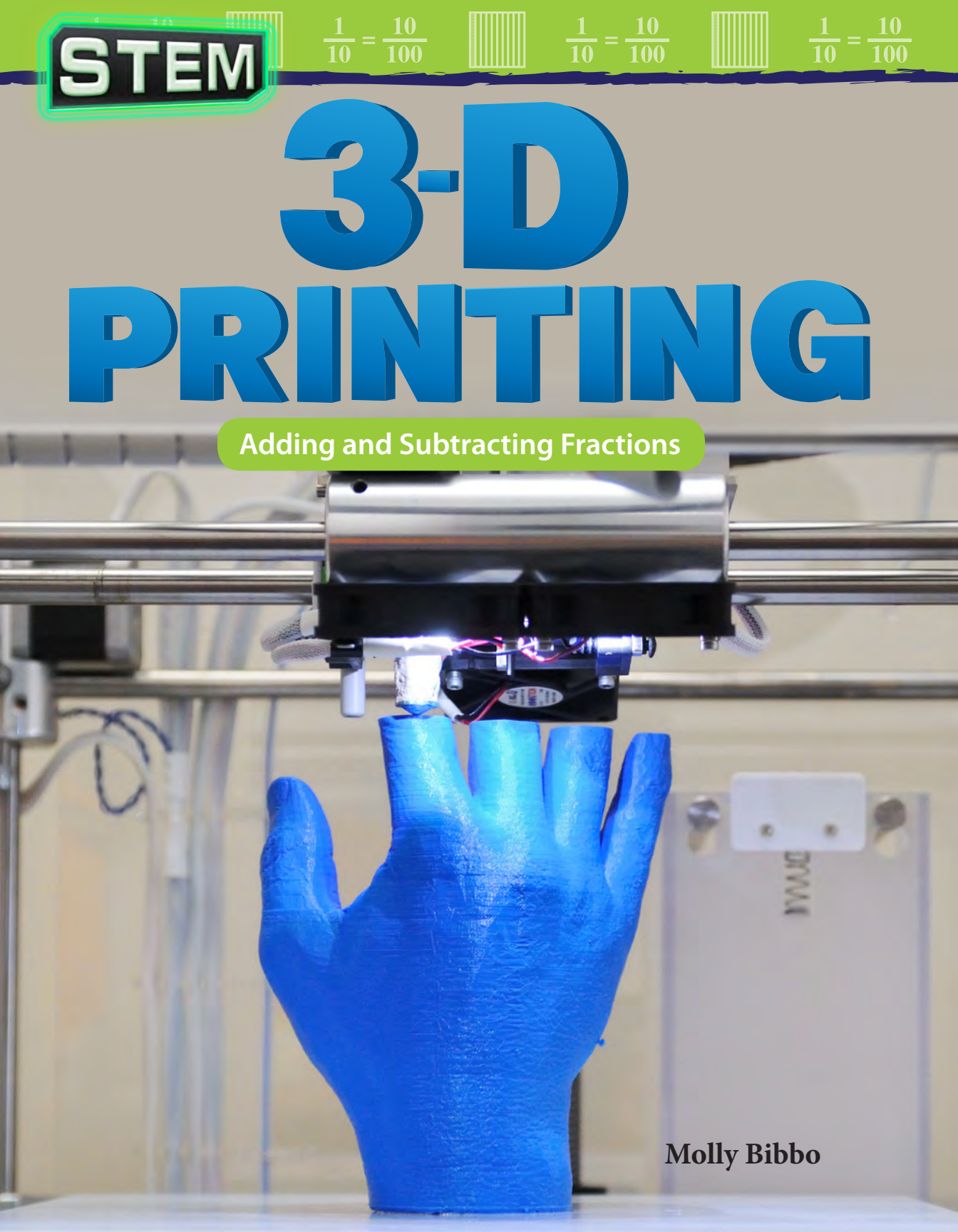
STEM

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3-D PRINTING

Adding and Subtracting Fractions



Molly Bibbo

For teachers' inspection ONLY

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A New World of Printing

Imagine being able to design your very own toy on a computer. Next, imagine being able to print that toy on a printer. It turns out, that's not too far out of reach!

Technology is changing the way we live. It has changed how we communicate. It has changed the way we travel. It has changed the way we learn. It has given people a better quality of life. Doctors and scientists are using technology to help people in need. In some cases, it is helping to save people's lives.



A 3-D printer produces a small spaceman.



A student adjusts a 3-D printer.

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Imagine dipping your hand in paint to create a handprint on a sheet of paper. When you look at your handprint, you see that the mark of your hand is flat. Flat objects are 2-D, or **2-dimensional**. Shapes like squares, triangles, and circles are 2-D.



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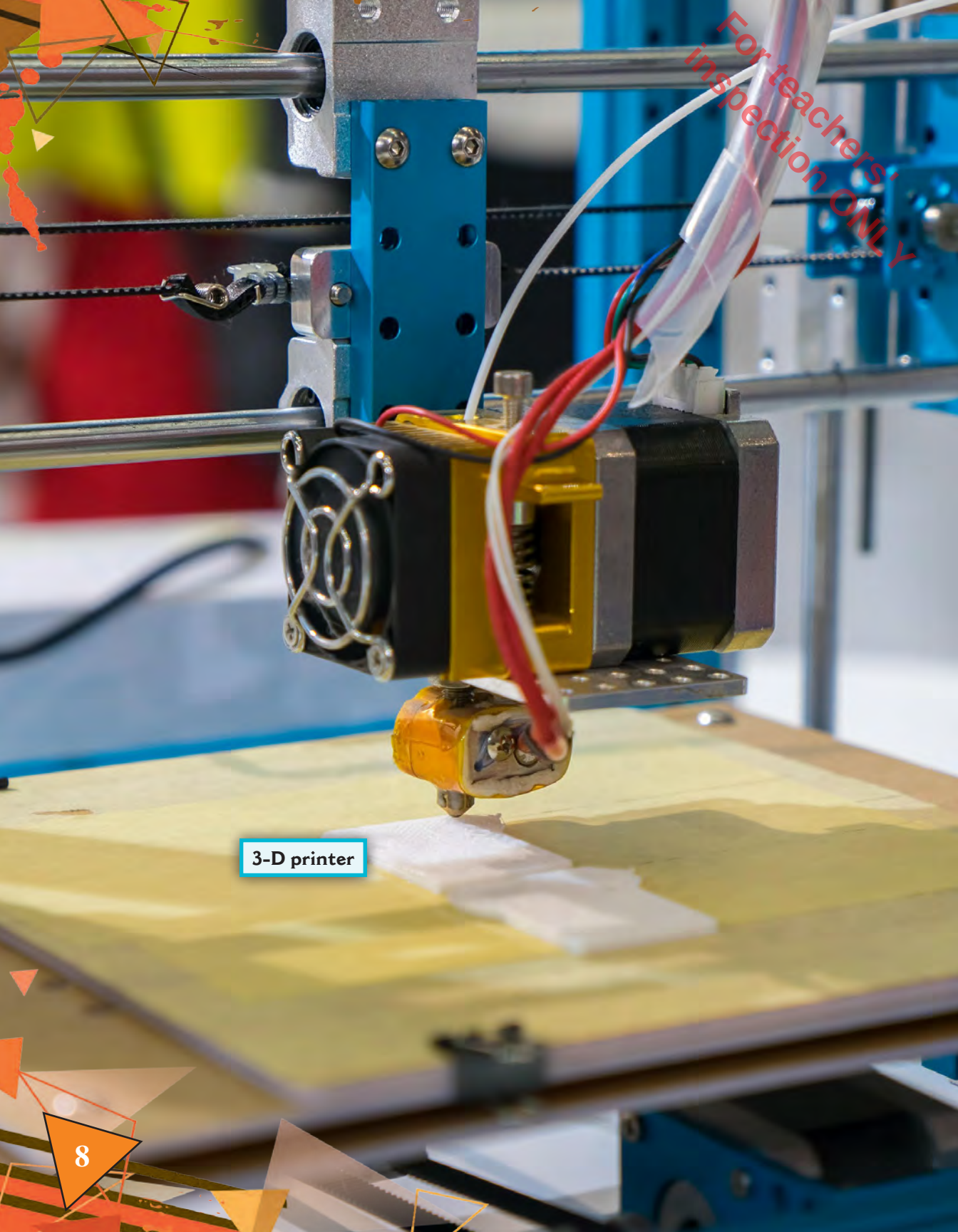
However, not all shapes and objects are 2-dimensional. Your physical hand is thicker than a sheet of paper. Your hand is 3-D, or **3-dimensional**. In fact, your whole body is 3-D. Objects that are 3-D have thickness, or **depth**. A cube or a sphere is 3-D. A cardboard box or a rubber ball is 3-D. Take a look around you—almost all of the everyday items you use are 3-D.

Let's Explore Math

Monica is printing birthday party invitations. She prints $\frac{2}{6}$ of the invitations on Monday. She prints $\frac{3}{6}$ of the invitations on Wednesday.

1. How can $\frac{2}{6}$ be decomposed into unit fractions? Draw a model to show your thinking.
2. What fraction of the invitations does Monica print on Monday and Wednesday? Write an equation to show your solution.
3. What fraction of the invitations does Monica still need to print? Explain your reasoning.





3-D printer

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3-D Printing

Wouldn't it be cool to be able to print a piece of chocolate whenever you wanted one? With a 3-D printer, you can do just that! But, how does it work? A 3-D printer prints layers on top of layers to give an object depth. The idea is similar to building a tower with blocks. At first, you create one row with blocks. Then, you stack another row of blocks on top. As you add more layers of blocks, your tower gets taller. A 3-D printer works the same way.

A 3-D printer doesn't use liquid ink like a 2-D printer. Instead, it uses a solid material. This material is called **filament**. Some examples are plastic, metal, and (you guessed it) chocolate! Different types of filaments make different objects. Some 3-D printers print parts for cars and bikes. They use a metal filament called **titanium**. But, most 3-D printers use plastic filament. Plastic doesn't cost much, and it comes in a variety of colors.

