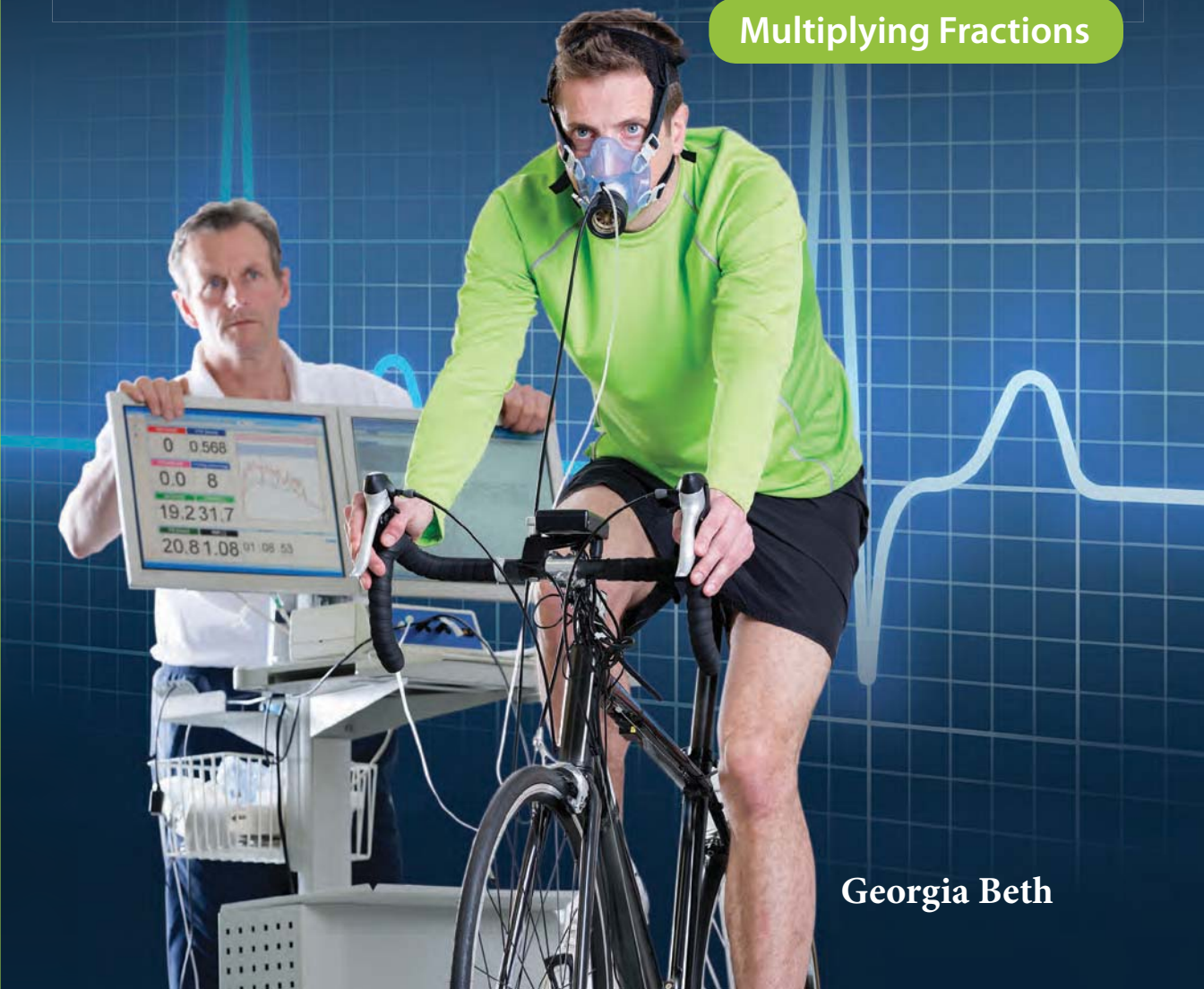
STEM

The Science of Fitness

Multiplying Fractions



Georgia Beth



Table of Contents

Stronger, Better, Faster 4

Training and Performance 6

Nutrition 14

Training Tools for Athletes 22

The Future of Fitness 27

Problem Solving 28

Glossary 30

Index 31

Answer Key 32

For Review Only

Stronger, Better, Faster

A swimmer reaches for the wall in record time. An artist stretches across a table as she draws. A family dances as they wash dishes. A firefighter hauls a hose up 10 flights of stairs. A dad lifts his son up to a jungle gym. We all depend on our bodies to perform at their best every day.

Around the world, scientists are peering into microscopes. They are reviewing data. Some of them observe world-class athletes as they sprint to the finish line. Others study **functional fitness**. They are devoted to making it easier for everyday people to lift heavy boxes, run to catch the bus, and play with their dogs. In the lab, on the track, or in the backyard, these scientists strive to understand the human body in new ways. The work they do pushes science forward. In the process, they make people stronger, better, faster. This is the science of fitness.



A man performs a fitness test on an exercise bike.

For Review Only



A doctor tests a patient to find out how many calories his body requires while resting.

For Review Only

Training and Performance

Some scientists study how athletes **exercise**. They observe people in labs where they can control the **variables**. Variables are things that might change. The temperature in a room might change. Athletes might change what they drink during workouts. Scientists need to control those things to get strong data.

Each study gives more information about what it takes to be fit. Scientists might track how much sweat athletes produce. They might focus on how long it takes to complete an exercise. The data makes sports safer. It helps people live longer. It helps people learn how to be healthier.

People must train to improve. Whether it's a student studying for a test or an athlete preparing for a big race, practice makes perfect. When it comes to fitness, performance improves when people train.



A man does push-ups during his crossfit workout.

For Review Only

Types of Training

Cardiovascular exercise, or cardio, gets hearts pumping hard and fast. It is an **aerobic** activity. Examples include dancing and biking. Parkour, Zumba, and zombie-inspired marathons keep hearts healthy, too. Cardio also helps people control their weight. It helps people prevent disease. Cyclists, runners, and triathletes all depend on cardio training to improve their bodies' ability to absorb oxygen. Training helps their muscles endure the demands of long races.



Parkour includes running, jumping, and climbing city obstacles.

Let's Explore Math

Aerobic exercise increases lung capacity. One way to measure lung capacity is to take a deep breath and blow all the air into a balloon. Then, measure the width of the balloon through its center.

The width of Grace's balloon is 6 inches. Keenan fills his balloon $\frac{5}{8}$ as much as Grace does. Is the width of Keenan's balloon greater than or less than 6 inches? How do you know?

For Review Only

Anaerobic exercise is a way to build fitness. It burns fat and strengthens muscles. Strength training is a form of anaerobic exercise. It should be included as part of a complete fitness routine. Many people report that strength training makes them feel more confident. These workouts can even be done with a set of weights or resistance bands. But, your own body weight works well, too. Push-ups, squats, and planks build strength without other equipment. **Plyometric** workouts push muscles to work hard in short bursts. This form of strength training often includes jumping, hopping, and skipping.

Some workouts are aerobic and anaerobic. For example, **high-intensity interval training (HIIT)** is a popular training method. It mixes intense movement with short periods of rest. The goal is to increase heart rate in cycles. This mix strengthens the heart and lungs. It helps the body gain speed and power, and it gets better results!

Another type of exercise that is neither aerobic nor anaerobic is yoga. It still provides a workout. Yoga poses stretch muscles. The moves are usually done on mats. There is even a special yoga mat that works with an app to let people know if they are off balance.

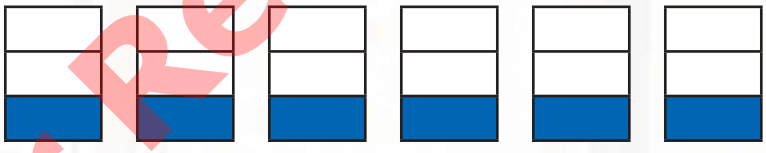


Two people add dumbbells to their routine for higher intensity planks.

For Review Only

LET'S EXPLORE MATH

HIIT includes a mixture of activity and rest. During 6 minutes of Reggie's workout, he rests $\frac{1}{3}$ of the time. Use the model to write an equation showing how long he rests.



For Review Only

Math Talk

1. What does it mean when a fraction is a *unit fraction*?
2. How is multiplying whole numbers related to multiplying fractions?
3. What patterns do you notice when multiplying fractions?
4. How can you use models to show multiplication of fractions?
5. Describe fractions that can be multiplied by 3 to create products that are less than 3. Why does this happen?
6. How might products of fractions be used to solve problems related to fitness?

For Review Only