

SONIC

THE HEDGEHOG

ADVENTURES IN MATH



DEAR EDUCATOR,

Practicing essential math skills is more fun with a boost from Sonic the Hedgehog! Building on the concepts of speed, problem solving, and teamwork, the *Sonic the Hedgehog: Adventures in Math* program challenges students to use their own special powers to solve a series of math problems and puzzles inspired by the new film, *Sonic the Hedgehog*, coming to theaters February 14.

This program, created by the curriculum specialists at Young Minds Inspired (YMI) in cooperation with Paramount Pictures, helps students work as teams to practice math operations and word-problem skills, while also highlighting real-world applications of math. Designed to complement your existing curriculum, the program's activities align with Common Core State Standards for Mathematics.

Although this program is copyrighted, feel free to make copies of the materials for your class and share the program with other teachers at your school. Return the enclosed postage-paid reply card or visit ymiclassroom.com/feedback-sonic to provide your thoughts on the program. We look forward to hearing from you.

Sincerely,
Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired

YMI Questions? Contact YMI toll-free at 1-800-859-8005, or by email at feedback@ymiclassroom.com.

TARGET AUDIENCE

Students in grades 3 through 5

PROGRAM OBJECTIVES

- Tap into student excitement about the new film *Sonic the Hedgehog* to boost enthusiasm for math
- Challenge students to use their math and problem-solving skills
- Highlight real-world applications of mathematics
- Engage students in teamwork

PROGRAM COMPONENTS

- This one-page teacher's guide
- Three reproducible activity sheets
- A colorful classroom wall poster
- A reply card for your comments, or comment online at ymiclassroom.com/feedback-sonic
- Visit ymiclassroom.com/sonic for alignment with Common Core State Standards for Mathematics

ABOUT SONIC THE HEDGEHOG

Based on the global blockbuster videogame franchise from Sega, *Sonic the Hedgehog* tells the story of the world's speediest hedgehog as he embraces his new home on Earth. In this live-action adventure comedy, coming to theaters February 14, Sonic and his new best friend Tom (James Marsden) team up to defend the planet from the evil genius Dr. Robotnik (Jim Carrey) and his plans for world domination. The family-friendly film also stars Tika Sumpter and Ben Schwartz as the voice of Sonic.

HOW TO USE THIS PROGRAM

Photocopy this teacher's guide and the student activity sheets before displaying the poster. Introduce the program by inviting students to imagine ways that Sonic the Hedgehog might connect to math. *How does Sonic use math in his life?*

ACTIVITY 1

THAT'S FAST!

To start their Sonic math adventure, have students work in teams to consider what it means to be "fast." Then, distribute copies of the activity sheet, and have students work individually to create a bar graph comparing some of the "world's fastest movers" listed. Next, invite students to work in teams to solve the word problems on the activity sheet and create a word problem of their own for another team to solve.

Answers: 1. 690 mph; 2. 190 mph; 3. 3,800 miles; 4. 134 miles; 5. 1 hour; about 10.9 hours; 6. About 5,700 miles; 7. 27.5 hours; 8. 7,448 miles; 9. 2.77 miles; 10. 24,928 miles

Extension: What might be the benefits of being able to go as fast as Sonic? For example, he can play ping pong against himself by running from one side of the table to the other to return the ball. Have students discuss their ideas in small groups or as a class.

ACTIVITY 2

DOES IT ADD UP?

The theme of speed continues in this activity, as students work with partners to complete two math challenges at Sonic speed. Before beginning, review the process for converting one unit of measure to another.

Pair students and distribute copies of the activity sheet face down (one copy per pair). Explain that there are two parts in this math challenge. The first part has four "events" or equations. Have the student teams flip over their sheets and do Part 1. Review the correct answers and create a leaderboard to celebrate successful teamwork and completion time. Then challenge the class to race the clock as

they work with their partners to complete the calculations in Part 2.

Answers: Part 1:

1. $10 - 3 + 9 = 16$
2. $4 + 13 - 5 + 8 = 20$
3. $11 - 3 + 10 + 2 - 6 = 14$
4. $25 - 9 - 5 - 3 - 1 - 7 = 0$

Part 2: 1. 1 yard; 2. 18 yards; 3. 2 feet; 4. 120 inches; 5. 21 feet; 6. 288 inches; 7. 300 minutes; 8. 1,440 minutes; 9. 7 hours; 10. 52,800 feet per hour; 11. 3 miles per minute; 12. 300 miles per hour

Extension: In the film, Sonic tries to stay hidden from view. Working in teams, have students use newspaper and tape to build a hiding place for Sonic. Share with students that the structure must be big enough to fit a soccer ball (to represent Sonic when he's rolled up) and have an entrance/exit.

ACTIVITY 3

SOLVE IT!

Speed and time are of the essence as Sonic and Tom try to outsmart and escape Dr. Robotnik in the new *Sonic the Hedgehog* film. In this activity, students work in pairs or teams to solve a series of problems and decode a message as quickly as they can.

Answers: Part 1: 1. 767 mph; 2. 46 feet; 3. 853 feet; 4. 1,614 feet; 5. 1889; 6. 240 feet; 7. 149.1 mph; 8. 448 feet; 9. 9.5 mph; 10. 302 stations **Part 2:** 1. R=7; 2. A=6; 3. N=3; 4. S=4; 5. G=9; 6. H=0; 7. I=1; 8. T=8; 9. E=5; 10. O=2. Decoded message: *Rings to transport him to an alternate universe*

Extension Activity: In the film, Sonic creates a list of things he would like to do and places he would like to see, such as the world's largest rubber band ball. Invite students to create an itinerary that identifies three places for Sonic to visit. Students should create brochures that include: a description of each place; the distance from their home city to each place; the time required for Sonic to travel to each place; and relevant illustrations or printed photos to add visual appeal.

RESOURCES

ymiclassroom.com/sonic





THAT'S FAST!

MEET SOME OF THE WORLD'S FASTEST MOVERS

As you'll see in the new film *Sonic the Hedgehog*, Sonic has a special power—speed. Along with his friend Tom, Sonic speeds around the planet to battle injustice and defeat his enemies. Complete the bar graph to compare Sonic's top speed to the other fast movers listed in the graph. Then, work with your team to use this information to calculate speedy (and correct!) solutions to the problems below.

Olympic Runner Usain Bolt	27.7 mph
Cheetah	70 mph
Peregrine Falcon	200 mph
Shanghai Maglev Train	268 mph
Boeing 747 Aircraft	570 mph
Sonic the Hedgehog	760 mph

mph = miles per hour

0 100 200 300 400 500 600 700 800

1. How much faster can Sonic travel than a cheetah?



2. How much faster is Sonic's top speed than a Boeing 747 aircraft?



3. If Sonic runs at top speed for 5 hours, how many miles will he travel?

4. Traveling at its top speed, how far could the Shanghai Maglev Train travel in 30 minutes?

5. How long will it take Sonic to travel 760 miles? How long would it take a cheetah moving at top speed to travel the same distance?

6. The Eiffel Tower is in Paris. If the flight from Paris to San Francisco takes about 10 hours on a Boeing 747, what is the distance between Paris and San Francisco?



7. The Great Wall of China was built over many centuries. During the Ming dynasty (1368 – 1644), 5,500 miles of the Wall were built. How much time would it take a peregrine falcon to fly at top speed from one end of that section of the Wall to the other?



8. Located in Egypt, the Great Pyramid at Giza is the oldest of the Seven Wonders of the Ancient World. If it takes Sonic 9.8 hours to travel from San Francisco to Giza, about how far is it?



9. If Sonic ran for 6 minutes at top speed, he would travel 76 miles. If Olympic champion Usain Bolt ran for 6 minutes at top speed, how far would he travel?

10. If Sonic decided to race around the Earth it would take approximately 32.8 hours. What is the distance around Earth or the circumference (approximately)?



Bonus: On the back of this sheet, create a word problem using information from the "World's Fastest" list above. Invite classmates to solve your problem.



See how Sonic
uses speed to solve
problems when

SONIC
THE HEDGEHOG

zooms into theaters on
February 14, 2020!



DOES IT ADD UP?

In the exciting new film *Sonic the Hedgehog*, Sonic uses his powers to try to stop Dr. Robotnik, who wants to take over the world! That means using all his skills—including math! Now it's time to test your math skills.

PART 1: MISSING SIGNS

Complete the equations below so they are correct. Add either an addition (+) or subtraction (-) sign in each blank.

Example: $4 \text{ } + \text{ } 3 \text{ } - \text{ } 5 = 2$

1. $10 \text{ } ______ 3 \text{ } ______ 9 = 16$

2. $4 \text{ } ______ 13 \text{ } ______ 5 \text{ } ______ 8 = 20$

3. $11 \text{ } ______ 3 \text{ } ______ 10 \text{ } ______ 2 \text{ } ______ 6 = 14$

4. $25 \text{ } ______ 9 \text{ } ______ 5 \text{ } ______ 3 \text{ } ______ 1 \text{ } ______ 7 = 0$



PART 2: CONVERT IT

Sonic zooms by everyone at 760 miles per hour. Miles and hours are just two units of distance and time. Test your math skills by converting the time and distance measurements below.

FAST FACTS

1 foot (ft) = 12 inches (in)

1 yard (yd) = 3 feet

1 mile (mi) = 5,280 feet

1 hour (hr) = 60 minutes (min)

1. 36 inches = _____ yards

2. 54 feet = _____ yards

3. 24 inches = _____ feet

4. 10 feet = _____ inches

5. 7 yards = _____ feet

6. 8 yards = _____ inches



7. 5 hours = _____ minutes

8. 24 hours = _____ minutes

9. 420 minutes = _____ hours

10. 10 miles per hour = _____ feet per hour

11. 180 miles per hour = _____ miles per minute

12. 5 miles per minute = _____ miles per hour



Bonus: Use a ruler to measure 2 items in the classroom, and record their length in inches. Write a different unit of measure (feet, yards) next to each item and challenge a friend to convert the length of each item from inches to the second unit of measure.



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SOLVE IT!

In the new film *Sonic the Hedgehog*, Sonic has a special item that helps him outsmart and escape Dr. Robotnik. What is it? To find out, you have to crack the code!

PART 1: DO THE MATH

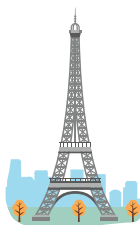
1. What is the speed of sound?
 $623 + 144 = \underline{\hspace{2cm}}$ mph

2. How high is the tallest section of the Great Wall of China?
 $414 \div 9 = \underline{\hspace{2cm}}$ feet



3. How tall is the Transamerica Building in San Francisco?
 $1,706 \div 2 = \underline{\hspace{2cm}}$ feet

4. The Shanghai World Financial Center is the world's tallest building with a hole. How tall is it?
 $908 + 706 = \underline{\hspace{2cm}}$ feet



5. When was the Eiffel Tower completed?
 $1,035 + 854 = \underline{\hspace{2cm}}$

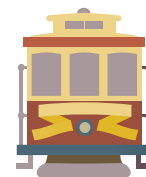
6. How long is the Great Sphinx of Giza from paw to tail?
 $1,680 \div 7 = \underline{\hspace{2cm}}$ feet



7. How fast is the world's fastest roller coaster (the Formula Rossa at Ferrari World in Abu Dhabi)?
 $94.2 + 54.9 \underline{\hspace{2cm}}$ mph

8. How tall is the Pyramid of Khafre in Giza, Egypt?
 $1,142 - 694 = \underline{\hspace{2cm}}$ feet

9. How fast does a San Francisco cable car move?
 $1.2 + 2.7 + 5.6 = \underline{\hspace{2cm}}$ mph



10. How many stations does the Paris Métro rapid transit system have?
 $1,812 \div 6 = \underline{\hspace{2cm}}$ stations

PART 2: DECODE IT

Now, use the answers above to create a letter key. Write the last digit of each answer from Part 1 on the blank next to the problem number. Then use your key to decode the answer below. Write the letter for each number on the line above it. Some letters are already filled in.

1. R = 2. A = 3. N = 4. S = 5. G =
 6. H = 7. I = 8. T = 9. E = 10. O =

What special item does Sonic use to protect himself?

Answer: 7 1 3 9 4 8 2 8 7 6 3 4 P 2 7 8 0 1 M
8 2 6 3 6 L 8 5 7 3 6 8 5 U 3 1 V 5 7 4 5



BONUS: Challenge yourself to make as many words as you can using only the letters listed in the decoding key. How many words can you make?



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