



GLASS
AGE

WELCOME TO THE GLASS AGE.

Dear Educator,

Can you imagine a world without glass? That's the question TV science investigators Jamie Hyneman and Adam Savage pose in "The Glass Age," an eye-opening new video series from Corning Incorporated that demonstrates how glass technologies are changing our lives.

This teaching kit is designed to help you make The Glass Age part of your science curriculum, with standards-based activities that will motivate your students to explore some of the most exciting innovations of The Glass Age and to imagine glass-technology innovations of the future.

Developed by the award-winning curriculum specialists at Young Minds Inspired (YMI) in cooperation with Corning Incorporated, these learning materials provide a content-rich supplement to high school courses in chemistry, physics, engineering, technology, and general science that features video demonstrations, interactive animations, and other online resources that will engage your students in authentic discovery.

We encourage you to share this program with other teachers at your school. Although the materials are protected by copyright, you may make as many copies as you need for educational purposes.

Please let us know your opinion of this educational program by commenting at ymiclassroom.com/feedback-glass-age. We depend on your feedback to continue providing free educational programs that expand students' horizons and help them gain a greater understanding of the world around them.

Sincerely,



Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired



CORNING

is the only company developing free, innovative classroom materials that is owned and operated by award-winning former teachers. Visit our website at www.ymiclassroom.com to send feedback and download more free programs. For questions, contact us at 1-800-859-8005 or email us at feedback@ymiclassroom.com.

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THE GLASS AGE

Target Audience

This program is designed for students in grades 9-12 as a supplement to the STEM curriculum.

Program Objectives

- To guide students' appreciation for technologies that have an impact on our daily lives, including communications, medical, art, engineering, and infrastructural applications as depicted in Corning's "The Glass Age" video series.
- To encourage students to consider a role in advancing the future through science and technology.

Standards Alignment

This program aligns with National Standards for Science, Common Core Standards, and Next Generation Science Standards for grades 9-12. For more details, visit ymiclassroom.com/glass-age.

Program Components

- "The Glass Age," a two-part video accessible at TheGlassAge.com.
- This educator's guide
- Four reproducible student activity sheets.
- Additional online learning resources available at ymiclassroom.com/glass-age.
- A teacher feedback form at ymiclassroom.com/feedback-glass-age.

How to Use This Program

Reproduce these materials to share with other teachers at your school and copy and distribute the activity sheets to students. When you assign the videos for each activity, suggest that students take advantage of the wide variety of supporting materials available at corning.com.

The Glass Age: A Synopsis

Part 1: Flexible, Bendable Glass introduces students to a new way of thinking about glass and explains the concept of The Glass Age. Students will learn the history of glass innovation and watch incredible demonstrations of bendable optical fiber and thin, ultra-flexible glass.

Part 2: Strong, Durable Glass shows students why industries such as automobile manufacturing and consumer electronics will experience amazing changes in the near future due to advances in materials engineering. Students will see Adam Savage and Jamie Hyneman conduct

mind-bending demonstrations of strong, durable glass, and they will lead students to consider what other industries may be revolutionized by these new capabilities.

Activity 1 Glass Class—Pre-viewing Activity

As a primer to the program, ask your class to think about common forms of glass that they use today and to guess when they were invented. Ask students what they think the oldest use of glass might be. Following this discussion, have students complete the quiz by researching the answers at Corning.com/GlassClass.

Answers to quiz: 1. True. 2. True. 3. True. 4. True. 5. False. Silicate comprises 90% of the Earth's crust. 6. True. 7. False. Glass flow is so infinitesimal it would take 20 trillion times the age of Earth to see a discernible difference. 8. False. More than 50 elements have been incorporated into silicate glass to meet specific technical and artistic needs. 9. True. 10. True. That's enough information to fill 25,000 DVDs every second. 11. False. LCD substrate is one of the most ubiquitous high-tech glasses. 12. True. 13. False.

Activity 2 "The Glass Age, Part 1: Flexible, Bendable Glass"

Begin the activity by asking your students to think about what an "age" is, as in the Stone Age, Bronze Age, or Iron Age, and have them brainstorm what kind of an age they live in. After students watch "The Glass Age, Part 1: Flexible, Bendable Glass", discuss whether they agree that this is The Glass Age. Have students work together to fill in the chart as they brainstorm new ways to use glass that take advantage of the incredible flexibility and durability depicted in the video. To help them, suggest that they consider future uses for a product called Corning® Willow® Glass that's as flexible as paper.

Activity 3 "The Glass Age, Part 2: Strong, Durable Glass"

To begin the activity, have students watch "The Glass Age, Part 2: Strong, Durable Glass." Then provide students with a brief primer/refresher on the periodic table and explain that ion exchange happens when two sets of charged molecules switch places. Ask students to go through the production process for Corning® Gorilla® Glass step-by-

step to see how scientific principles directly affect the manufacturing process. Then have students brainstorm how the unique qualities of this material might have an important impact in each of the areas listed on the sheet. Demonstrations of how it is tested, available on CorningGorillaGlass.com, can provide a starting point. Another great article about the production of Corning® Gorilla® Glass is available at wired.com/2012/09/ff-corning-gorilla-glass/all/.

Answers to diagram: A. 4. B. 2. C. 7. D. 3. E. 1. F. 6. G. 5.

Activity 4 Inspired by Glass

Part 1: Discuss the different uses of glass depicted in the "Welcome to The Glass Age, Presented by Corning" video and brainstorm the impact on additional industries. Then, direct students to theglassage.com/inspirational-quotes to read why scientists, engineers, and designers have been inspired by glass. Ask students what surprised them about what they read and suggest that students submit their own quote. To extend the lesson, have them click onto articles on "The Glass Age" website, such as: *Glass Heroes*, *A Window to the World* and *Drawing on Glass*.

Part 2: Explain that materials engineers are responsible for much of the innovation in glass technology, and that they work at the atomic level to produce new and improved products. Tell students that careers in this fascinating world begin in high school with science, math, and computer courses.

www.Corning.com/Careers.

Resources

TheGlassAge.com — Adam Savage and Jamie Hyneman demonstrate the mind-bending capabilities of today's advanced glass.

Corning.com — a wealth of information about cutting-edge technologies

Corning.com/glassclass — uncommon knowledge about an extraordinary material

Corninggorillaglass.com/en/technology/how-its-made — information and videos about Gorilla® Glass

cmog.org — Corning Museum of Glass in Corning, NY

ymiclassroom.com/glass-age — for Corning and other educational programs

Is there any limit to what glass can do? Visit TheGlassAge.com or watch "The Glass Age" video series at YouTube.com/CorningIncorporated to find out — you might just be amazed.