Activity 4 | Glass on the Go

Part 1: Corning® Gorilla® Glass– A Tough Story

In 2007, a major technology company approached Corning about glass for its first smartphone.

The problem: Plastic scratched too easily, so they wanted a more durable and elegant material.

The solution: Drawing on decades of glass expertise, Corning delivered its solution within six months and created the market for cover glass. Since then, Gorilla Glass has been featured on more than 6 billion smartphones, tablets, and notebooks around the world.

How they got there: To innovate rapidly, Corning scientists and engineers looked at their company's research from the 1960s and experimented with more than a hundred glass compositions to come up with the right solution.

The story continues: Scientists and engineers work to constantly push the boundaries of glass. Corning didn't stop with the creation of Gorilla Glass in 2007. They've continually improved on the original design, making each composition tougher, sleeker, and more durable for new applications. Corning® Gorilla® Glass 6 withstands drops from up to 1 meter on rough surfaces such as asphalt.

Brainstorm which technologies and products you use on a daily bases that need Gorilla's toughness. Then check out some stories about how people are using these tough devices every day at corning.com/gorillaglass/worldwide/en/incredibly-tough.html

Part 2: Ion Exchange

How can today's high-tech glass be so tough that it withstands drops, bumps, and scratches in everyday life, even while remaining incredibly thin?

The problem: Glass cracks and shatters when there are flaws on its surface and when tensions, from a fall or hit, are placed on it.

The solution: The combination of two Corning innovations:

- First, Corning's fusion process is used to produce thin, pristine, smooth glass that is virtually flawless.
- Second, the glass is chemically strengthened through an ion-exchange process, creating a surface layer of compression to resist the tensions that occur during drops, bumps, and scratches.

Imagine you have a box of pool balls. When you shake the box, they jiggle around and crash into each other. So one by one, you replace the balls with tennis balls, which are larger and softer. Now when you shake the box, they're too close together to move much. That's similar to how ion exchange creates compression to strengthen Gorilla Glass. To learn more, watch the video *Why Glass Breaks* at corning.com/gorillaglass/worldwide/en/technology/how-it-s-made.html

Take note of the following in the ion-exchange process:

1) Glass parts are immersed in a molten salt solution.
2) Potassium ions (electronically charged particles) in the solution migrate into the glass surface, replacing the smaller sodium ions originally in the glass.
3) As the glass cools, the larger potassium ions compress the glass together, creating a compressive stress layer that forms a tough surface.

MY LIFE IN THE GLASS AGE

Gorilla Glass is unlocking possibilities in other arenas beyond mobile devices – in fact, the possibilities are endless. Read more at corning.com/worldwide/en/innovation/the-glass-age/glass-a-clear-solution.html #ChemicallyStrengthenedGlass. Then put on your engineering hat and brainstorm some ideas for NEW uses for tough, ultra-thin glass. List your ideas on the back of this sheet. For each idea, be sure to explain the problem you are trying to solve and why Gorilla Glass is the solution.

YMI CORNING