

Hot Science

Superhero Science



Hot
Science
Cool Activities

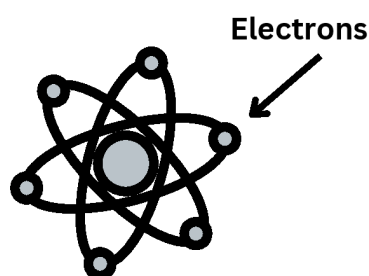
www.HotScience.tv

Reference Sheet

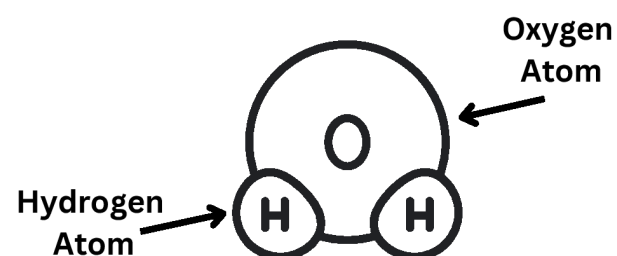
Terms to Know

- **Molecule:** A group of two or more atoms that are joined (or “bonded”) tightly together by their electrons.
- **Atom:** A basic building block of matter. Everything around you is made of atoms, including the air, water, and even your own body.
- **Electrons:** Tiny particles with a negative charge that move around the center of an atom responsible for electricity. They help atoms connect with each other to form different substances, like water or salt.
- **Mechanical Energy:** The energy of an object that is moving or has the potential to move.
- **Sucrose:** Also known as table sugar, it is the most popular sweetener used worldwide. This type of sugar is also present in most fruits, some root vegetables, many trees, and grasses.
- **Triboluminescence:** The flash of light that happens when certain materials are rubbed, scratched, or crushed. For Life Savers, this light comes from the energy released when the candy's crystals are broken.

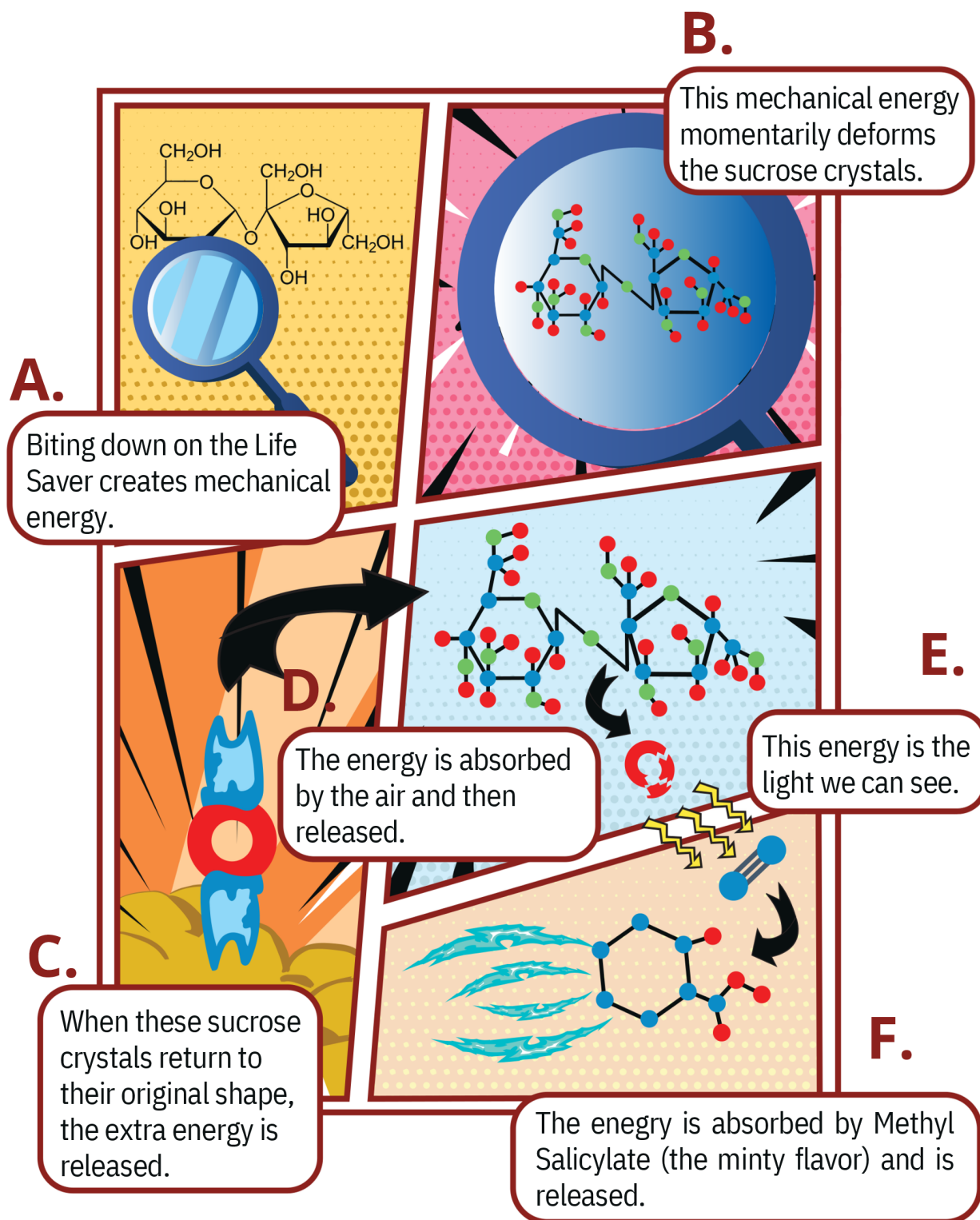
Atom



Water Molecule



Reference Sheet



Life Saver Experiment

Name

Date

Directions: Break Into groups of 3-4 based on the experiment method chosen. Review and prepare for any safety precautions. Follow the directions and observe triboluminescence before your eyes!

Draw what you observed when the Life Saver cracked!



1. Did the Life Saver emit more than one flash of light? If so, why might that be?

2. What did you notice about the sparks? Were they bright? Dim? Yellow? Blue? Large? Small?

3

3. If you could change anything about this experiment, what would you change? Why?

Learn More

4

What causes this “tiny lightning”?

Triboluminescence is the release of light that happens when an object's structure is broken or deformed (like Thor's hammer hitting Captain America's shield or your teeth hitting a Life Saver mint). This bending releases energy that makes nearby electrons excited. These newly excited electrons give off light as they go back to normal. If this process sounds familiar to you, that's because lightning is created by a similar process!

Why did we use wintergreen Life Savers?

Triboluminescence should occur in most hard candies, so why did we specify that a specific flavor of Life Saver be used? This is because the light released when crystals deform/break is mostly invisible (like the UV radiation from the sun). The wintergreen flavoring used in Life Savers happens to absorb invisible light and release it as visible light, allowing us to see it. Other hard candies without this flavoring will still emit light when broken, but it would be much harder to see with the naked eye.

Why does moisture affect the process?

Sucrose (the primary ingredient in Life Savers) dissolves in water. Any exposure to water will cause small portions of the candy to dissolve, changing the structure of the Life Saver, causing it to become soft. Because the structure is no longer perfectly crystalline it will no longer break in the same way.