

Photo Description



This image shows car tires with deep grooves and patterns carved into the rubber surface. The tread (the bumpy, patterned part) helps tires grip the road and push water away. You can see how the tire tread is designed with special shapes that help cars stop safely and drive smoothly on different surfaces.

Scientific Phenomena

Anchoring Phenomenon: Why do tires have bumpy patterns on them?

Tire tread exists because of friction and water displacement. The grooves in tire tread create grip (friction) between the tire and the road, which helps cars stop, start, and turn safely. The patterns also channel water away from the tire's contact point, preventing skids on wet roads. This is an example of how humans design objects based on understanding how materials interact with their environment.

Core Science Concepts

- * **Friction:** The force that happens when two surfaces rub together. Tire tread increases friction between the tire and road, making it harder for the tire to slip.
- * **Material Properties:** Rubber is flexible, stretchy, and grips well. These properties make it perfect for tires, but the rubber alone isn't enough—the tread pattern makes tires work even better.
- * **Design and Function:** Objects are designed in specific ways to help them work better. The bumpy tread pattern on tires is intentionally designed to solve a problem (slipping and skidding).
- * **Wear and Erosion:** Over time, tires wear down from friction with the road. The tread becomes smoother and shallower, which makes the tire less safe.

Pedagogical Tip:

Help students understand tread by making a connection to their own shoes: Ask them to examine the soles of their sneakers. Compare smooth-soled shoes to shoes with bumpy soles. Which shoes grip better on a slippery surface? This concrete comparison helps Second Graders understand why tires need tread without requiring abstract thinking about cars.

UDL Suggestions:

Provide multiple representations: (1) Tactile exploration—let students feel real tire tread samples or shoe soles with different patterns, (2) Visual models—show pictures of worn vs. new tires side by side, and (3) Kinesthetic activity—have students walk on smooth tile and textured carpet to feel the difference in grip. This multi-sensory approach supports learners with different strengths and learning preferences.

Discussion Questions

1. What would happen if tires were completely smooth like a rubber ball? (Bloom's: Predict | DOK: 2)
2. Why do you think tire tread looks different from the tread on the bottom of your shoes, even though they both need to grip? (Bloom's: Analyze | DOK: 3)
3. How do you think a tire's tread changes after someone drives a car for many years? (Bloom's: Infer | DOK: 2)
4. If you were designing a tire for a race car on a wet track, what would you change about the tread pattern and why? (Bloom's: Create | DOK: 3)

Extension Activities

Activity 1: Texture Testing

Provide students with various materials (sandpaper, smooth plastic, textured rubber, cloth). Have them predict which materials have the most "grip," then test each one by seeing which material can hold a toy car best on a tilted board. Record observations and discuss why rougher textures grip better.

Activity 2: Design Your Own Tread

Give students modeling clay or playdough and ask them to create a tire with a tread pattern they design. Have them predict what their tread pattern should do (stop cars, move through mud, drive in snow), then test their models on different surfaces to see if their designs work. Discuss what worked and what they would change.

Activity 3: Tire Wear Investigation

Show students pictures or video of new tires versus extremely worn tires with barely any tread. Ask: "Why is a tire with very little tread dangerous?" Create a simple safety poster as a class about why tire tread matters.

NGSS Connections

Performance Expectation:

K-2-ETS1-2: Develop a simple sketch, drawing, or physical model that represents how the shape of an object helps it function to solve a given problem.

Disciplinary Core Ideas:

- K-PS2.A Forces and Motion: Pushes and pulls can change the speed or direction of an object's motion.
- K-2-ETS1.B Developing Possible Solutions: Designs can be tried, tested, and improved.

Crosscutting Concepts:

- Structure and Function The shape and materials of objects relate to what they can do.
- Systems and System Models Objects have parts that work together.

Science Vocabulary

- * Tread: The bumpy, grooved pattern on the bottom of a tire that helps it grip the road.
- * Friction: A force that happens when two things rub together and makes it harder for them to slide past each other.
- * Grip: When something holds onto another thing tightly so it doesn't slip.
- * Groove: A long, narrow cut or channel in a surface.

* Wear: When something gets thinner, smoother, or damaged from being used over and over.

External Resources

Children's Books:

- Cars by Leslie Pate Mackinnon (simple introduction to how cars work)
- Tires by Rebecca Stefoff (part of the "How It Works" series; explains tire design for early readers)
- Wheels by Mick Manning (explores different wheel and tire designs across transportation)

YouTube Videos:

- "Why Do Tires Have Tread?" by SciShow Kids (2:45 minutes)
<https://www.youtube.com/watch?v=u-yLWrnsDIU>
Clear explanation of tire tread function with engaging visuals appropriate for Second Grade.
- "How Are Tires Made?" by National Geographic Kids (3:10 minutes)
https://www.youtube.com/watch?v=oVW5Mz_3Yk8
Shows the manufacturing process and highlights why tread patterns matter for safety.