Tires

Physical Science | Lesson Guide

Kindergarten

Photo Description

This image shows a close-up view of a tire's tread pattern—the bumpy, textured surface on the bottom of a tire. The tread has many small ridges and grooves that help the tire grip the ground. In the background, we can see a metal wheel rim and part of a vehicle.

Scientific Phenomena

Anchoring Phenomenon: Why do tires have bumpy patterns instead of being smooth?

Scientific Explanation: Tires have tread patterns (those bumpy ridges and grooves) because they help vehicles grip and hold onto the ground—similar to how your shoes have bumpy soles to keep you from slipping. The grooves channel water away when it rains, and the ridges increase the contact area between the tire and the road surface. This is an example of how texture affects friction, a fundamental physical science concept. The bumps create more points of contact, which increases grip and traction, making vehicles safer to drive.

Core Science Concepts

* Texture and Surface Properties: Tires have a rough, bumpy texture instead of a smooth surface. This texture helps tires grip the ground better.

* Friction: The bumpy tread pattern creates friction—a force that helps the tire grip the road and prevents skidding. More bumps = more grip.

* Purpose and Function in Design: Tires are designed with tread patterns on purpose. Humans created this pattern to solve a problem (keeping vehicles from sliding).

* Observation and Properties: We can observe and describe the physical properties of objects using our senses (sight, touch). The tread has texture, color, and a specific pattern.

Pedagogical Tip:

For Kindergarteners, use the compare and contrast strategy: Have students feel smooth and bumpy objects (a smooth plastic toy vs. a textured sponge). Ask, "Which one grips better when you push it across the table?" This concrete experience helps them understand why tires need bumps before showing them the tire photo.

UDL Suggestions:

Multiple Means of Representation: Provide a tactile exploration station with sandpaper, smooth plastic, bumpy rubber, and textured fabric so students can feel different surfaces. Some learners benefit from hands-on sensory engagement before abstract photo analysis. You might also use a simple diagram showing a smooth tire vs. a treaded tire.

Multiple Means of Engagement: Let students choose whether they want to examine real tire samples (safely), draw tire patterns, or act out what happens when a car tire tries to move on different surfaces. This choice increases motivation for diverse learners.

Discussion Questions

1. Why do you think the tire has bumpy parts instead of being smooth like a ball? (Bloom's: Analyze | DOK: 2)

2. If the tire was completely smooth, what might happen when a car drives on a rainy day? (Bloom's: Evaluate | DOK: 3)

3. Can you find other things in our classroom that have bumpy surfaces? What do you think they're bumpy for? (Bloom's: Apply | DOK: 2)

4. How is the bumpy tire tread like the bumpy bottom of your shoe? (Bloom's: Understand | DOK: 1)

Extension Activities

1. Tire Tread Rubbings: Provide paper and crayons. Have students place paper over a safe, clean tire tread (or a textured rubber mat) and rub the crayon over it to reveal the pattern. This kinesthetic activity helps students understand texture through tactile and visual learning.

2. Smooth vs. Bumpy Race: Set up a simple ramp. Give students toy cars or blocks with smooth bottoms and blocks with bumpy/textured bottoms (tape sandpaper underneath). Let them race both down the ramp. Observe and discuss which one grips better. Safety note: Use a short, safe ramp and supervise closely.

3. Texture Hunt and Sort: Take students on a classroom walk to find and touch different surfaces (smooth tile, bumpy rug, rough tree bark, smooth plastic, bumpy sponge). Have them sort pictures or objects into "Smooth" and "Bumpy" categories and discuss why each surface feels that way.

NGSS Connections

Kindergarten Performance Expectation:
K-PS2-1: Plan and conduct investigations to provide evidence that vibrations make sound.
(While this PE focuses on sound, the friction and grip concept relates to K-PS2 Motion and Stability: Forces and Interactions)

Disciplinary Core Ideas:
* K-PS2.A - Forces and Motion: Objects can move in different ways (fast, slow, straight, round). Texture affects how easily objects move.
* K-PS2.B - Types of Forces: Pushes and pulls have different strengths and directions.

Crosscutting Concepts:
* Patterns - The tread has a repeating pattern of bumps and grooves.
* Structure and Function - The structure (bumpy tread) serves a function (gripping the road).

Science Vocabulary

* Tread: The bumpy, grooved part on the bottom of a tire that helps it grip the ground.
* Texture: How something feels when you touch it—smooth, bumpy, rough, or fuzzy.
* Friction: A force that happens when two things rub together and try to slow each other down.
* Grip: The ability of something to hold onto another surface without slipping.
* Pattern: A repeating design or arrangement of shapes, colors, or textures.

External Resources

Children's Books:

Tires* by Rebecca Stefoff (Introduction to Tires and How They Work)
Wheels on the Bus* by Raffi (Classic song that introduces vehicle parts in a fun, musical way)
Little Blue Truck* by Alice Schertle (Engaging story about trucks and their parts)

YouTube Videos:
"How Tires Work - Simplified for Kids" - A 3-minute animated video explaining tire function and tread patterns. Available on YouTube Kids and educational channels. Note: Preview for age-appropriateness.*
* "Tire Tread Safety Experiment" (National Geographic Kids) - A short demonstration showing why tire tread matters for grip and safety. Search "tire tread demonstration for kids" on YouTube for similar age-appropriate videos.

Teacher Note: This lesson connects physical science concepts (texture, friction, force) to real-world examples students encounter daily. Kindergarteners learn best through concrete, hands-on exploration, so prioritize tactile activities before abstract discussions about the tire image.