Name: _____ **Date:** _____

Answer Key: Shatter Reality: 3rd Grade Modern Physics Quiz

Particle surfing, stretchy clocks, and invisible forces — students evaluate how the tiniest pieces of our universe challenge everything they see.

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1. If you could ride on a magical skateboard moving almost as fast as light, why would you age slower than your friends back on Earth?

Answer: B) Fast motion stretches out time like a rubber band

According to special relativity, time actually slows down for objects moving at extremely high speeds compared to objects that are standing still.

2. Imagine a giant bowling ball sitting on a soft trampoline. The way the ball curves the trampoline's fabric is how mass curves _____.

Answer: C) Spacetime

General relativity explains that gravity isn't just a pull, but a curve in the fabric of 'spacetime' created by heavy objects.

3. In the world of the very small, a particle can sometimes act like a solid marble and other times act like a wiggly wave in a pool.

Answer: A) True

This is known as wave-particle duality. Tiny things like electrons don't follow the rules of big objects; they have characteristics of both particles and waves.

4. If you throw a ball at a solid brick wall, it bounces back. But in 'Quantum Tunneling,' what might a tiny particle do instead?

Answer: B) Magically appear on the other side of the wall

Quantum tunneling is a phenomenon where subatomic particles have a small chance of passing through a barrier that should be impossible to cross.

5. A Superconductor is a special material that, when frozen very cold, allows electricity to flow with zero _____.

Answer: B) Resistance

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Superconductors are quantum materials that don't resist electricity, meaning no energy is lost as heat while the power moves through them.

6. The Uncertainty Principle says that if you know exactly where a tiny electron is hiding, you cannot know exactly how fast it is moving.

Answer: A) True

Heisenberg's Uncertainty Principle proves there is a limit to what we can know about a particle's position and speed at the same time.

7. Why do scientists use 'Probability Clouds' to describe where an electron is, instead of drawing a specific circle path?

Answer: C) We can only predict the area where they might be

In quantum mechanics, particles don't have a set path; they exist in a range of possible locations until they are measured.

8. The 'Photoelectric Effect' is the reason your calculator or a garden light can turn ____ into electricity.

Answer: C) Light

This effect happens when light hits a material and knocks electrons loose, creating an electric current used in solar power.

9. Which of these is a real-world tool that uses modern physics to help your parents find their way to a new restaurant?

Answer: B) GPS Satellites

GPS satellites move so fast and are so far from Earth's gravity that they must use Relativity to keep their clocks accurate for our phones.

10. Black holes are parts of space where gravity is so strong that even light, the fastest thing in the universe, gets trapped.

Answer: A) True

Because mass curves spacetime, a black hole creates a curve so deep that nothing can climb back out once it crosses the edge.