Name: _____ **Date:** _____

Could You Live in a World of Waves? 4th Grade Modern Physics Quiz

Moving beyond simple sight and sound, students analyze how invisible quantum rules and gravity warps shape the secret clockwork of our universe.

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1. Imagine you are an astronaut traveling at 99% the speed of light. If you looked at a clock on Earth, why would it seem to be ticking much faster than your own watch?

A. Gravity makes the batteries in your watch run out faster.
B. Space and time stretch and squeeze depending on how fast you move.
C. The air in space is thinner, so clocks move more easily.
D. Light cannot reach a spaceship that is moving that fast.

2. In the world of Quantum Mechanics, a tiny particle like an electron can actually be in two different places at the exact same time until someone measures it.

A. True
B. False

3. Albert Einstein's General Relativity suggests that heavy objects like stars do not just pull on things, but actually bend the 'fabric' of the universe called ___.

A. The Ozone Layer
B. The Milky Way
C. Spacetime
D. Atmospheric Pressure

4. If you tried to measure exactly where a quantum particle is and how fast it is going at the same time, what would happen?

A. You would get a perfect measurement because of better technology.
B. The particle would stop moving entirely so you could see it.
C. The more you know about its position, the less you know about its speed.
D. The particle would split into two identical pieces.

5. Scientists have found that light is very strange because it acts like a wave (like a ripple in water) but also acts like a tiny ___ (like a marble).

A. Shadow
B. Particle
C. Vacuum
D. Magnet

6. Because of gravity's effect on time, a clock on top of a very tall mountain actually ticks slightly faster than a clock at the beach.

A. True

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B. False

7. What would happen to a beam of starlight if it passed very close to a massive Black Hole?

A. The light would speed up and become invisible.
B. The light would bounce off the black hole like a mirror.
C. The light would curve because the space around the black hole is bent.
D. The light would turn into solid matter.

8. In modern physics, the famous equation $E=mc^2$ tells us that ___ and energy are actually two versions of the same thing.

A. Magnetism
B. Matter (Mass)
C. Coldness
D. Electricity

9. In the world of the very small, particles can sometimes 'teleport' through solid walls that they shouldn't be able to cross.

A. True
B. False

10. Why do engineers have to use Modern Physics (Relativity) to make sure the GPS on your phone works correctly?

A. To keep the satellites from falling out of the sky.
B. To protect the satellites from solar heat.
C. Because clocks on fast-moving satellites tick differently than clocks on the ground.
D. Because the internet travels faster than the speed of light.