Name: _____ **Date:** _____

Stretching Time and Shrinking Atoms: 4th Grade Modern Physics Quiz

Learners apply synthesis skills across 10 challenging items to explain how the very fast and very small change our view of reality.

---

1. Imagine you are an astronaut traveling on a super-fast rocket at 90% the speed of light. If you looked at your watch and then compared it to a clock on Earth, what would you notice?

A. Time on your watch stayed the same as the Earth clock.
B. Your watch ticked slower than the clock back on Earth.
C. The Earth clock stopped working completely.
D. Your watch ticked much faster than the Earth clock.

2. True or False: In quantum physics, a tiny particle like an electron can be in two different places at the exact same time until we look at it.

A. True
B. False

3. Albert Einstein's famous equation $E=mc^2$ proves that ___ and energy are actually two different forms of the same thing.

A. Magnetism
B. Speed
C. Mass
D. Electricity

4. If you stood near a massive object like a star, General Relativity says that space isn't just empty—it actually behaves like which of these?

A. A hard, flat wooden floor.
B. A stretched trampoline that curves under weight.
C. A vacuum cleaner sucking up all the air.
D. A mirror reflecting light backwards.

5. When scientists say light has a 'Dual Nature,' they mean it can act as both a wave and a tiny packet of energy called a ___.

A. Proton
B. Neutron
C. Photon
D. Electron

6. True or False: Because of gravity's effect on time, the clocks on GPS satellites must be adjusted because they tick slightly differently than clocks on the ground.

A. True

Name: _____ **Date:** _____

B. False

7. The 'Uncertainty Principle' is a rule in modern physics that says you can never perfectly know an electron's position and its ___ at the same time.

A. Color
B. Weight
C. Temperature
D. Speed

8. Black holes are regions in space where gravity is so strong that even ___ cannot move fast enough to escape its pull.

A. Sound
B. Light
C. Magnets
D. Heat

9. Which of these everyday inventions relies on our understanding of quantum physics to work?

A. A bicycle
B. A wooden pencil
C. A smartphone
D. A manual can opener

10. True or False: According to Special Relativity, if an object could travel at the speed of light, it would appear to have no length (it would be flat).

A. True
B. False