Name: _____ **Date:** _____

Will Time Slow Down? Launch Into 7th Grade Modern Physics

Analyze relativistic effects and quantum behavior to strengthen conceptual models of how the universe functions at high speeds and tiny scales.

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1. If a cosmic explorer travels at 90% the speed of light to a distant star system, what will they observe regarding their own clock compared to a clock left on Earth?

A. Their clock stops moving entirely.
B. Their clock ticks slower relative to the Earth clock.
C. Their clock ticks faster than the Earth clock.
D. Both clocks remain perfectly synchronized.

2. Modern physics suggests that light can behave as both a continuous wave and as discrete packets of energy called _____.

A. Protons
B. Neutrons
C. Photons
D. Electrons

3. True or False: General Relativity describes gravity as a force that pulls objects, rather than a curvature of the fabric of space and time.

A. True
B. False

4. Why must engineers account for relativity when designing and maintaining the Global Positioning System (GPS) satellites?

A. To prevent the satellites from falling out of orbit.
B. Because the satellites travel through a vacuum.
C. To correct for time differences caused by speed and gravity.
D. Because batteries drain faster in space.

5. In the subatomic world, the _____ Principle states that we cannot know both the exact position and the exact momentum of a particle at the same time.

A. Einstein
B. Newton
C. Heisenberg
D. Galileo

6. True or False: According to the principle of mass-energy equivalence, even a small amount of mass can be converted into a massive amount of energy.

A. True

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B. False

7. Which unusual quantum phenomenon allows a particle to pass through a solid energy barrier that it classically shouldn't be able to cross?

A. Quantum Tunneling
B. Space Warping
C. Atomic Friction
D. Light Refraction

8. When a very massive star collapses into a point of nearly infinite density, it creates a _____, where gravity is so strong even light cannot escape.

A. White Dwarf
B. Supernova
C. Black Hole
D. Nebula

9. True or False: Particles at the quantum level have definite, fixed paths just like a marble rolling across a floor.

A. True
B. False

10. What happens to the length of an object, such as a high-speed train, as it approaches the speed of light from the perspective of a stationary observer?

A. It stays exactly the same length.
B. It appears to stretch and get longer.
C. It appears to shorten in the direction of motion.
D. It turns into pure liquid energy.