Name: _____ **Date:** _____

Answer Key: Wrangle Subatomic Zoo Animals: A 5th Grade Quantum Quiz

Students transition from Newtonian logic to particle-wave duality and spacetime warping by analyzing how tiny particles and massive stars behave.

---

1. Imagine you are an astronaut traveling in a super-fast rocket. According to Albert Einstein, what happens to your watch compared to a watch left on Earth?

Answer: A) Your watch ticks slightly slower

This is called time dilation. When you move very fast through space, time actually passes slower for you than for people standing still.

2. True or False: In the world of quantum physics, a tiny particle can act like both a solid marble and a rippling wave at the same time.

Answer: A) True

This is known as wave-particle duality. Light and electrons don't just act like little balls of matter; they also travel in waves.

3. Einstein's famous equation $E=mc^2$ tells us that mass (matter) and _____ are actually two different forms of the same thing.

Answer: C) Energy

The 'E' in the equation stands for Energy, showing that even a small amount of matter contains a huge amount of trapped energy.

4. If you placed a heavy bowling ball on a stretchy trampoline, it would curve the fabric. In modern physics, what 'fabric' do massive stars curve?

Answer: B) Spacetime

General Relativity suggests that gravity isn't just a pull, but a curve in the fabric of spacetime caused by heavy objects.

5. When a giant star collapses into a tiny point with gravity so strong that not even light can escape, we call it a _____.

Answer: C) Black Hole

Name: _____ **Date:** _____

Black holes are regions where gravity is so intense that the 'escape velocity' is faster than the speed of light.

6. True or False: Because of gravity, a clock at the top of a tall mountain ticks slightly faster than a clock at the beach.

Answer: A) True

Gravity affects time! Stronger gravity near the Earth's surface slows time down more than weaker gravity higher up.

7. The Heisenberg Uncertainty Principle says we can't know two things about a particle perfectly at the same time. Which two things are they?

Answer: B) Position and Speed

In quantum physics, the more accurately you know where a particle is, the less you know about how fast it is going (and vice versa).

8. Which modern technology uses quantum physics to create detailed images of the inside of a human body without using surgery?

Answer: C) MRI machine

Magnetic Resonance Imaging (MRI) relies on the quantum properties of atoms inside your body to create a picture.

9. True or False: According to special relativity, nothing in the universe can travel faster than the speed of light.

Answer: A) True

Light speed is the 'universal speed limit.' As objects with mass get faster, they become 'heavier' (more energetic), making it impossible to reach the speed of light.

10. What is 'Quantum Tunneling' similar to in the real world?

Answer: B) A ghost walking through a wall

Quantum tunneling is when a particle disappears on one side of a barrier and instantly appears on the other side, appearing to go 'through' it.