

Eighth Grade Physics Final

Name _____

Date _____

1. In 1687, Newton laid the groundwork for modern physics by publishing a great book. What was it called?
 - Foundations of Modern Physics
 - Foundations of Modern Mathematics
 - Philosophiae Naturalis Principia Mathematica*
 - Philosophiae Naturalis Principia Physica*
2. Newton's insights became known as the "first great unification", because they unified our understanding of:
 - Gravity on Earth and the behavior of planets, solar systems, and stars
 - Electricity and magnetism
 - Time and space
 - None of the above
3. Why was Newton left with a lingering sense of insecurity that stayed with him for the rest of his life?
 - His father abandoned him at an early age.
 - His mother abandoned him at an early age.
 - He was spoiled by his stepfather.
 - He was spoiled by his stepmother.
4. Where did Newton first discover the wonders of science?
 - The London Library of Congress
 - His family farm when he observed an apple fall from a tree
 - Cambridge
 - In an apothecary where he worked as a youth
5. While Newton was studying at Cambridge, which understanding of reality did he reject?
 - A neocentric solar system
 - A geocentric solar system
 - A heliocentric solar system
 - A universal solar system
6. Newton kept secret notes called, "Quaestiones Quaedam Philosophicae". What did he write there?
 - Secret and questionable sonnets to his girlfriend
 - Questions to ask his professors the next day in class
 - Questions he could not ask his professors
 - Questions about the known planetary orbits and their inverse orbits.
7. What was Newton's first major achievement?
 - Designing and constructing the first Cartesian Coordinate Grid
 - Designing and constructing a reflecting telescope
 - Developing the Theory of Magnetism
 - Developing the Theory of Relativity

8. In which of the following areas did Newton NOT make major discoveries?

- Optics
- Physics
- Motion
- Biology
- Mathematics

9. Newton discovered three laws of motion. What were they?

- 1. Entropy 2. Light 3. Energy
- 1. Effort 2. Counter-effort 3. Reaction to effort
- 1. Inertia 2. Force 3. Action and Reaction
- 1. Energy 2. Matter 3. Light

10. When Newton first published his great book, *Principia*, Robert Hooke accused him of plagiarism. Why was Hooke's claim rejected by the scientific community?

- Hooke's idea was wrong
- Hook did not prove his idea mathematically
- Newton had better connections among English royalty
- None of the above

11. Which of these is a famous quotation by Newton?

- "Wise are they who know they know not."
- "When it's dark enough, you can see the stars."
- "I'm a very stable genius."
- "If I have seen further it is by standing on the shoulders of Giants."

12. What is a good definition for a "scientific law"?

- An observation about the physical universe that seems to be true for all things in all places.
- An observation about the physical universe that seems to be true only on Earth.
- A theory developed by either Newton, Einstein or Hawking.
- The core observation noted by Newton in his foundational book, *Principia*.

13. Which law of motion is described by, "If a force acting in one direction is greater than the force acting in the opposite direction, the object will move."?

- First (Inertia)
- Second (Force)
- Third (Action and Reaction)

14. Which law of motion is described by, "The greater the force the greater the acceleration."?

- First (Inertia)
- Second (Force)
- Third (Action and Reaction)

15. Which law of motion is described by, "An object at rest will stay at rest, and an object in motion will stay in motion until a force acts upon it."?

- First (Inertia)
- Second (Force)
- Third (Action and Reaction)

16. Which law of motion is described by, "*The greater the mass, the greater the force needed to move the object.*"?

- First (Inertia)
- Second (Force)
- Third (Action and Reaction)
- Fourth (Gravity)

17. "When two objects collide their momentum before the collision equals their momentum after the collision." This is an example of which idea?

- Law of Friction
- Law of Gravity
- Entropy
- Conservation of Energy

18. Which of the following is an example of Gravitational Potential Energy?

- Acceleration
- A Newton's Cradle at rest
- A swing at the top of its arc
- Friction

19. Which of the following is a clear example Entropy?

- Heat from friction
- Ice cubes
- Conservation of energy
- Swings

20. Which of the following is by far the most entropic way to create electric power?

- Wind turbines
- Nuclear reactors
- Solar panels
- Burning oil

21. Where did Einstein first find a place to study where his questions were welcome?

- Italy
- Switzerland
- Germany
- USA

22. What question did Einstein work on throughout his life without ever solving?

- Why does quantum mechanics work so well?
- What is the Unified Field Theory?
- Where do Black Holes go?
- If time is relative, why do I have to wind my watch all the time?

23. In the equation, $E = mc^2$, what does the variable "c" stand for?

- Continues change
- Calculation variable
- Captured energy
- Constant speed of light

24. **Extra Credit:** Think about why people such as Newton and Einstein are considered great scientists? What habits of mind made them great scientists?

The following questions are not graded.

25. What are the most interesting things you learned in this block?

26. What was most challenging about this block?

27. What new questions about physics do you have?