

## Intuitor Basic Physics Savvy Test

Name \_\_\_\_\_ Date \_\_\_\_\_

**Indicate whether each of the following statements is true or false. T = true. F = false.**

- \_\_\_ 1) Temperature is the same thing as heat.
- \_\_\_ 2) Force is a form of energy.
- \_\_\_ 3) A person's sense of hot and cold is a measure of temperature.
- \_\_\_ 4) Running a ceiling fan in an enclosed room during the summer will slowly raise the room's temperature (assuming no heat transfer in or out).
- \_\_\_ 5) A simple machine such as a lever or a pulley cannot increase the power or work output of a person while they're using the machine.
- \_\_\_ 6) If there were no energy losses due to friction, an engine could be built for an automobile which would be capable of converting 100% of the combustion energy in gasoline into energy used for moving the car. (Assume 100% of the fuel is burned during combustion.)
- \_\_\_ 7) To produce heat, the Sun burns hydrogen in a combustion reaction.
- \_\_\_ 8) Energy is the ability to do work. In other words, if Ben needed 1000 joules of energy to move a box 5 meters across the floor it would make no difference whether he had 1000 joules of thermal energy or the same amount of mechanical energy, he could still do the work required to get the job done.
- \_\_\_ 9) If a feather and hammer are dropped on the Moon at the same time from the same height they will hit the Moon's surface at the same time.
- \_\_\_ 10) The Moon has no gravity.
- \_\_\_ 11) Mass and weight have essentially the same meaning. To increase weight requires an increase in mass.
- \_\_\_ 12) Susan jumps off a chair. As she is falling, the Earth's gravitational force on her is higher than her gravitational force on the Earth.
- \_\_\_ 13) An astronaut orbits the Earth 500 miles above its surface. She appears to be weightless because there is virtually no gravitational force on her.
- \_\_\_ 14) When a person on Earth stands on a floor, her perception, or sensation, of weight directly depends on the upward force the floor exerts on her feet, not the downward force of gravity.
- \_\_\_ 15) When an object has negative acceleration, the object has to be slowing down.
- \_\_\_ 16) Juan drives around a corner at constant speed. His car accelerates.
- \_\_\_ 17) Shanda drives around a circular track exactly 12 times in 2 hours. Her speedometer constantly reads exactly 15 miles per hour during this time. Her average velocity is zero for the trip.
- \_\_\_ 18) The force between your feet and the floor is greater while standing on your tiptoes than while standing flat on your feet.
- \_\_\_ 19) The pressure at the bottom of a 10-meter-deep, 20-kilometer-wide lake is higher than the pressure at the bottom of a 10-meter-deep well which is only 1 meter across. (Assume all things are equal except the parameters mentioned.)
- \_\_\_ 20) If an object is placed in water and sinks, it is because it has no buoyancy force acting on it.

- \_\_\_ 21) An insect flying through the air smacks into the windshield of a rapidly-moving train. The force the windshield exerts on the insect is higher than the force the insect exerts on the windshield.
- \_\_\_ 22) Susan throws a ball in the air. After the ball leaves her hand, the ball accelerates in the upward direction as it is moving upward and accelerates in the downward direction as it is moving downward.
- \_\_\_ 23) Friction provides the force which "pushes" a car forward as it drives down the road.
- \_\_\_ 24) If a car hits a tree, the car's occupants (assume no seat belts or air bags) will be violently thrown forward due to a force created by the car seats.
- \_\_\_ 25) A table resting on the floor pushes downward on the floor. The floor likewise pushes upward on the table.
- \_\_\_ 26) Ben travels to a distant planet. In outerspace, with essentially no gravity, he can throw a baseball (mass = 0.5 kg) and a shot put (mass = 4 kg) at the same speed with no discernable difference in effort.
- \_\_\_ 27) 1000 liters of water is more dense than 10 liters of water. (Ignore the container and assume all conditions are equal except the ones stated.)
- \_\_\_ 28) Iron can exist as a gas.
- \_\_\_ 29) A cloud is made primarily of water vapor.
- \_\_\_ 30) An atom is like a tiny solar system in which the nucleus is like the Sun and electrons are like tiny planets orbiting the nucleus.
- \_\_\_ 31) Under typical conditions, ice melts and water freezes at the same temperature.
- \_\_\_ 32) A solid object like a rock is almost entirely filled with empty space and only feels solid due to electrical repulsion forces.
- \_\_\_ 33) If lightning strikes a car, the people inside it will most likely be electrocuted, assuming that the car's tires are wet from rain and hence do not act as insulators.
- \_\_\_ 34) Voltage is a measure of the force which pushes electrons through wires.
- \_\_\_ 35) Jane reads that passing a current of 100 milliamps through a person's body from one hand to the other can be fatal. She accidentally grabs the positive terminal of her car's battery in one hand and the negative in the other. Her car has a 12-volt battery rated for 100 amps. Jane would most likely be electrocuted by her careless action.
- \_\_\_ 36) A light bulb is connected with a battery to form a simple circuit. A stream of electrons flows from the positive terminal of the battery to the negative terminal.
- \_\_\_ 37) There are 100 cubic centimeters in a cubic meter.
- \_\_\_ 38) A milliliter is exactly the same size as a cubic centimeter.
- \_\_\_ 39) Two 90-decibel sound sources are turned on at the same time. Together they create a 180-decibel sound level.
- \_\_\_ 40) A mole of helium has exactly the same number of atoms as a mole of lead.