

Name _____ Class _____

Directions: Write the answer on the line that precedes each question.

1. _____ Which of the following words means "push" or "pull"?
- A) Acceleration
 - F) Force
 - M) Mass
 - S) Speed
 - V) Velocity

2. _____ A heavy plane needs more lift than a lighter plane.
- True
 - False



3. _____ If an object "accelerates," it...
- A) moves at constant velocity.
 - B) moves.
 - C) changes speed.

4. _____ Where is the potential energy stored in your balsa model?
- A) the ailerons
 - B) the horizontal stabilizer
 - C) the propeller
 - D) the rubber motor
 - E) the rudder



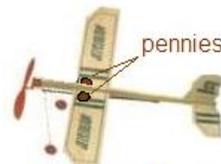
5. _____ In general, heavier planes require more _____ to fly.
- D) Drag
 - L) Lift



6. _____ A student winds her rubberband-powered airplane 1000 times and launches it. Then she places two pennies over the center of gravity, winds the motor 1000 times and launches it again. What is the effect on flight distance?
- H) The HEAVIER plane has a longer flight distance.
 - L) The LIGHTER plane has a longer flight distance.



Experiment 1



Experiment 2

7. ____ A student winds her rubberband-powered airplane 1000 times and launches it. Then she places two pennies over the center of gravity, winds the motor 1000 times and launches it again. What is the effect on flight time?

- L) The LIGHTER plane has a longer flight time.
- H) The HEAVIER plane has a longer flight time.



8. ____ In level flight, which force of flight opposes "Weight"?

- D) Drag
- L) Lift
- T) Thrust



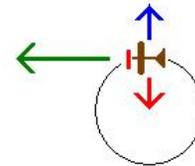
9. ____ In general, heavy planes require more thrust.

- True
- False



10. ____ A plane is flying around its pylon. In what direction is centripetal force acting?

- S) Straight
- I) Inward
- O) Outward



11. ____ What is the only force that acts on a plane when it sits on the ground?

- D) Drag
- L) Lift
- T) Thrust
- W) Weight

12. ____ What kind of energy is stored in the wound rubber motor of a model plane?

- N) Nuclear
- C) Chemical
- K) Kinetic
- P) Potential



13. ____ Increasing speed DECREASES lift.

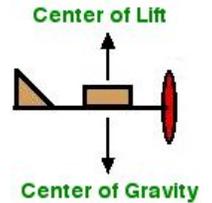
- True
- False



14. _____ Which force on a rubber-powered airplane remains the same before, during, and after landing?
 D) Drag
 L) Lift
 T) Thrust
 W) Weight



15. _____ Where would you add the penny so as not to affect the pitch of the plane?
 A) In front of the center of gravity.
 B) At the center of gravity.
 C) Behind the center of gravity.



16. _____ A plane's propeller pushes air back and the plane moves forward. What is true?
 A) The propeller pushes harder than the air.
 B) The air pushes harder than the propeller.
 C) The air and propeller always push with equal and opposite force.
 D) When the plane accelerates, the propeller pushes harder.



17. _____ In general, heavy planes require more ____ and _____. Choose **all** that apply.
 D) Drag
 L) Lift
 W) Weight
 T) Thrust (speed)



18. _____ A student winds her rubberband-powered airplane 1000 times and launches it. Then she places two pennies over the center of gravity, winds the motor 1000 times and launches it again. How does takeoff distance differ according to Newtons 2nd Law, $F=MA$? Choose all that apply.
 S) The planes will takeoff at the same point.
 L) The LIGHTER plane requires less takeoff distance.
 H) The HEAVIER plane requires less takeoff distance.



19. _____ A force is required to change the speed of a plane.
 True
 False



ARCONIC

