

1. How many kilometers in 50.8 cm?
2. How many liters in 10,400 mL?
3. How many kilometers in 12 ft?
4. An automobile with a mass of 1000 kg accelerates when the traffic light turns green. If the forward force on the car is 5000-N and the air resistance is 1000-N, what is the car's acceleration?
5. If a freely falling object were somehow equipped with a speedometer, its speed reading would increase each second by about how many units?
6. A sack of potatoes weighting 200 N falls from an airplane. As the velocity of fall increases, air resistance also increases. When air resistance equals 200 N, the sack's acceleration in m/s^2 is _____.

7. A 5 kg fish swimming at a speed of 1 m/s swallows an absent-minded 2 kg fish at rest. What is the speed of the larger fish after lunch?

8. A 50.0 kg wolf is running at 10.0 m/s. What is the wolf's kinetic energy?

9. How much power is needed to lift the 200 N object to a height of 4 m in 4 seconds?

10. When a heavy football player and a light one run into each other, which player hits the other with more force? Explain. Which one is hurt more by the collision? Explain.

11. Give an example of Newton's 1st law in action.

12. A book sliding across a desk loses all its kinetic energy and comes to a stop. The book feels slightly warm. Was energy conserved? Explain your answer.

13. For the following question, think about using a screwdriver to pry the lid off a paint can.

- a. What is the input force and what is the output force?
- b. Compare the input distance to the output distance.
- c. Will it require less force to use a long screwdriver or a short screwdriver? Explain.

14. A student working in a grocery store after school pushes several grocery carts together on a ramp.

- a. What length of ramp would allow her to push the grocery carts with the least amount of force, a 3 meter ramp, a 4 meter ramp, or a 5 meter ramp? Explain the reasoning behind your answer.
- b. Which ramp length would allow her to do less work? Explain your answer.

15. Suppose you live on the fifth floor of an apartment building. You have just bought a new television that weighs 50 Newtons. To reach your apartment, which is 35 meters up, you can climb the stairs or take an elevator.

a. If you climb the stairs, how much work is done on the television?

b. If you take the elevator, is the amount of work done on the television greater, smaller, or equal to the work done by climbing the stairs?

c. If it takes 5 minutes to climb up the stairs with the television, but on only 2 minutes if you take the elevator, in which instance is more power used? Explain.

16. How are isotopes different from ions?

17. Draw a Bohr model for lithium.

18. How many protons, neutrons, electrons in magnesium?

19. Describe a physical property in this classroom.

20. Describe a chemical change that happened today.

21. PbSO_4

22. $\text{Ca}(\text{H}_2\text{PO}_4)_2$

23. What compound is formed when lithium bonds to oxygen? Is that a molecule or ionic compound?

24. What compound is formed when calcium bonds to a carbonate ion?

25. Draw a Lewis structure for phosphorus.

26. Draw a Lewis structure for BaCl_2 .

27. What isotope is formed from alpha decay of U-234?

28. CCl_4 forms what type of bond?

29. Balance: $\text{H}_2 + \text{N}_2 \rightarrow \text{NH}_3$

What type of chemical reaction?

30. Balance: $\text{CuCl}_2 + \text{H}_2\text{S} \rightarrow \text{CuS} + \text{HCl}$

What type of chemical reaction?

31. $450\text{K} = \underline{\hspace{2cm}} \text{ } ^\circ\text{C}$

32. $98.6^\circ\text{F} = \underline{\hspace{2cm}} \text{ } ^\circ\text{C}$

33. Which has the greater amount of thermal energy, an iceberg or a cup of hot coffee?

34. Why is a temperature change needed prior to a phase change?

35. What effect does melting ice have on the surrounding air?

36. Why will wrapping a bottle in a wet cloth at a picnic cool it off?

37. You can comfortably hold your fingers beside a candle flame, but not very close above the flame. Why?