

40 pts.

Semester Exam → 20% of your trimester grade

Suggestions:

Study from your notebook.

- Read over worksheets.
- Review the vocabulary.
- Complete this review pack thoroughly.

Exam Format:

- True/False
- Multiple Choice
- Vocabulary
- Short answer [problems, diagrams, labeling, tables, etc.]

Concept Questions

Chapter 11

1. How is the **speed** of a moving object calculated?
2. Sketch and describe the slope of a line for an object traveling at **constant speed** on a "Distance vs. Time" graph.
3. Sketch and describe the slope of a line for an object traveling with an **increasing speed** on a "Distance vs. Time" graph.
4. If an object is **accelerating**, what are the three ways that it can accelerate?
5. What are the two basic **contact forces**?
6. What are two examples of **field forces** or "forces at a distance"?
7. Give two examples of objects experiencing **balanced forces**.
8. Give an example of an object experiencing **unbalanced forces**.

9. Describe the difference between **static friction** and **kinetic friction**.
10. Describe a situation where the **friction** that occurs is not between two solids.

Chapter 12

11. State **Newton's First Law of Motion**.
12. If forces are **balanced** on a moving object, what will the **path** of the object be?
13. If your car stops suddenly and you are not wearing a seatbelt, how does **Newton's First Law** explain the results?
14. State **Newton's Second Law of Motion**.
15. What causes objects to **accelerate**?
16. All free falling objects accelerate at the same rate due to gravity. What is the **acceleration due to gravity**?
17. What is the unit **NEWTON (N)** equal to? [refer to the formula for force]
18. Explain why your **weight** would be less on the Moon than on Earth even though your **mass** would not change.
19. According to the **Universal Gravitation Equation**, the force between two objects depends on what two factors?
20. As the distance between two objects increases, the **force** between them _____(general).
21. Do you exert a **gravitational force** on surrounded matter? Explain.
22. A thrown baseball is a **projectile**. What are the two forces acting on the baseball?
23. How is the Moon a **projectile**?
24. State **Newton's Third Law of Motion**.
25. Explain how swimming is a classic example of **Newton's Third Law**.

26. The **momentum** of an object depends on what two factors?
27. Two objects, like a tennis racket and a tennis ball, may contact with **equal and opposite force**, but their masses may be very different. What is the result due to the difference in the masses?

Chapter 13

28. What two things must occur if **work** is done on an object?
29. If you mow the lawn this week with more **power** than last week, what does that mean according to the power formula [$P = W/t$]?
30. What are the two families of **simple machines**?
31. What are the six types of **simple machines**?
32. For each type of lever, explain where the **fulcrum** is in relation to the input force and the output force AND state a common use for each type.
1st class:
2nd class:
3rd class:
33. What are two benefits of using **simple machines**?
34. What are the **Five Forms of Energy**?
35. What three factors determine the **gravitational potential energy** of an object?
36. According to the formula for **kinetic energy** [$KE = \frac{1}{2} mv^2$], does mass or velocity have a great impact on the kinetic energy of an object?
37. What are the two types of **mechanical energy**?
38. What are the three **types of energy** that were transferred within your mouse trap car?
39. State the **Law of Conservation of Energy**.

40. In your own words explain the **Law of Conservation of Energy**.
41. Describe an **energy conversion** that occurs when give a skateboard a push along the sidewalk.
42. When an apple is falling to the ground from a tree, what **energy conversion** occurs while it is falling?
43. For a given machine, why is **work output** always less than work input?

Chapter 15

44. Draw a Sine Wave and label the **crest, trough, wavelength and amplitude**.
45. What does a **wave** transport?
46. Because of the motion of particles in a **sound wave**, it is called a _____ wave.
47. Because of the motion of particles in a **light wave**, it is called a _____ wave.
48. The material that the **sound wave** vibrates through is called the _____.
49. What is the **frequency** of a wave that completes 20 cycles in 5 seconds [in Hertz]?
50. The **speed of all light waves** in air is _____ m/s.
51. The **speed** of any type of wave does depend on the _____.
52. As the **frequency** of a wave increases, the wavelength _____.
53. The greater the frequency of a wave, the _____ the **energy**.
54. What is **refraction**?
55. When looking into water, light is **refracted** as it travels from air into water. How does this change your view of things under the water?

Problems

Formulas: $S = D/t$ $F = ma$ $W = mg$

$W = Fd$ $P = W/t$ $GPE = mgh$

1. What is the **speed** of a runner that travels 2.8 miles in 45 minutes [in mph]?
2. What **net force** is needed to accelerate a 1600 kg car forward at 2.0 m/s^2 ?
3. What force [**weight**] do you exert as you stand on the earth [your mass is roughly equal to your pounds X 2]?
4. A bicycle's brakes apply 125 N of frictional force to the wheels as the bike moves 14.0 m. How much **work** do the brakes do?
5. While rowing across the lake during a race, John does 3960 J of work on the oars in 1 minute. What is his **power** in Watts?
6. A diver has 3400 J of **gravitational potential energy** after climbing up onto a diving platform that is 6.0 m above the water. What is the diver's mass in kilograms?