

Unit 1: Newton's Laws

1. What is the difference between distance and displacement. Explain in words, and also draw a picture to explain.
2. Explain how speed and velocity are the same and how they are different. Write the formula for both.
3. What is acceleration, explain this, and write down the formula for this.
4. How can acceleration be negative.
5. What is the acceleration due to gravity on earth.
6. What is the formula for weight?
7. What is the difference between rotation and revolution. Relate this to planets.
8. What are Newton's three laws of motion?
9. What is inertia, and which of the three laws is it mainly a part of.
10. What is the formula for work?
11. What are two ways you could make the work of a object go up?
12. What is the formula for power?
13. What are two ways you could make the power of an object go up?
14. What is friction?
15. Why are weight and mass different. Explain what happens to both when you take a trip from earth to the moon.
16. What are two ways that an object can accelerate.
17. Draw a distance time graph and draw three sections of a line that correlate to: no motion, constant velocity, acceleration
18. Draw a velocity time graph and draw three sections of a line that correlate to: no motion, constant velocity, acceleration
19. What is the mass of a dog with a force of 4 newtons and an acceleration of 26 m/s²
20. What is the speed of a car that travels 35 meters in 4.56 seconds?
21. What is the work of a bike that has a mass of 3 kg, acceleration of 2 m/s² and travels 6 meters?
22. What is the power of a sled with 56 J of work that is moving for 6 seconds.

Unit 2: Heat and Energy

23. What is gravitational potential energy? What is elastic potential energy?
24. What is kinetic energy? What is the formula for kinetic energy?
25. What is the Law of Conservation of Energy?
26. What are the other forms of energy?
27. Describe how energy changes forms.
28. What are renewable and non-renewable resources? Give an example of each.
29. Compare/contrast conduction, convection, and radiation. Give an example of each.
30. What are thermal conductors and insulators. Give an example of each.
31. What is the kinetic energy of an object moving at 3 m/s and has a mass of 15 kg?
32. What is the mass of an object that has 2000J of energy and is moving at 10 m/s?
33. What is the energy of an object with a mass of 15 kg, a height of 3 m, and is on Earth?
34. What is the height of an object that has a mass of 24 kg and 200 J of energy?
35. What is the heat required to increase the temperature of water 10 degrees if it's mass is 25 grams. ($c = 4.18$)
36. What is the specific heat of a substance that has a temperature increase of 20 degrees, a mass of 10 grams, and 400 J of energy?

Unit 3 : Waves

37. What is faster, speed of sound or speed of light. Explain.
38. How does the speed of sound change in different mediums. When is it the fastest?
39. How does the speed of light change in different mediums. When is it the fastest?
40. Explain two examples of doppler effect.
41. Explain what radar and sonar are, how they work, and how they are different.
42. Draw a picture of a wave that has a frequency of 2 Hz over the distance of 6 cm, and that has an amplitude of 2 cm. Label the amplitude, wavelength, frequency, period, normal rest position.
43. What is the intensity of a wave the same as from #42?
44. What is the pitch of a wave the same as from #42?
45. What is the difference between transverse and longitudinal waves?
46. What type of wave is a sound wave?
47. What type of wave is a light wave?
48. Draw a picture of the electromagnetic spectrum and label all of the different types of waves. Label how energy, frequency, and wavelength change over the course of the spectrum.
49. Explain what reflection is and draw a picture showing it.
50. Explain what refraction is and draw a picture showing it.
51. Explain what diffraction is and draw a picture showing it.
52. What is the difference between translucent, transparent, and opaque.
53. What is the law of reflection?

54. Draw two waves and a resulting 3rd wave after constructive interference.
55. Draw two waves and a resulting 3rd wave after destructive interference.
56. What is the frequency of a wave with a speed of 4568m/s and a wavelength of 5.683m?

Unit 4: Electricity

57. What are volts and what are they like?
58. What are amps and what are they like?
59. What are watts, and what is the formula for it?
60. What is the resistance?
61. What are the three ways to increase or decrease resistance?
62. What are the three ways of charging an object?
63. What are AC and DC and how are they different?
64. What are example of things that use AC, what about DC?
65. What is Ohm's Law?
66. Draw a picture of a series and a parallel circuit.
67. What is the resistance of a wire with a current of 45 amps, and 16 volts?
68. What is the wattage of a light bulb plugged into the wall that uses .85 amps?
69. How much does it cost to run the vacuum cleaner for $\frac{1}{2}$ an hour if it carries 200 watts of power, and a kw-hr costs \$0.11?
70. What are the volts of a device that uses 4 amps and uses 480 watts?