

Conceptual Physics

Text:	Hewitt, Paul G. (2006) <i>Conceptual Physics</i> . Pearson Prentice Hall, Upper Saddle River, NJ.
Supplemental Materials:	Scientific Calculator Conceptual Physics Concept Development Practice Book Conceptual Physics Laboratory Manual
Course Description:	Conceptual Physics is an approach to physics that will stimulate your students' higher-level cognitive skills. Physics is a vast subject. The value of teaching physics conceptually is not in minimizing mathematics, but in maximizing the use of students' personal experience in the everyday world and in their everyday language.
Methods of Evaluation:	Students can be evaluated through tests, quizzes, labs, homework assignments, semester exams, and/or any other form of evaluation instrument the instructor finds applicable to the course.
Pace of Instruction:	First Semester: Chapters 1-12 Second Semester: Chapters 17-22, 25-28, 32-35
Course Objectives:	<p>At the end of this course students should be able to:</p> <ol style="list-style-type: none"> 1. explain why physics is the basic science. 2. explain the idea that motion is relative. 3. distinguish between speed and velocity, and describe how to tell whether a velocity is changing. 4. describe the motion of an object in free fall. 5. for a projectile, describe the changes in the horizontal and vertical components of its velocity, when air resistance is negligible. 6. describe Galileo's contribution to the science of motion. 7. state Newton's first law of motion. 9. explain how something that is not connected to the ground is able to keep up with the moving Earth. 10. state and explain Newton's second law of motion. 11. explain why the acceleration of an object in free fall does not depend on the mass of the object. 12. state Newton's third law of motion. 13. explain why the accelerations caused by an action force and by a reaction force do not have to be equal. 14. explain why an action force is not cancelled by the reaction force. 15. define linear momentum. 16. distinguish between an elastic collision and an inelastic collision. 17. define and describe work, power, mechanical energy, and state the law of conservation of energy.

18. describe the motion of an object if the centripetal force acting on it ceases.
19. describe how a simulated gravitational acceleration can be produced.
20. describe center of gravity and center of mass.

21. distinguish among stable equilibrium, unstable equilibrium, and neutral equilibrium.
22. define and describe torque.
23. describe on what the rotational inertia of an object depends.
24. define angular momentum and describe the conditions under which it remains the same and changes.
25. explain Newton's idea of why the apple falls to Earth.
26. state Newton's law of universal gravitation.
27. explain the significance of an inverse-square law.
28. describe atoms and elements.
29. identify and describe the building blocks that make up an atom.
30. define density and explain why it is the same for different amounts of the same material.
31. distinguish between an elastic material and an inelastic material and describe Hooke's law.
32. describe the relationship among linear growth, surface area growth, and volumetric growth.
33. explain what causes a buoyant force on an immersed or submerged object.
34. describe what determines whether an object will sink or float in a fluid.
35. describe the source of atmospheric pressure.
36. explain what determines whether an object will float in air.
37. describe some applications of Bernoulli's principle.
38. define temperature in terms of KE and describe the common temperature scales.
39. describe how the quantity of heat that enters or leaves a substance is measured.
40. compare the specific heat capacities of different substances.
41. distinguish between conduction and convection.
42. compare the ability of an object to emit radiant energy with its ability to absorb radiant energy.
43. describe global warming and Earth's greenhouse effect.
44. describe the characteristics and properties of waves and wave motion and distinguish between transverse waves and longitudinal waves.
45. describe the movement of sound through air.
46. describe loudness and sound intensity.
47. describe resonance.
48. describe the dual nature of light and the relationship among light, radio waves, microwaves, and x-rays.
49. describe how the reflection of light affects an object's color.

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| <ol style="list-style-type: none">50. explain how a spectrum can be used to identify the presence of an element.51. describe electrical forces between objects.52. explain how an object becomes positively charged and negatively charged.53. distinguish between a conductor and an insulator.54. describe how to measure the strength of an electric field at different points.55. describe how objects can be completely shielded from electric fields.56. distinguish between electrical potential energy and electric potential.57. describe the flow of electric charge.58. describe Ohm's law.59. relate the electric power used by a device to current and voltage.60. describe the configuration of a working circuit.61. distinguish between series and parallel circuits. |
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