

## Conceptual Physics Review (Chapters 4, 5, & 6)

### Chapter 4

- Review and describe Aristotle's concepts of natural and violent motion.
- Review and describe Galileo's experiments with a ball rolling on an incline.
- Define force.
- State Newton's first law of motion.
- Explain the relationship between mass and inertia.
- Distinguish among mass, volume, and weight, and be able to recognize common units for measuring each.
- Be able to calculate the net force on an object by combining force vectors.
- Explain why force is a vector quantity and not a scalar.
- Describe what is meant by equilibrium. Distinguish between static and dynamic equilibrium.
- Explain how Newton's first law applies to objects in each type of equilibrium.
- Explain why (in terms of Newton's laws) a helicopter cannot hover above the earth waiting for Los Angeles to show up where New York was, as the earth spins underneath the stationary helicopter.

### Chapter 5

- State the relationship between acceleration and net force on an object.
- State the relationship between acceleration and the mass of an object.
- State Newton's second law of motion.
- Describe the effect of friction on stationary and moving objects.
- Explain why the acceleration of an object in free fall does not depend on the mass of the object. Use Newton's first and second laws in your explanation.
- Describe the effect of air resistance on a falling object.

### Chapter 6

- Discuss forces involved in an interaction between two objects. What is true of the magnitudes and directions of the force pairs involved in any interaction?
- State Newton's third law of motion.
- Given an action force, identify the reaction force.
- Explain why the accelerations caused by action and reaction forces do not have to be equal.
- Explain why an action force is not canceled by the corresponding reaction force.
- Explain why the horse was wrong when he said that the force he exerts on the cart would be canceled by the force the cart exerts on him and so he would not move if he pulled on the cart.

### Labs and Worksheets

- Review Lab #4: Asteroids (Newton's First Law of Motion)
- Review Lab #5: Newton's Second Law of Motion
- Review Lab #6: Match Rockets (Newton's Third Law of Motion)
- Review Lab #7: Summary of Newton's Three Laws of Motion
- Review all Worksheets from chapters 4, 5, and 6 thoroughly, as well as all homework problems you have been assigned from the chapter assessments and from Appendix F.