Name _____ Date _____ Period _____

Worksheet: Equation Review

CHAPTER 7: Newton's Third Law

Directions: *Answer the following questions based on reading from Chapter 7 (pgs. 106-119) and/or from notes in class.*

EQUATIONS: **1 kg = 2.2 lbs** **1 kg = 10 Newtons** $a = \frac{F}{m}$ $F = ma$ $m = \frac{F}{a}$

QUESTIONS:

1. Forces always occur in _____.

2. An archer shoots an arrow. Consider the action force to be the bowstring against the arrow. The reaction to this force is the?

3. A person is attracted towards the center of Earth by a 50-N gravitational force. The force with which Earth is attracted toward the person is?

4. An unfortunate bug splatters against the windshield of a moving car. Compared to the force of the car on the bug, the force of the bug on the car is?

5. A large truck and a small car traveling at the same speed have a head-on collision. The vehicle to undergo the greater change in velocity will be?

6. A karate chop delivers a blow of 3000 N to a board that breaks. The force that acts on the hand during this feat?

7. A woman weighing 700 N sits on the floor. The woman exerts a force on the floor of?

8. Apply Newton's third law to a falling boulder, identifying the action and reaction forces. If a force is exerted on Earth, why doesn't it move? Explain.

9. Explain how Newton's third law applies to a cannon launching a cannonball. Which has the larger acceleration, the cannonball or the cannon? What if the cannonball were just as massive as the cannon—how fast would the cannon move compared to the cannonball?

10. If you push off the ground with a force of 250N when you jump upward, what force pushes Earth downward?

11. A pair of blocks, one 2 times as massive as the other, are connected by a compressed spring. When the spring is released, the blocks fly apart. Compared to the heavier block, how many times as fast does the lighter block accelerate?

12. A 100-kg person on in-line skates pushes against a wall with a force of 70N and recoils. What acceleration does that person experience?

13. What engine thrust (in newtons) is required for a rocket of mass 100 kg to leave the launching pad?

14. Below is an example of action and reaction. Why does the bullet travel faster than the rifle itself after being fired? (HINT: ***F = ma***)

15. Give three examples of **action-reaction forces**