Name _____ Date _____ Period _____

Worksheet: Free Fall

C O N C E P T U A L P H Y S I C S : U N I T 1

Directions: Answer the following questions using the equations below. You must show your work in order to receive credit. Each question is worth 4 points. Use g = 10 m/s^2

$$v = \frac{d}{t} \qquad v = v_0 + gt \qquad d = \frac{1}{2} gt^2 \qquad t = \sqrt{\frac{2d}{g}}$$

Problems:

1. *You drop a rock off the top of a building. It takes 6.0 s to hit the ground. How tall is the building?*

2. *You drop a rock off the top of a building. It takes 4.5 s to hit the ground. How tall is the building?*

3. *You drop a rock off the top of a 500 m tall building. Assuming there is no air resistance, how long does it take to hit the ground?*

4. *You drop a rock off the top of a 750 m tall building. Assuming there is no air resistance, how long does it take to hit the ground?*

5. *You drop a rock off the top of a building. It takes 3.5 s to hit the ground. What is the velocity at impact (final velocity)?*

6. *You drop a rock off the top of a building. It takes 1.5 s to hit the ground. What is the velocity at impact (final velocity)?*

7. *You throw a rock off the top of a building with an initial velocity of 8.0 m/s. It hits the ground going 28 m/s. How long did it take to impact on the ground?*

8. *You throw a rock off the top of a building with an initial velocity of 4.0 m/s. It hits the ground going 35 m/s. How long did it take to impact on the ground?*

9. *You throw a rock up into the air as hard as you can. It stays in the air a total of 8.0 s. What was the velocity of the rock when you threw it?*

10. *You throw a rock up into the air as hard as you can. It stays in the air a total of 6.5 s. What was the velocity of the rock when you threw it?*

11. You drop a rock off the top of a tall building. How tall is the building if it hits the ground 3.5 seconds later?

12. You drop a rock off the top of a tall building. How tall is the building if it hits the ground 8.0 seconds later?

13. You toss a ball at 5 m/s straight upward. How much time will the ball take to reach the top of its path?

14. You toss a ball at 3 m/s straight upward. How much time will the ball take to reach the top of its path?

15. If a projectile fired beneath the water, straight up, breaks through the surface at a speed of 13 m/s, to what height above the water will it ascend?

16. If a projectile fired beneath the water, straight up, breaks through the surface at a speed of 30 m/s, to what height above the water will it ascend?