Homework 5

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1. Both balls will have the same acceleration due to gravity. Acceleration on earth due to gravity will always be approximately 9.8 m/s^2 and is not affected by mass.
2. I would expect the uncrumpled paper to hit the ground first. Due to its larger surface area, air resistance will have a greater effect and will reduce its velocity more significantly than the crumpled paper.
3. No, the velocity closer to the water will be greater because gravity is acting on the rock as it falls, so the acceleration from gravity will cause the velocity to increase as the rock falls.
4. (a) Yes, the ball thrown downward will reach the ground sooner due to its increased starting velocity. (b) The ball will not accelerate faster than the dropped ball; as stated in question 1, acceleration during freefall is constant regardless of velocity or mass. The force acting upon the ball from the initial throw ceases to act on the ball as soon as it leaves the hand of the thrower, so the only downward force acting on the ball during freefall is gravity.
5. No, its acceleration is still 9.8 m/s^2 downwards. The acceleration downwards due to gravity acts upon all things constantly, however as the ball travels upwards after being thrown the force from the throw and its resultant velocity is greater than the force of gravity pulling the ball down, so the ball rises through the air.
6. The ball accelerates upwards as force from the throw acts upon it. Once the ball leaves the thrower’s hand, the acceleration direction is only downwards from gravity.
7. (a) V = a \* t = 10 m/s^2 \* .6 s = 6 m/s

(b) V = 10 m/s^2 \* 1.2 s = 12 m/s

8. (a) d = ½ (a\*t^2) = ½ (10 m/s^2\*.6^2 s^2) = .5\*3.6 m = 1.8 m

(b) d = .5 (10 m/s^2 \* 1.2^2 s^2) = .5 \* 14.4 m = 7.2 m

9. V = a \* t = 10 m/s^2 \* 5 s = 50 m/s

D = .5 (a \* t^2) = .5 \* (10 m/s^2 \* 5^2 s) = .5(250 m) = 125 m