**Unit 2 Review Guide: Force and Motion (Gifted/Advanced)**

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| **Ch 11 Lesson 3**  Motion  Reference point  Relative (motion is relative) | **Ch 11 Lesson 4**  Speed  Instantaneous Speed  Average Speed Velocity Distance-Time Graph Slope | **Ch 11 Lesson 5**  Acceleration  Positive Accel. Negative Accel. | **Ch 12 Lesson 1**  Force Newtons  All 6 types of forces! Law of Universal Grav. mass  weight | **Ch 12 Lesson 2**  Unbalanced Forces  Balanced Forces Net Force |

1. Give an example of each: instantaneous speed, constant speed and average speed.

2. Describe the relationship among distance, mass, and gravitational force between any two objects.

3. Differentiate between mass and weight and draw diagrams for each.

4. Name at least four contact forces. Name three main non-contact forces.

5. Summarize this explanation of the law of Universal Gravitation: Every object and particle exerts gravitational force on every other object and particle and that the force depends on how much mass the objects have and how far apart they are.

6. Luis rubbed a balloon on his hair and held the balloon next to the wall. He observed the balloon stick to the wall. Which force is responsible for the balloon sticking to the wall?

7. An unbalanced force acting on an object changes its \_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or both (basically it causes acceleration. Acceleration can include which three things? Speeding up,\_\_\_\_\_\_\_\_\_\_\_\_\_ down and changing \_\_\_\_\_\_\_\_\_\_\_\_\_.

9. What is the speed of an animal traveling 44 km in 11s?

10. During a trip, a car’s average speed was 48km/hr. If they continue at this speed, how far can they go in another 3 ½ hours?

11. What is the speed formula? How can you change the formula to solve for different variables? List the other versions.

12. What is the acceleration formula?

13. What is the difference between speed and velocity?  
14. What does a horizontal (flat) line on a speed graph represent?

15. On a Distance-Time graph, what is the independent variable and what is the dependent variable?

16. On a Distance-Time graph, how does the line look if there is a constant speed?  
17. What is the SI unit for speed? What is the SI unit for acceleration?   
18. Explain how air resistance and gravity would affect a piece of paper falling towards Earth’s surface.

19. In the absence of air (no air resistance), a soccer ball and bowling ball are dropped from the same height at the same time.  
 Which hits the ground first?

20. The amount of inertia depends on how much \_\_\_\_\_\_\_\_\_\_\_ an object has.

21. The amount of gravity pulling on objects depends on what two things?

22. As you get farther from the center of Earth, your weight will increase or decrease?

23. Explain action-reaction forces. Give an example.

24. Friction always acts in the \_\_\_\_\_\_\_\_\_\_\_\_\_ direction of an object’s motion.

25. A force is described by its \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

27. The diagram below shows forces acting on a model airplane. Both its speed and height above the ground are constant.



Which of the following conditions would cause the model airplane to descend toward the ground?

A.The lift is equal to the drag. C. The thrust is equal to the weight.  
B.The lift is less than the weight. D.The thrust is greater than the drag.

**28. Read the following experiment**: One tank of gold fish is fed the normal amount of food once a day, a second tank is fed twice a day, and a third tank four times a day during a six week study. The fish’s weight is recorded daily. What are the independent variable, dependent variable, control and constants? **29. For the following scenario, draw and label a net force diagram with arrows. Then calculate the net force.**  
A boy is pulling a piano to the right with a force of 50 N and a girl is pushing it to the right with a force of 30 N.