# Fall 2015 Final Exam Review: Physics 1P, Mr. Traeger

Name: _____ Period: _____ Date: _____

| Section | Major Questions to be asked and/or tasked to be measured | Where do I find the information and/or where did we learn this and/or where do I find practice problems and Review Guides? |
|---|---|---|
| **Basics of Science** | **Basics**<br>▪ What is scientific notation and how do you convert to standard notation?<br>▪ What are the basic rules of significant figures when multiplying/dividing and adding/subtracting numbers?<br>▪ What is the correct order of operations for math problems? Hint: PEMDAS<br>▪ How do you use the factor label method (T-square method) to convert among units?<br>▪ Differentiate between nano, micro, milli, centi, kilo, mega, and giga unit prefixes<br>▪ What is science?<br>▪ Why is the study of math important to science?<br>▪ What are the basic steps of the scientific method?<br>▪ How do you differentiate between among scientific fact, hypothesis, law, and theory?<br>▪ What are similarities and differences among science, art, and religion?<br>▪ What is the difference between science and technology? | ▪ Hewitt Chapter 1 |
| **Linear Motion and Kinematics** | • What does LINEAR mean?<br>• What is speed and how do you measure it and calculate it?<br>• What is the difference between instantaneous and average speed? Give an example of each.<br>• What is velocity and how do you measure and calculate it?<br>• How can you have changing velocity if the speed remains constant?<br>• What is acceleration and how do you calculate it?<br>• What is the accepted value of g on Earth to 3 digits?<br>• How would you use $v = v_0 + at$ to calculate time to fall or speed of fall?<br>• How would you use $x = x_0 + v_0t + 1/2at^2$ to calculate distance traveled or fallen?<br>• How do you analyze motion given a position-time graph? What does the slope of its line tell you?<br>• How do you analyze motion given a velocity-time graph? What does the slope of its line tell you?<br>• How does air resistance affect falling objects? How would falling objects of different masses behave in a vacuum?<br>• How do you solve all types of kinematics problems? Go back and practice these. | ▪ Hewitt Chapter 2<br>▪ Physics Classroom 1-D Kinematics<br>▪ PowerPoint for Kinematics and 1-D Motion<br>▪ Dr. Eôs Kinematics Unit Resources<br>▪ Kinematics Problem Set |
| **Projectile Motion** | • What is the difference between vector and scalar quantities? How do you represent these?<br>• How does the length and direction of two or more vectors express objects relative motion?<br>• How do you resolve vectors at right angles using Pythagorean Theorem?<br>• How do you resolve vectors not at right angles using trigonometric functions? | ▪ Hewitt Chapter 3<br>▪ Physics Classroom Vectors and Projectile Motion<br>▪ Dr. Eôs Resources on Projectile Motion<br>▪ Dr. Eôs PPT on Projectile Motion |

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| | • How do you draw vector components using the tip to tail and parallelogram methods?<br>• What is projectile motion? How do you separate out x and y components for projectile motion using trigonometry?<br>• How does air friction affect projectile motion?<br>• How do you solve projectile motion from cliff problems?<br>• How do you solve projectile motion from the ground problems?<br>• What launch angle will give projectiles the highest and shortest trajectory? What launch angle will give projectiles the lowest and shortest range? Are these angles complementary?<br>• What launch angles will give projectiles intermediate range and also are complimentary?<br>• What launch angle will give projectiles the farthest range?<br>• How is projectile motion essentially like a satellite orbit? What horizontal launch speed will keep a satellite in orbit if launched from ground level?<br>• How do you solve all types of projectile motion problems? Go back and practice these. | |
| **Dynamics: Forces and Newton's Laws** | • What were Aristotle's views on motion? Copernicus? Galileo?<br>• What does Newton's 1st Law say about Inertia?<br>• What determines the amount of inertia something has?<br>• Is mass volume?<br>• Is mass weight?<br>• What is a force?<br>• What is the Unit of a Newton<br>• What is equilibrium of Forces? Give some examples.<br>• What does Net Force mean?<br>• How do you draw a free body diagram to express all of the forces acting on a body?<br>• How do you use vectors to calculate resultant forces?<br>• What does Newton's Second Law say?<br>• Hoe does mass relate to acceleration if Force is held constant?<br>• What is friction?<br>• What takes more force to move if the masses and characteristics of an object are the same? Does it take more force to move an object that is stationary or an object that is moving? Why?<br>• What is a normal force?<br>• How do you calculate friction force on an object, both static and kinetic when the object if flat on the surface? How about when the surface is angled?<br>• How do you calculate forces on an object when pulling that object at an angle?<br>• A bug hits a windshield and a windshield hits a bug? If the forces are equal in magnitude, but opposite in direction, then why does the bug go | ▪ Hewitt Chapters 4, 5, and 6<br>▪ Physics Classroom Newtons Laws<br>▪ Notes on Forces and Newton's Laws used in class<br>▪ Forces and Newton's Laws Problem Set<br>▪ Dr. E's Resources for Forces and Newton's Laws |

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| | splat?<br>• What is pressure? Is it easier to lie down on one nail or a bed of nails spread out evenly over your body?<br>• What is terminal velocity and how does it affect falling bodies of varying mass and cross sectional area?<br>• What does Newton's Third Law say?<br>• What are action reaction pairs? Give some examples?<br>• A skydiver falls? Does the Earth rise up too to meet her? Explain using 3rd Law.<br>• Do action reaction forces cancel each other out?<br>• Describe the Magnus Effect and give some examples of how it affects the activities and sports you may do in life.<br>• How do you solve all types of force and motion problems? Go back and practice these. | |
| **Work, Energy, and Power** | • What is work? Give some examples of work.<br>• When is work positive and when is work negative? Ie: Is lifting a bar bell against gravity doing positive work or negative work?<br>• What are the most common forms of mechanical energy?<br>• What is gravitational potential energy and how do you calculate it?<br>• What is kinetic energy and how do you calculate it?<br>• A car doubles its velocity. How much more distance will it need to stop? Why?<br>• What is elastic potential energy? How do you calculate it?<br>• What is Hooke's Law and how can you use it to calculate the force of a spring?<br>• What does the law of conservation of energy say?<br>• How can you calculate the velocity of an object if you know how high it was dropped from?<br>• How can you calculate the height of an object if you know how fast it is going at the bottom of its path?<br>• How can you calculate the velocity of a projectile in a spring gun?<br>• Give some examples of simple machines and why we would use them. Ie: Why would you use a ramp when trying to move a heavy refrigerator in to your house?<br>• How do you calculate the efficiency of a machine?<br>• What is renewable energy? What is non-renewable energy? How does society use and produce these types of energy? What are positive and negative aspects of the different types of energy?<br>• What is power? How do you calculate it?<br>• Does your power company sell you power or energy if the units they are selling it in are Kilowatt-hours?<br>• How do you solve all types of Work, | ▪ Hewitt Chapter 8<br>▪ Physics Classroom Work, Energy, Power<br>▪ Energy Class Notes<br>▪ Work, Energy, Power Chapter Problems<br>▪ Dr. E's Energy Resources<br>▪ Energy Kids Website |

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| | Energy, and Power problems? Go back and practice these. | |
| **Momentum, Impulse, and Collisions** | • What is momentum and how do you calculate it using p = mv? How does it relate to inertia that you learned about in chapter 4?<br>• What is impulse (change in momentum)?<br>• What is the best way to protect yourself in car crashes and eggs in egg drop projects and when bungee jumping? Explain using the formula Ft=mqv.<br>• Why did we relate the recent rocket launching to the concept of impulse? How did this enable us to calculate the theoretical height of the rocket launch? How did we calculate the actual height of the rocket launch?<br>• Is it a good thing to have a flower pot bounce on your head when it hits you? Explain.<br>• What is conservation of momentum? Is momentum always conserved? Why?<br>• Describe the basic properties of 1-D elastic collisions.<br>• Is momentum conserved in elastic collisions? Is energy conserved in elastic collisions? Explain.<br>• Describe the basic properties of 1-D inelastic collisions.<br>• Is momentum conserved in inelastic collisions? Is energy conserved in inelastic collisions? Explain.<br>• What is an explosion in relation to a collision? Give an example of some explosions.<br>• How do you solve all types of Momentum, Impulse, elastic collision, and inelastic collision problems? Go back and practice these. | ▪ Hewitt Chapter 7<br>▪ Physics Classroom Momentum and Its Conservation<br>▪ Momentum Class Notes<br>▪ Momentum and Collisions Chapter Problems<br>▪ Dr. E's Momentum Resources<br>▪ Dr. Bourke's Rocket Science PowerPoint |

**Physics Final Exam Schedule for Fall Semester 2015**

| Date | Period | Who Takes It? | Subject | Time |
|---|---|---|---|---|
| Wednesday, 12/16/15 | 6 | EVERYONE | Physics 1P | 10:20-12:25 |

**Frequently Asked Questions about Traeger's Final Exam**

- What should I bring to the final? Bring your brain, a #2 pencil, a calculator, and any work that is due on the final day.
- What items are NOT allowed to be in use during the test? cell phones, iPhones, Blackberries, iPods, your moving mouth, and wandering eyes are not allowed on the final.
- How much of my semester grade is the final worth? The final exam will be about 12-15% of your overall semester grade. The final exam will be included in the test category.
- What if I need extra time? There will be plenty of time to take the test.
- What is the format of the test? The test will be mostly multiple choice/true false/matching. There will be a small written component for calculations on momentum, impulse, and collision problems.
- What is the best way to study for this test? Use this review sheet and work problems. Answering ALL of the questions on this review study guide will score you an additional 15 TEST credit points! These questions are due on the day of the final exam.
- Am I allowed a note card on the final? Yes. One 3ò x 5ònote card with formulae and notes front and back will be allowed. You must bring your own formulae to the final WRITTEN BY HAND on this card. I will not be providing you with any formulae.
- How do I get help studying for the final? Email Mr. Traeger at ttraeger@lcusd.net or come by at lunch or after school!