# Locust Grove High School Unit Lesson Plan

| Grade Level: | 11-12 | Subject: | Honors Physics (Projectile Motion) | Prepared By: | Gillies |
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**Georgia Performance Standards Addressed**

SP1 Students will analyze the relationships between force, mass, gravity, and the motion of objects.
Elements:

a. Calculate average velocity, instantaneous velocity, and acceleration in a given frame of reference.
b. Compare and contrast scalar and vector quantities.
c. Compare graphically and algebraically the relationships among position, velocity, acceleration, and time.
f. Measure and calculate two-dimensional motion (projectile and circular) by using component vectors

| Teacher Guide | Student Guide |
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| **Activating Strategies:**<br>Daily warm ups on motion and demonstrations of concepts talked about. (projectile launcher). In class demonstrations of simple and complex physical processes will be used as discussion starters to gauge previous knowledge of the students and to encourage student participation and discussion.<br>Physlet Physics interactives. | **Students will be able to …**<br>▪ Determine the x and y components of a projectiles motion by resolving vectors.<br>▪ Explain the independence of the x and y components of motion and factors that affect each.<br>▪ Use vector addition to find the velocity of a projectile<br>▪ Describe the motion of a horizontally launched projectile<br>▪ Describe the motion of a projectile launched at an angle<br>▪ Apply kinematic equations in order to evaluate the position, velocity, and acceleration of a projectile at any point during its trajectory.<br>▪ Correctly identify scalar and vector quantities and apply vector addition rules at the appropriate times. |
| **Acquisition Strategies:**<br>Students will acquire knowledge through a mixture of lecture, real world examples, practice problems, and investigative lab activities.<br>Students will apply information discussed in lectures to real life situations involving motion. | **Interdisciplinary Connections:**<br>Algebraic relationships among several variables. Trig functions to solve for component vectors. Dimensional analysis and graphical representation of collected data. |
| **Differentiated Instructional Support**<br>Independent work time so that teacher can assess individual student progress on concepts. Small groups for practice and lab experiments, peer tutoring, self-assessing of formal assessments. | **Post Assessment of Student Outcomes**<br>Formal lab reports and unit test will be analyzed to assess students' retention and application of the concepts covered during the projectile motion unit. Students must apply the concepts to future units, so assessment will be ongoing throughout the semester. |
| **Activities/Resources/Technology**<br>CPO lab equipment, class website with notes, Physlet Physics DVD, Various video clips involving kinematics and projectile motion. | **Scoring Rubrics:**<br>Rubric will be provided to students for the formal lab report regarding projectile motion. |

| **Formative and/or Summative Assessments:**<br>Calculations and problems dealing with projectile motion. Students will complete a lab for both horizontally launched projectiles, and projectiles launched at an angle. | **Key Terms and Vocabulary: Review previous unit's vocabulary**<br>speed, velocity, average velocity, instantaneous velocity, acceleration, distance, displacement, free fall, gravitational acceleration, terminal velocity, position-time graph, velocity-time graph, acceleration-time graph<br><br>**Two-dimensional motion terms:** projectile, projectile motion, trajectory, horizontally launched projectile, horizontal motion, horizontal velocity, vertical velocity, component vectors, resultant vectors<br><br>**Kinematics Equations for constant acceleration:**<br>1. $v_f = v_o + at$<br>2. $\Delta x = v_o t + 1/2\ at^2$<br>3. $v_f^2 = v_o^2 + 2a\Delta x$ |
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