

The following instructional plan is part of a GaDOE collection of Unit Frameworks, Performance Tasks, examples of Student Work, and Teacher Commentary. Many more GaDOE approved instructional plans are available by using the Search Standards feature located on [GeorgiaStandards.Org](http://GeorgiaStandards.Org).

## **Georgia Performance Standards Framework for Physical Science – GRADE 8**

### **Unit: Sports Differentiated Task Forces are Fundamental**

**Subject Area: Physical Science**

**Grade: 8**

#### **Standards (Content and Characteristics):**

**S8P5. Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature.**

- a. Recognize that every object exerts gravitational force on every other object and that the force exerted depends on how much mass the objects have and how far apart they are.

**S8CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.**

- a. Understand the importance of—and keep—honest, clear, and accurate records in science.
- b. Understand that hypotheses can be valuable even if they turn out not to be completely accurate.

**S8CS2. Students will use standard safety practices for all classroom laboratory and field investigations.**

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate techniques in all laboratory situations.
- c. Follow correct protocol for identifying and reporting safety problems and violations.

**S8CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities utilizing safe laboratory procedures.**

- b. Use appropriate tools and units for measuring objects and/or substances.
- c. Learn and use standard safety practices when conducting scientific investigations.

**S8CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.**

- b. Understand that different models (such as physical replicas, pictures, and analogies) can be used to represent the same thing.

**S8CS6. Students will communicate scientific ideas and activities clearly.**

- a. Write clear, step-by-step instructions for conducting scientific investigations, operating a piece of equipment, or following a procedure.

## Georgia Performance Standards Framework for Physical Science – GRADE 8

**S8CS9. Students will understand the features of the process of scientific inquiry.** Students will apply the following to inquiry learning practices:

- a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing different theories.  
Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.
- b. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.

### **Enduring Understandings:**

- Every object exerts a gravitational force on every other object.
- The force of gravity between two objects depends on their mass and the distance between them.

### **Essential Questions:**

- Why does an astronaut’s weight on the moon differ from their weight on Earth?
- How would throwing a football on the moon differ from throwing a football on Earth?

## **ADMINISTRATION PROCEDURES**

### **Pre-Assessment:**

Chalk Talk- Force

Chalk Talk is a means of determining what students know about a topic. A large circle is drawn on the board or on a large piece of butcher paper with a topic in the center. Students are then asked to write everything they know about the topic. Everyone must write something and sign their initials by it. This way, the teacher knows who wrote what and can use this to clear up misconceptions and limited knowledge about the topic.

**Georgia Performance Standards Framework for Physical Science – GRADE 8**

	<b>BASIC</b>	<b>INTERMEDIATE</b>	<b>ADVANCED</b>
<b>Outcome/Performance Expectations</b>	<p>Students will write and participate in a mock trial.</p> <p>Galileo vs. Aristotle</p> <p>Basic tasks include: conducting general background research, writing minor speaking parts for the trial, creating props, participating as minor/supporting trial members and other tasks as the teacher deems appropriate.</p>	<p>Students will write and participate in a mock trial.</p> <p>Galileo vs. Aristotle</p> <p>Intermediate tasks include: conducting in- depth research, writing major speaking parts for the trial, developing trial strategy, planning set design, participating as major trial members and other tasks as the teacher deems appropriate.</p>	<p>Students will write and participate in a mock trial.</p> <p>Galileo vs. Aristotle</p> <p>Advanced tasks include: conducting specific precedent-setting research, using research to develop both a defense and prosecution strategy, developing trial format based on real cases, writing the over-all trial transcript, participate as major trial members, develop a multi-media presentation to present activity and findings to other classes, and other tasks as the teacher deems appropriate.</p>
<b>Performance Task (Detailed Description)</b>	<p>See resource information listed below.</p> <p>Mock Trial Students will conduct a mock trial between Galileo and Aristotle, specifically their Natural Laws as they relate to gravity, falling objects, and force.</p>	<p>See resource information listed below.</p> <p>Mock Trial Students will conduct a mock trial between Galileo and Aristotle, specifically their Natural Laws as they relate to gravity, falling objects, and force.</p>	<p>See resource information listed below.</p> <p>Mock Trial Students will conduct a mock trial between Galileo and Aristotle, specifically their Natural Laws as they relate to gravity, falling objects, and force.</p>

**Georgia Performance Standards Framework for Physical Science – GRADE 8**

<b>Teacher role?</b>	<p>Be sure that students use sports examples when preparing the evidence. The teacher will instruct students about locating reputable resource information, guide students in writing dialogue for the trial using scientific facts and evidence, and offer suggestions for prop building, costumes, and dramatic interpretation. Develop a rubric to assess the task and provide checkpoints along the way to assess progress.</p>	<p>Be sure that students use sports examples when preparing the evidence. The teacher will instruct students about locating reputable resource information, guide students in writing dialogue for the trial using scientific facts and evidence, help students investigate legal strategies, and offer suggestions for set design, costumes, and dramatic interpretation. Develop a rubric to assess the task and provide checkpoints along the way to assess progress.</p>	<p>Be sure that students use sports examples when preparing the evidence. The teacher will instruct students about locating reputable resource information, guide students in writing dialogue for the trial using scientific facts and evidence, help students investigate legal strategies, locate case studies, and offer suggestions for trial format, and dramatic interpretation. Develop a rubric to assess the task and provide checkpoints along the way to assess progress.</p>
<b>Student role?</b>	See specific tasks above	See specific tasks above	See specific tasks above
<b>Resources</b>	<p>Suggested resource with information on conducting mock trials:</p> <p><a href="http://www.19thcircuitcourt.state.il.us/bkshelf/resource/mt_conduct.htm">http://www.19thcircuitcourt.state.il.us/bkshelf/resource/mt_conduct.htm</a></p> <p>The instructor may wish to make use of video vignettes from <a href="http://gpb.unitedstreaming.com/">Unitedstreaming via the Georgia Public Broadcasting site</a> at <a href="http://gpb.unitedstreaming.com/">http://gpb.unitedstreaming.com/</a>, the segment entitled <i>Gravity and Mass</i> from the video <i>Laws of Motion</i> (Grade: 3-8, produced by <i>100% Educational Videos</i>)</p> <p>Other resources include:</p> <p><i>Gravity: The Weakest Force</i>  <a href="http://worsleyschool.net/science/files/gravity/force.html">http://worsleyschool.net/science/files/gravity/force.html</a></p> <p><i>Forces: Gravity</i>  <a href="http://www.icteachers.co.uk/children/sats/gravity.htm">http://www.icteachers.co.uk/children/sats/gravity.htm</a></p> <p><i>How does Weight affect an Airplane?</i>  <a href="http://scifiles.larc.nasa.gov/text/kids/Problem Board/problems/flight/weight2.html">http://scifiles.larc.nasa.gov/text/kids/Problem Board/problems/flight/weight2.html</a></p>		

**Georgia Performance Standards Framework for Physical Science – GRADE 8**

	<p><i>BrainPop: Gravity</i>  <a href="http://www.brainpop.com/science/motionsandforces/gravity/">http://www.brainpop.com/science/motionsandforces/gravity/</a></p>		
<b>Homework/Extension</b>	Name 2 sports where gravitational force plays an important role.	Explain how gravitational force plays an important role in sports today. Give examples in your explanation.	Write suggestions how gravitational force can serve athletes to improve their performance.
<b>Instructional Tasks Accommodations for ELL Students</b>	<p>Students may need a handout with basic notes on how to organize information. The handout should include writing prompts to stimulate responses about their investigation. Include all required vocabulary words in a word bank with basic definitions as needed.</p> <p>Assign the ELL student a specific task at each stage of the lab. Be sure to visit the team at timed intervals to assess comprehension and progress.</p>		
<b>Instructional Tasks Accommodations for Students with Specific Disabilities</b>	<p>Students with developmental disorders such as Asperger's Syndrome, or students having Autistic tendencies display impaired social interactions and repetitive patterns of behavior. Students with ADD may display impaired social interactions without the repetitive behaviors. These characteristics make collaborative group work difficult at times. Be specific with the student about roles the student will have in data collection, assembly of materials, etc. Students with organizational deficits may need handouts that give them a skeleton organization to frame and prioritize tasks, explanations and conclusions. The teacher may want to assess focus and progress at timed intervals throughout trial preparation.</p>		
<b>Safety Accommodations</b>	<p>Monitor internet access and trial dialogue. Remind students of what props/ costumes are appropriate and inappropriate.</p>		
<b>Instructional Tasks Accommodations for Gifted Students</b>	<p>Gifted students should participate in the production of the presentation to other classes. They can also explore the theoretical influences of William Gilbert and Kepler as they relate to Galileo's theories.</p>		