

Overview

Overview | The Law of Inertia



The Law of Inertia

by Adam Lowe, Tiffany Murray, and Eric Herndon

Students will be able to summarize the background and concepts behind Newton's Law of Inertia. They will apply Newton's First Law to real world phenomena.

Grades: 9 10 11 12

Discipline: Science

Teaching Task: Task Template 11 (Informational or Explanatory and Definition)

Course: Integrated Science

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Section 1: What Task?

TEACHING TASK

Task Template 11 [2 Levels]

Informational & Definition

L1: After researching informational texts on Newton's Law of Inertia, write a report that defines Newton's Law of Inertia and explains how it can be applied to real world phenomena. Support your discussion with evidence from your research.

STUDENT BACKGROUND

You will need to know how motion is defined and measured in physics. Specifically, you will need to know the difference between constant velocity, and acceleration and how each one affects a specific object. You must also know what is defined as a force and its consequences on a system.

EXTENSION

Rubric

Scoring Elements	Not Yet		Approaches Expectations		Meets Expectations		Advanced
1	1.5	2	2.5	3	3.5	4	
Focus	Attempts to address prompt, but lacks focus or is off-task.		Addresses prompt appropriately, but with a weak or uneven focus.		Addresses prompt appropriately and maintains a clear, steady focus.		Addresses all aspects of prompt appropriately and maintains a strongly developed focus.
Controlling Idea	Attempts to establish a controlling idea, but lacks a clear purpose.		Establishes a controlling idea with a general purpose.		Establishes a controlling idea with a clear purpose maintained throughout the response.		Establishes a strong controlling idea with a clear purpose maintained throughout the response.
Reading/Research	Attempts to present information in response to the prompt, but lacks connections or relevance to the purpose of the prompt. (L2) Does not address the credibility of sources as prompted.		Presents information from reading materials relevant to the purpose of the prompt with minor lapses in accuracy or completeness. (L2) Begins to address the credibility of sources when prompted.		Presents information from reading materials relevant to the prompt with accuracy and sufficient detail. (L2) Addresses the credibility of sources when prompted.		Accurately presents information relevant to all parts of the prompt with effective selection of sources and details from reading materials. (L2) Addresses the credibility of sources and identifies salient sources when prompted.
Development	Attempts to provide details in response to the prompt, including retelling, but lacks sufficient development or relevancy. (L2) Implication is missing, irrelevant, or illogical. (L3) Gap/unanswered question is missing or irrelevant.		Presents appropriate details to support the focus and controlling idea. (L2) Briefly notes a relevant implication or (L3) a relevant gap/unanswered question.		Presents appropriate and sufficient details to support the focus and controlling idea. (L2) Explains relevant and plausible implications, and (L3) a relevant gap/unanswered question.		Presents thorough and detailed information to strongly support the focus and controlling idea. (L2) Thoroughly discusses relevant and salient implications or consequences, and (L3) one or more significant gaps/unanswered questions.
Organization	Attempts to organize ideas, but lacks control of structure.		Uses an appropriate organizational structure to address the specific requirements of the prompt, with some lapses in coherence or awkward use of		Maintains an appropriate organizational structure to address the specific requirements of the prompt.		Maintains an organizational structure that intentionally and effectively enhances the presentation of information as required by the

			the organizational structure.			specific prompt.
Conventions	Attempts to demonstrate standard English conventions, but lacks cohesion and control of grammar, usage, and mechanics. Sources are used without citation.		Demonstrates an uneven command of standard English conventions and cohesion. Uses language and tone with some inaccurate, inappropriate, or uneven features. Inconsistently cites sources.		Demonstrates a command of standard English conventions and cohesion, with few errors. Response includes language and tone appropriate to the audience, purpose, and specific requirements of the prompt. Cites sources using an appropriate format with only minor errors.	Demonstrates and maintains a well-developed command of standard English conventions and cohesion, with few errors. Response includes language and tone consistently appropriate to the audience, purpose, and specific requirements of the prompt. Consistently cites sources using appropriate format.
Content Understanding	Attempts to include disciplinary content in explanations, but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.		Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.		Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

STANDARDS

Kentucky Physical Science

SC-HS-1.2.1: Students will select or construct accurate and appropriate representations for motion (visual, graphical and mathematical); and defend conclusions/explanations about the motion of objects and real-life phenomena from evidence/data.

Common Core Anchor Standards Reading

R.CCR.1: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

R.CCR.2: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

R.CCR.4: Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

R.CCR.6: Assess how point of view or purpose shapes the content and style of a text.

R.CCR.10: Read and comprehend complex literary and informational texts independently and proficiently.

Common Core Anchor Standards Writing

W.CCR.2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

W.CCR.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

W.CCR.5: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

W.CCR.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.CCR.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Custom Standards

Section 2: What Skills?

Selected Skills

Preparing for the Task

TASK ENGAGEMENT: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns

TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric.

Reading Process

ACTIVE READING: Ability to identify the central point and main supporting elements of a text.

ESSENTIAL VOCABULARY: Ability to apply strategies for developing an understanding of text(s) by locating words and phrases that identify key concepts and facts, or information.

ACADEMIC INTEGRITY: Ability to use and credit sources appropriately.

NOTE-TAKING: Ability to read purposefully and select relevant information; to summarize and/or paraphrase.

Transition to Writing

BRIDGING: Ability to begin linking reading results to writing task.

Writing Process

CONTROLLING IDEA: Ability to establish a controlling idea and consolidate information relevant to task.

PLANNING: Ability to develop a line of thought and text structure appropriate to an information/explanation task.

DEVELOPMENT: Ability to construct an initial draft with an emerging line of thought and structure.

REVISION: Ability to refine text, including line of thought, language usage, and tone as appropriate to audience and purpose.

EDITING: Ability to proofread and format a piece to make it more effective.

COMPLETION: Ability to submit final piece that meets expectations.

Section 3: What Instruction?

MiniTasks

Preparing for the Task

TASK ENGAGEMENT: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns

LIST**30 minutes**

In a quick write, write your first reaction to the task prompt. In your reaction, include the definition of Newton's first law of motion and translate its meaning. In addition, list any examples of Newton's first law that you have seen in real life

Scoring Guide (Work Meets Expectations If):

Students are able to successfully explain Newton's law of inertia and come up with at least 3 examples of real world applications.

Instructional Strategies:

Students will need to address motion, as discussed in the background section, and how it applies to Newton's law of inertia.

Students will share their examples with their seat groups and explain how the examples apply.

Class will discuss the timetable and expectations for the module.

Have students enter their lists into their writer's notebook.

TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric.

LIST**60 minutes**

Use the "Understanding Force" website to do the following. In your own words translate the parts two parts of Newton's first law of motion. In addition, students will create a list of items they should discuss when explaining the applications of Newton's first law.

Scoring Guide (Work Meets Expectations If):

Students have created a complete analysis of the authors explanation and examples of Newton's first law.

Instructional Strategies:

Provide students with the Newton's First Law page of the "Understanding Force" website.

Ask students to list what the writer was discussing in each paragraph.

Students will identify the examples given by the author and explain if the examples were effective. Then the students must justify their opinion.

Students will need to partner up to explain their analysis of the author's examples from the text.

Create a classroom list: Choose one student to share a few ideas on the board, and ask other to add to it and enter their additions into their writer's notebook.

Reading Process

ACTIVE READING: Ability to identify the central point and main supporting elements of a text.

SHORT CONSTRUCTED RESPONSE

30 minutes

From the previous website "Understanding Force" explain the following. What is the author trying to accomplish? Which parts of the text show you that?

Scoring Guide (Work Meets Expectations If):

Answers questions with credible response.

Instructional Strategies:

Students will discuss in small groups what ways they can use to find the author's intentions.

Students will share their points with the class to create a class list of information they can use to discover an author's agenda.

After the discussion, allow them to add to their entries to their writer's notebook.

ESSENTIAL VOCABULARY: Ability to apply strategies for developing an understanding of text(s) by locating words and phrases that identify key concepts and facts, or information.

LIST

30 minutes

In your writer's notebook, list words and phrases essential to the texts. Add definitions, and notes to how the terms and phrases are linked to Newton's law of inertia.

Scoring Guide (Work Meets Expectations If):

Lists appropriate phrases.

Provides accurate definitions.

Instructional Strategies:

Invite students to create a list of words from the "Understanding Force" article that they believe to be important. Students should create a second list of words that they found confusing.

After students have created their list of terms create a class list with them of important

terms and confusing terms.

Invite students to explain the terms to their classmates.

Enter both lists into the writer's notebook.

ACADEMIC INTEGRITY: Ability to use and credit sources appropriately.

SHORT CONSTRUCTED RESPONSE

30 minutes

Define "plagiarism" and list ways to avoid it. Have students create a list of ways that they have seen people intentionally, and unintentionally plagiarize resources.

Scoring Guide (Work Meets Expectations If):

Provides accurate definition

Lists several appropriate strategies

Lists several ways that plagiarism can happen.

Instructional Strategies:

Discuss respect for others work to assemble evidence and create texts.

Discuss academic penalties for stealing others thoughts and words.

Students will work in groups to discuss ways that they have intentionally or accidentally copy another's work.

Students will share with the class ways that they have seen work copied.

Students will commit their ideas into their writer's notebook.

NOTE-TAKING: Ability to read purposefully and select relevant information; to summarize and/or paraphrase.

LIST

30 minutes

Prior to reading the articles, make a list of the elements that look most important for answering the prompt. Do what you need to do to avoid plagiarism.

Scoring Guide (Work Meets Expectations If):

Identifies relevant elements.

Includes information to support accurate citation (for example, page numbers for a long text, clear indication when quoting directly).

Instructional Strategies:

Review Cornell model for note taking.

Have students make a list of the important elements that they will need to include in their paper, and enter their list in the "essential question" column of the note paper.

Have students prepare a page of Cornell notes for each of their examples to discuss in their paper.

NOTES

45 minutes

Use your Cornell notes that you have prepared, to research Newton's first law of motion. Use the "Newton's First Law" website to answer the essential questions you have created.

Scoring Guide (Work Meets Expectations If):

Students have successfully collected information that satisfies their essential questions.

Instructional Strategies:

Review how to use Cornell method for note taking.

Students will research the specified website, and gather information that answers their essential questions about Newton's first law of motion.

Invite the students to discuss in groups what information they have collected from their research about Newton's first law.

Add Cornell notes to writer's notebook.

NOTES

90 minutes

Use your Cornell notes that you have prepared, to research real life examples of Newton's law of inertia. Use the "Skateboarding", "Curling", and "Football" websites to collect information of applications of the first law.

Scoring Guide (Work Meets Expectations If):

Students have identified three real world examples of Newton's first law of motion and the applied physics.

Instructional Strategies:

Review how to use Cornell method for note taking.

Students will research the specified websites, and gather information about how Newton's law of inertia can be seen in the real world and answer the essential questions in their notes.

As a class discuss the real world applications they have found and how Newton's first law is seen in each.

Add Cornell notes to writer's notebook.

BRIDGING: Ability to begin linking reading results to writing task.

SHORT CONSTRUCTED RESPONSE

30 minutes

In a quick write, identify what you have learned about Newton's first law of motion. Write a paragraph about what you have learned about how Newton's first law can be seen in the real world.

Scoring Guide (Work Meets Expectations If):

Students have identified the ways that their understanding has changed after researching.

Instructional Strategies:

After students have done the quick write, invite them to discuss as a group how their understanding of the law of inertia has changed.

Have students compare their previous thinking about the application of the law of inertia and their current views on it's application.

Writing Process

CONTROLLING IDEA: Ability to establish a controlling idea and consolidate information relevant to task.

SHORT CONSTRUCTED RESPONSE

Write an opening paragraph that includes a controlling idea and sequences the key points you plan to make in your composition

Scoring Guide (Work Meets Expectations If):

Writes a concise summary statement or draft opening.

Provides direct answer to main prompt requirements.

Establishes a controlling idea.

Identifies key points that support development of argument.

Instructional Strategies:

Offer several examples of opening paragraphs.

Ask class to discuss what makes them strong or weak.

Review the list that students created earlier to identify needed elements (from Cluster 1, skill 2).

PLANNING: Ability to develop a line of thought and text structure appropriate to an information/explanation task.

OUTLINE

Create an outline based on your notes and reading in which you state your claim, sequence your points, and note your supporting evidence.

Scoring Guide (Work Meets Expectations If):

Creates an outline or organizer.

Supports controlling idea. Uses evidence from texts read earlier.

Instructional Strategies:

Provide and teach one or more examples of outlines or organizers.

Invite students to generate questions in pairs about how the format works, and then take and answer questions.

DEVELOPMENT: Ability to construct an initial draft with an emerging line of thought and structure.

LONG CONSTRUCTED RESPONSE

60 minutes

Write an initial draft complete with opening, development, and closing; insert and cite textual evidence.

Scoring Guide (Work Meets Expectations If):

Provides complete draft with all parts.

Supports the opening in the later sections with evidence and citations.

Instructional Strategies:

Review the initial prompt and have the students discuss as a class the things the prompt is directly asking them to do.

Have the students use their outlines, Cornell notes, and writer's notebooks to create an initial draft of their paper complete with introduction, examples and explanations, and conclusion.

REVISION: Ability to refine text, including line of thought, language usage, and tone as appropriate to audience and purpose.

LONG CONSTRUCTED RESPONSE

60 minutes

Refine your compositions explanation of Newton's law of inertia and the examples you have used to demonstrate it's application. Use textual evidence carefully, with accurate citations. Decide what to include and what not to include.

Scoring Guide (Work Meets Expectations If):

Provides complete draft with all parts.

Supports the opening in the later sections with evidence and citations.

Improves earlier edition.

Instructional Strategies:

Have students use the information that they selected for their writer's notebook on what made a good explanation in the "Understanding Force" website.

Have the students review a classmate's paper and see if their explanations have the same qualities that they selected from the example reading.

Use first revision to make sure that the draft is free from content errors.

EDITING: Ability to proofread and format a piece to make it more effective.

LONG CONSTRUCTED RESPONSE

60 min

Revise draft to have sound spelling, capitalization, punctuation, and grammar. Adjust formatting as needed to provide clear, appealing text.

Scoring Guide (Work Meets Expectations If):

Provides draft free from distracting surface errors.

Uses format that supports purpose.

Instructional Strategies:

Briefly review common grammar and spelling errors seen in student text.

Teach a short list of proofreading marks.

Assign students to proofread each others texts a second time.

Make the corrections indicated by partner's editing.

COMPLETION: Ability to submit final piece that meets expectations.

LONG CONSTRUCTED RESPONSE

10 minutes

Turn in your complete set of drafts, plus the final version of your piece

Scoring Guide (Work Meets Expectations If):

Fits the Meets Expectations category in the rubric for the teaching task.

Instructional Strategies:

Turn in final drafts along with previous drafts and selections from the writer's notebook.

Resources

Uploaded Files

[Cornell Notes for Newton.docx](#)

(http://literacybytechnology.s3.amazonaws.com/teacherresourceuploads/39242/396819678_Apr_23_2014_170604327.docx)

Cornell Notes for Newton's Law of Inertia research.

[Newton's law outline.docx](#)

(http://literacybytechnology.s3.amazonaws.com/teacherresourceuploads/39242/2067530773_Apr_30_2014_104857527.docx)

Outline for Newton's Law of Inertia Paper

Keywords

Links*

[Newton's First Law of Motion \(N/A\)](#)

(<http://www.physicsclassroom.com/class/newtlaws/Lesson-1/Newton-s-First-Law>)

This link provides background information on Newton's Law of Inertia and how it can be seen in real world phenomena

[Newton's First Law and Skateboarding \(N/A\)](#)

(<http://www.ck12.org/physics/Newtons-First-Law/lesson/Newtons-First-Law-Middle-School/r24/>)

This website breaks down how Newton's Law of Inertia can be observed while riding a skateboard.

[Newton's First Law and Curling \(N/A\)](#)

(<http://www.washingtonpost.com/news/olympics/wp/2014/02/16/curling-brooms-newtons-first-law-of-motion-an>)

This website explains how Newton's Law of Inertia is essential to the olympic sport of curling.

[Newton's First Law and Football \(1450L\)](#)

(<http://www.nbclearn.com/portal/site/learn/science-of-nfl-football>)

This website has a short video clip produced by the NFL about how Newton's Law of Inertia is seen in the sport of football.

[Example Explanation of Newton's First Law of Motion \(N/A\)](#)

(<http://www.understandingforce.com/newton'sfirstlawofmotion.html>)

Students will analyze the authors explanation and examples of Newton's first law.

[Example of a poor introductory paragraph \(N/A\)](#)

(http://www.edurite.com/kbase/examples-of-newtons-three-laws-of-motion#close_iframe)

An introduction that is overly complicated and dry. It does a poor job of piquing interest and

creating focus.

 **Example of a better introductory paragraph (N/A)**

(<http://www.grc.nasa.gov/WWW/k-12/airplane/newton1g.html>)

Introduction is more focused and even though it is technical, it is not overly so.

* These Lexile measures were computed automatically and did not undergo human review. They are not certified measures and should not be published or recorded in any way.

Other Resources

Section 4: What Results?

Classroom Assessment Rubric	
Not Yet	
Focus	Attempts to address prompt but lacks focus or is off-task.
Reading/Research	Attempts to present information relevant to prompt.
Controlling Idea	Controlling idea is weak and does not establish a purpose and/or address a research question.
Development	Tends to retell rather than present information in order to answer questions, solve problems; lacks details to develop topic. *L2 Implications are weak or not relevant to topic. L3 Does not identifies a relevant gap or unanswered question.
Organization	Applies an ineffective structure; composition does not address requirements of the prompt.
Conventions	Demonstrates a weak command of standard English conventions; lacks cohesion; language and tone are inappropriate to audience and purpose.
Meets Expectations	
Focus	Addresses prompt with a focused response.
Reading/Research	Presents and applies relevant information with general accuracy.
Controlling Idea	Establishes a controlling idea that states the main purpose and/or question for the tasks. L2 Addresses the credibility of sources.
Development	Presents sufficient information in order to examine or convey topics or issues, answer questions, solve problems; identifies salient themes or features; explains key information with sufficient detail. *L2 Discusses relevant implications to topic. L3 Identifies a gap or unanswered question.
Organization	Applies a generally effective structure to address specific requirements of the prompt.
Conventions	Demonstrates a command of standard English conventions and cohesion; employs language and tone appropriate to audience and purpose.

Classroom Assessment Task
No Classroom Assessment Task for this module

Exemplar Work
<p><i>Uploaded Files</i></p> <p>1.docx (Not Yet) (http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/1448399325_May_01_2014_141921463.docx)</p> <hr/> <p>1-b.docx (Not Yet) (http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/662419096_May_01_2014_141928900.docx)</p> <hr/> <p>2.docx (Approaches Expectations) (http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/1477028476_May_01_2014_141942577.docx)</p> <hr/>

[2-b.docx](#) (Approaches Expectations)

(http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/1080391239_May_01_2014_141949837.docx)

[3.docx](#) (Meets Expectations)

(http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/1505657627_May_01_2014_142002423.docx)

[3-second.docx](#) (Meets Expectations)

(http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/345170720_May_01_2014_142014789.docx)

[4-Good.docx](#) (Advanced)

(http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/165012904_May_01_2014_142025395.docx)

[4-B.docx](#) (Advanced)

(http://literacybytechnology.s3.amazonaws.com/worksampleuploads/39242/645088219_May_01_2014_142034117.docx)

Comments

Author Notes

Other Comments