Literacy Design Collaborative

Building Bridges

★TASK ★LADDER

by Shelia D. Banks

Students will participate in an inquiry-based experiment in which they will design and construct a wooden bridge that can support as much weight as possible given size constraints. A reading self-assessment will be given to students prior to module implementation. The data gained from the assessment was use to assign "literacy partners" for the purpose of reading and understanding a journal article later in the module. A copy of the assessment can be found under the uploaded resources.

The process requires students to work in teams to define the purpose, develop a hypothesis, design the experimental procedure,collect and analyze data, and make conclusions. They will write a formal lab report that is analogous to a peer-reviewed journal article in terms of format. Throughout the module,students will perform 2 web quests, closely read vital components in a peer-reviewed journal article, respond to a video, perform a hands-on engineering activity, collaborate with a team of peers, and write a high level laboratory report. Students will refer to the teaching task when completing daily mini-tasks. In order to facilitate learning how to properly write a legitimate scientific paper, students are provided with a variety of supports including graphic organizers and talking points. Many of these organizers were created by the author of this module.

When teaching this module, the teacher should be cognizant of practices that encourage student engagement and cooperation with each other. Many tasks are structured as team activities.

This module can also be adapted for use in a CTAE class due to the hands-on nature of the module.

GRADES	DISCIPLINE	COURSE	PACING
9 - 12	Science	Physics	N/A

Section 1: What Task?

Teaching Task

Task Template 17 - Informational or Explanatory

After researching informational texts on the structure and function of bridges, developing a hypothesis, and conducting an experiment examining live load forces on bridge stability, write a laboratory report in which you explain your procedures and results and confirm or reject your hypothesis. What conclusions can you draw?

Standards

Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

CCR.SL.1

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCR.SL.2

Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

CCR.SL.4

Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

CCR.L.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCR.L.2

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

CCR.L.3

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

CCR.L.4

Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

CCR.L.6

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

CCR.R.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.

CCR.R.2

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

CCR.R.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.

CCR.R.6

Assess how point of view or purpose shapes the content and style of a text.

CCR.R.10

Read and comprehend complex literary and informational texts independently and proficiently.

CCR.W.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.

CCR.W.4

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

CCR.W.5

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

CCR.W.9

Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCR.W.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.

RST.11-12.1

Focus

Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

WHST.11-12.2

Focus

Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

WHST.11-12.7

Focus

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

WHST.11-12.9

Focus

Draw evidence from informational texts to support analysis, reflection, and research.

Louisiana Content Standards for Science

SI-H-A2

Designing and conducting scientific investigations;

SI-H-B1

Communicating that scientists usually base their investigations on existing models, explanations, and theories;

SI-H-B4

Focus

Analyzing a proposed explanation of scientific evidence according to the following criteria: follow a logical structure, follow rules of evidence, allow for questions and modifications, and is based on historical and current scientific knowledge;

PS-H-E1

Recognizing the characteristics and relative strengths of the forces of nature (gravitational, electrical, magnetic, nuclear);

PS-H-A1

Manipulating and analyzing quantitative data using the SI system;

Next Generation Science Standards (NGSS Comprehensive)

HS-PS1-4.

Focus

Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

Texts

- **Coupled Safety Assessment of Cable Stay Bridges**
- **Web Quest I**
- **Web Quest II**

Student Work Rubric - Informational or Explanatory Task - Grades 9-12

	Emerging	Approaches Expectations	Meets Expectations	Advanced
	1	2	3	4
Controlling Idea	Presents a general or unclear controlling idea.	Presents a **clear** controlling idea **that addresses the prompt**, with an **uneven focus**.	Presents **and maintains a clear, specific** controlling idea that addresses **all aspects** of the prompt and **takes into account the complexity of the topic**.	Presents and maintains a **precise, substantive** controlling idea that addresses all aspects of the prompt, **takes into account the complexity of the topic** and, where appropriate, **acknowledges gaps in evidence or information**.
Selection & Citation of Evidence	Includes minimal details from sources. Sources are used without citation.	Includes **details, examples, and/or quotations** from sources that are **relevant to the controlling idea**. **Inconsistently** cites sources.	Includes details, examples, and/or quotations from sources that **support** the controlling **and supporting ideas**. **Consistently** cites sources **with minor formatting errors**.	Includes **well-chosen** details, examples, and/or quotations from sources that **fully support** the controlling and supporting ideas. Consistently cites sources **using appropriate format**.
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.	Explains ideas and source material **to support the controlling idea**, with **some incomplete reasoning or explanations**.	**Accurately** explains ideas and source material and **how they support** the controlling idea.	**Thoroughly** and accurately explains ideas and source material **to support and develop** the controlling idea.
Organization	Lacks an evident structure. Makes unclear connections among ideas, concepts, and information.	**Groups ideas and uses transitions** to develop the controlling idea, with **some lapses in coherence or organization**.	**Groups and sequences** ideas to **develop a cohesive explanation**. Uses transitions **to clarify the relationships among complex ideas, concepts, and information**.	Groups and sequences ideas **in a logical progression in which ideas build to create a unified whole**. Uses **varied** transitions to clarify the **precise** relationships among complex ideas, concepts, and information.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.	Errors in standard English conventions **sometimes interfere** with the clarity of the writing. Uses language and tone that are **sometimes inappropriate** for the audience and purpose.	**Consistently applies** standard English conventions; **minor errors**, while noticeable, **do not interfere** with the clarity of the writing. Uses language and tone **appropriate to the audience and purpose**.	Consistently applies standard English conventions, **with few errors**. Demonstrates **varied syntax** and **precise word choice**. **Consistently** uses language and tone appropriate to the audience and purpose.
Content Understanding (Generic)	Attempts to include disciplinary content in explanation or argument 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.

Background for Students

Before module implementation, you learned about the types of forces, force equations, gravity, and the normal force. You will use what you have learned about forces to conduct an investigation. In order to conduct the investigation, you will perform research about the structure and function of bridges and how various forces affect them. You and your design team will design a bridge that can support as much weight as possible with construction constraints that follow.

After collecting your data, you and your team will compose a formal laboratory report. Each design team will be given 150 Popsicle sticks. Bridges have to be between 25 cm and 30 cm long and width must be between 5 cm and 7 cm wide. The bridges must be less than 10 cm high. The only materials you will have are a knife, working surfaces, ruler, wood, and glue. The objective is to build a bridge that is stronger than the bridges of the other teams.

Extension

Students will study the Crescent City Connection bridge that exists between Eastbank New Orleans and the Westbank for structural analysis. We will discuss the politics involved in maintaining the bridge properly and how it impacts the communities that use it.

Section 2: What Skills?

Preparing for the Task

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

TASK AND RUBRIC ANALYSIS > 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. Ability to identify the components of a journal article.

ACTIVE READING THROUGH RESEARCH: Ability to research information needed to complete the task performed by completing two web quests, a hands-on activity, and by viewing a video.

Transition to Writing

HYPOTHESIS AND INVESTIGATION: Ability to form a hypothesis that is based on background knowledge gained from research and test that hypothesis by designing and executing a suitable methodology.

Writing Process

WRITING AN INTRODUCTION FOR A LAB REPORT: Ability to introduce the topic with a description of the problem or issue being investigated, describe the entity being studied, describe the variables, and provide a concise overview of the methods used.

WRITING A METHDOLOGY FOR A LAB REPORT: Ability to tell the reader how data was collected, give the reader enough information to assess the validity and reliability of the results, and give the reader enough information to replicate the study.

WRITING THE RESULTS SECTION OF A LAB REPORT: Ability to interpret and summarize data to either support or refute the hypothesis.

WRITING A CONCLUSION FOR A LAB REPORT: Ability to summarize the results and state whether or not they support your hypotheses, relate the results to previous research, discuss whether they are similar or dissimilar to previous findings, discuss any weaknesses in the design or procedures and how this may have affected your results, discuss implications of the findings and any potential directions for future research, and comment on the significance of your research.

WRITING AN ABSTRACT FOR A LAB REPORT: Ability to write a concise summary of the whole report.

DEVELOPMENT: Ability to construct an initial draft by piecing together the components of the lab report with coherence.

REVISION: Ability to refine the text by focusing on concepts such as sentence structure and coherence, 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?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
Preparing for the Task				
50 mins	**BRIDGING CONVERSATION > TASK ENGAGEMENT**: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns.	**SHORT CONSTRUCTED RESPONSE** Generate a list of things that you already know about forces. Include what you know about bridges and the weight they they support.	• Response contains about 5 ideas written in complete sentences. • It is acceptable for students to say what they want to learn about forces and bridges.	• Done as an individual assignment. • Engage the students in a class discussion about what they have written. • Encourage the sharing of ideas, especially if students have written what they would like to know about bridges and support forces. **Note:** *Time should be adjusted as necessary.* **Accommodations and Interventions:** *Extended time, assign peer tutor, remove distractions from work area, read task aloud*
	Additional Attachments: **Student Writer's Notebook for the Complete Module**			
50 mins	**TASK AND RUBRIC ANALYSIS > TASK ANALYSIS**: Ability to understand and explain the task's prompt and rubric.	**CONSTRUCTED RESPONSE AND CLASSROOM DISPLAY** **The culminating task for this investigation is as follows:** *"After researching informational texts on the structure and function of bridges, developing a hypothesis, and conducting an experiment examining live load forces on bridge stability, write a laboratory report in which you explain your procedures and results and confirm or reject your hypothesis. What conclusions can you draw?"* Respond to the the following questions and record your answers in your writer's notebook: 1. What are you going to write about? 2. How are you going to get the information? 3. What is the final product that you will turn in to your teacher? 4. What do you want to ask your teacher about the task? 5. Re-write the prompt in your own words. 6. What reading and writing skills will you need in order to complete this teaching task? Participate in a class discussion and question and answer session (students ask questions about the upcoming module and teacher answers questions). (*Volunteers assist the teacher in creating an attractive poster where the teaching task is written. The poster is displayed in the classroom and is referred to daily as we complete the module.*)	• Students respond to questions. • Students willingly participate in an open format class discussion. • They are able to ask relevant questions about the teaching task and their upcoming responsibilities.	• Students complete the task analysis in teams of 4 (the same teams that will construct the bridges together.) • Kagan Cooperative learning strategy Round Table is used for task completion. • Students rotate one task analysis sheet until it is completely filled out. • They then meet with the teacher for information verification before copying the information into their own writer's notebooks. • Pacing time includes time for poster creation and display. **Note:** *Encourage cooperation and teamwork. Be open to hearing student ideas during discussions.* **Accommodations and Interventions:** *Extended time, assign peer tutor, remove distractions from work area, read task aloud.*
Reading Process				
3 hrs	**ACTIVE READING**: Ability to identify the central point and main supporting elements	**THINKING NOTES, RESEARCH NOTES, AND VOCABULARY IDENTIFICATION** **Day 1:** Skim through the entire article first. Then closely read the abstract, introduction, and	• Responses are submitted correctly. • Students choose	• Teacher presents the PowerPoint entitled "Instruction for Journal Reading 1." • The teacher uses the results of a reading self-assessment that was administered prior

	of a text. Ability to identify the components of a journal article.	conclusion. Underline key phrases and write your thinking notes on the left of the page. **Remember**: thinking notes are used to summarize information in less than 10 words and to write questions and comments about the information. State how information is relevant to your investigation on the right side of the page. Identify vocabulary words that are difficult to understand with your partner. Enter the words into the Google form. In the next space, write the sentence in which the word was located. In the next space, enter 2 clue words in or around the key term. Write your best “guesstimate” of what you think the word means in the next space. Respond to the questions on the Google form **The questions:** 1. Identify 5 words that are of interest to you. These will be future vocabulary words. 2. How does this study support or relate to your experiment? 3. What are the main results of the study? Summarize the findings. Evaluate the validity of the researchers' conclusions. 4. Using information from the text, what is the difference between a case study and an experiment? 5. What is the author's purpose in writing the article? Provide evidence from the article supporting how you recognize his purpose. 6. What does this article contribute to the knowledge base? 7. Write the reference citation for this article. It will appear in the reference list of your formal lab report. *** Teacher will have to show students how to cite an article in a reference in APA format. Refer to **http://owl.english.purdue.edu/owl/section/2/** for APA format.* **Day 2:** Get together with your literacy partner. You will receive a copy of the words that another pair selected yesterday. Use **dictionary.com** to define the words. Record the definitions in the Google form entitled "Vocabulary."	challenging words and enter the correct definitions into the appropriate form.	to beginning the module. • The data from the assessment is used to pair students up with a "literacy partner". Students read the article in pairs with their literacy partner. • They complete the questions on a Google form that is embedded on their class web page (sbanks.wikispaces.com). The teacher has access to the spreadsheet that displays all of the responses. • The teacher engages the students in a class discussion as we view the responses on the Promethean board (smart board). • During the next class period, the vocabulary words that were entered into the Google form by each pair are distributed to the students. • They use dictionary.com to locate the correct definitions and enter those into another Google form. After the definitions are entered, they are distributed to all students.
	Additional Attachments: **Instructions for Journal Reading PowerPoint**			
1 hr and 30 mins	**ACTIVE READING THROUGH RESEARCH**: Ability to research information needed to complete the task performed by completing two web quests, a hands-on activity, and by viewing a video.	**WEB QUESTS** You will use the internet to perform 2 web quests. Web quests are like a scavenger hunt for information using web sites. The sites provided to you are reliable and enjoyable. Complete both web quests and fill in appropriate information in your writer's notebook. Teacher explicitly tells students that the information gathered from the web quests provides an insight into how structure impacts function.	• Web quest responses are complete and correct. • Responses include structural information about each type of bridge, materials, reinforcements, and whatever each individual	• Task completed in computer labs. Can be done individually or in cooperative teams. **Notes:** *Students can be taken to a computer lab for the completion of this activity. Personal electronic devices (such as ipods) can be used if not a violation of the district's electronic use policy.* **Accommodations/Modifications:** *Individualized instruction; model, modify, repeat instructions; assign peer tutor*

			deems significant enough for consideration. • Responses are subjective in nature, so they will vary from student to student. This is purposely left as a subjective activity because of the variety that will exist in their preferences as to how their bridges will be built. • Students should make a connection between the information gathered during the web quests and the final product. (Info gathered here provides students with how structure impacts function- the teacher needs to iterate the significance of the information and relate that significance through direct communication with the students.)	
1 hr and 30 mins	**ACTIVE READING THROUGH RESEARCH**: Ability to research information needed to complete the task performed by completing two web quests, a hands-on activity, and by viewing a video.	**HANDS-ON ENGINEERING ACTIVITY** Complete the engineering hands-on activity in teams of 4. Adhere to expectations and be willing to present your findings to the class. Include descriptions, facts, details, examples and alternative perspectives. Use appropriate eye contact and volume, and clear pronunciation during your presentation. Fill in the appropriate spaces in your writer's notebook.	Expectations are met and student engagement is at maximum. Expectations are as follows: • Rule 1: Postpone and withhold your judgment of ideas • Rule 2: Encourage wild and exaggerated ideas(think outside box!) • Rule 3: Quantity counts at this stage, not quality • Rule 4: Build on the ideas put forward by others • Rule 5: Every	• Teacher presents the PowerPoint entitled "You, the Engineer" to the class. • Class is divided into cooperative teams. Each team gets the following materials: 10 sheets of paper, 20 drinking straws, 20 paperclips, tape, and scissors. • Each team has 15 minutes to build a structure that can support the weight of at least one 23 Newton textbook at least 1.5 inches off the surface. • Teams get 3 minutes to plan before construction. • Upon conclusion, each team discusses why their structure failed or succeeded with the class. Students make a connection between this activity and the teaching task. **Notes**: *If time permits, allow teams to create another structure.* **Accommodations and Interventions:** *Extended time, directions read aloud, preferential group assignment, and instructions on the design process: find the*

			person and every idea has equal worth Successful adherence to these expectations will be assessed by teacher observation and by questioning students from each group directly.	*need, define the problem, come up with ideas, select the most* *promising design, plan and manage the project, and build the design.*
	Additional Attachments: **Engineering Activity Powerpoint**			
1 hr and 30 mins	**ACTIVE READING THROUGH RESEARCH**: Ability to research information needed to complete the task performed by completing two web quests, a hands-on activity, and by viewing a video.	**DOCUMENTARY NOTES** Watch the video "Modern Marvels: The Golden Gate Bridge." Respond to the following questions in your writer's notebook: 1. Evaluate the effectiveness of the bridge. Was the purpose achieved? How? Provide specific examples. 2. Identify at least two safety concerns that arose during bridge construction. 3. Evaluate the effectiveness of improvements and updates made to the bridge to date. Did they changes make the bridge stronger? Safer? Provide specific examples. 4. What concerns about safety and maintenance arose from deciding on the color of the Golden Gate Bridge? What external organization had a big say in determining the color? 5. Do you feel as though building the Golden Gate bridge had a significant economic impact on the communities surrounding it? 6. What information from the video will assist you in building your bridge? Provide at least 3 examples.	• Responses are in direct reference to the video. • No outside sources are used to answer the questions. • Expectations are met if students are able make a connection between the content in the video and the teaching task. • The importance of structure on function is emphasized.	• Can be completed as a Kagan Round Table activity in teams of 4 or as an individual activity. **Notes:** *Video was streamed online through the teacher's netflix account. The DVD is available to* *order through the PBS website or on sites such as Amazon.com or ebay.*
Transition to Writing				
40 mins	**HYPOTHESIS AND INVESTIGATION**: Ability to form a hypothesis that is based on background knowledge gained from research and test that hypothesis by designing and executing a suitable methodology.	**HYPOTHESIS FORMATION** When you write a hypothesis, you are proposing a possible explanation to some natural phenomenon, topic, or issue that you have observed. The hypothesis is never just a guess. It is always based on what is already known about the phenomenon, topic, or issue. As a team, complete the *Developing A Hypothesis* organizer. Respond to the following: • Step 1: What is the phenomenon, topic, or issue that you are investigating? • Step 2: What do you already know about this phenomenon, topic, or issue? (note-students fill in a table with two columns- column 1 asks "what I know" and column 2 asks for the source of the information and whether it is a primary or secondary source) • Step 3: What is the question that you are asking about this phenomenon, topic, or issue? • Step 4: Make a claim based on what you already know or have learned about this topic or issue. • Step 5: If possible, rewrite your claim in "If-	• Responses are correct and are sensible within the context of this investigation. • Hypothesis is written coherently.	• Each team works together to complete the organizer. • Discussions about the information are encouraged. • Each team member is responsible for filling in the organizer in his or her own writer's notebook. **Notes:** *Time may have to be adjusted depending on the ability of the team to input the required information into the organizer.* **Accommodations and Interventions:** *Extended time, peer tutoring, questions/statements read aloud*

		Then" format.		
6 hrs	**HYPOTHESIS AND INVESTIGATION**: Ability to form a hypothesis that is based on background knowledge gained from research and test that hypothesis by designing and executing a suitable methodology.	**INVESTIGATION** In this experiment you will have an opportunity to apply what you have learned about bridges and forces. The objective of this experiment is to build the strongest bridge possible given a set of predetermined constraints. Each group will present their design to the class and then test the maximum weight that the bridge can hold. **Constraints:** • Bridges have to be between 25 cm and 30 cm long and width must be between 5 cm and 7 cm wide. The bridges must be less than 10 cm high. • The only materials you will have are a knife, working surfaces, ruler, wood, and glue. **TITLE:** Consult with your group and decide on a title for your report. Write the title in the space provided. **Purpose:** Consult with your group and decide on the purpose of this activity. Write the purpose in the space provided. **Experimental Procedure:** How are you going to test your hypothesis? Write out the step-by- step procedure that you will use. Make sure that someone would be able to replicate your procedure using only your directions. **Materials:** What materials will you use for your experiment? List them in the space provided. **Data:** Construct a data table. You and your group need to decide on what data to record and in what units.	• Bridge is designed, built, and tested. • Data table has been created and filled in.	• Each team works together to complete the investigation. **Notes:** *Time includes drying time for the glue. Glue takes 24 hours to dry completely. Each part of the bridge has to be built and then put together.* **Accommodations and Interventions:** *Model, modify, repeat directions; provide individual assistance; reduce or increase the amount of materials*
Writing Process				
45 mins	**WRITING AN INTRODUCTION FOR A LAB REPORT**: Ability to introduce the topic with a description of the problem or issue being investigated, describe the entity being studied, describe the variables, and provide a concise overview of the methods used.	**WRITING THE INTRODUCTION** Read the section in your writer's notebook that pertains to the parts of a good introduction. In the spaces provided below, respond to the following statements in the graphic organizer provided: 1. Describe the problem under investigation 2. Describe the entity to be studied 3. Describe the independent variable 4. Describe the dependent variable 5. Write an overview of the method used to test the hypothesis	• All sections of the graphic organizer are complete and are sensible enough to include in the draft of the report.	• Each team works together to complete the organizer. • Discussions about the information are encouraged. • Each team member is responsible for filling in the organizer in his or her own writer's notebook. **Notes:** *Time may have to be adjusted depending on the ability of the team to input the required information into the organizer.* **Accommodations and Interventions:** *Model, modify, repeat directions; read prompts aloud; modify organizer to accommodate individual needs.*
45 mins	**WRITING A METHDOLOGY FOR A LAB REPORT**: Ability to tell the reader how data was collected, give the reader enough information to assess the validity and	**WRITING THE METHODOLOGY** Read the section in your writer's notebook that pertains to the parts of a good methodology. In the spaces provided below, respond to the following statements in the graphic organizer provided: 1. What materials did you use for your investigation? Include units of measurement	• All sections are complete and are sensible enough to include in the draft of the report.	• Each team works together to complete the organizer. • Discussions about the information are encouraged. • Each team member is responsible for filling in the organizer in his or her own writer's notebook. **Notes:** *Time may have to be adjusted*

	reliability of the results, and give the reader enough information to replicate the study.	if applicable. 2. How exactly did you conduct the investigation from beginning to end? Write this as though someone else is going to replicate your investigation. 3. How did you collect data? 4. What photographs can you include in this section? Label each photo as a figure. Assign a number and a title to each figure.		*depending on the ability of the team to input the required information into the organizer.* **Accommodations and Interventions:** *Model, modify, repeat directions; read prompts aloud; modify organizer to accommodate individual needs.*
45 mins	**WRITING THE RESULTS SECTION OF A LAB REPORT**: Ability to interpret and summarize data to either support or refute the hypothesis.	**WRITING THE RESULTS SECTION** Read the section in your writer's notebook that pertains to the parts of a good results section. In the spaces provided below, respond to the following statements in the organizer provided: 1. Begin with main findings and then describe other relevant results. 2. Round numbers to the nearest hundredth (two decimal points). 3. As a result of _____ Newtons of force being added to the bridge, _____ was observed. 4. What was the force required to break the deck of the bridge? 5. When you use any tables or figures, refer to them in the text of the results section: e.g., “see Table 1” or “as shown in Figure • NOTE: Do not discuss the implications of your results in this section.	• All sections are completed and are sensible enough to include in the draft of the report.	• Each team works together to complete the organizer. • Discussions about the information are encouraged. • Each team member is responsible for filling in the organizer in his or her own writer's notebook. **Notes:** *Time may have to be adjusted depending on the ability of the team to input the required information into the organizer.* **Accommodations and Interventions:** *Model, modify, repeat directions; read prompts aloud; modify organizer to accommodate individual needs.*
1 hr	**WRITING A CONCLUSION FOR A LAB REPORT**: Ability to summarize the results and state whether or not they support your hypotheses, relate the results to previous research, discuss whether they are similar or dissimilar to previous findings, discuss any weaknesses in the design or procedures and how this may have affected your results, discuss implications of the findings and any potential directions for future research, and comment on the significance of your research.	**WRITING THE CONCLUSION** Read the section in your writer's notebook that pertains to the parts of a good discussion/conclusion section. In the spaces provided below, respond to the following statements in the organizer provided: 1. First, summarize the results and state whether or not they support your hypotheses. 2. Relate the results to previous research, discussing whether they are similar or dissimilar to previous findings 3. Discuss any weaknesses in the design or procedures and how this may have affected your results. 4. Discuss implications of the findings and any potential directions for future research. 5. End this discussion by commenting on the significance of your research.	• All sections are complete and are sensible enough to include in the draft of the report.	• Each team works together to complete the organizer. • Discussions about the information are encouraged. • Each team member is responsible for filling in the organizer in his or her own writer's notebook. **Notes:** *Time may have to be adjusted depending on the ability of the team to input the required information into the organizer.* **Accommodations and Interventions:** *Model, modify, repeat directions; read prompts aloud; modify organizer to accommodate individual needs.*
45 mins	**WRITING AN ABSTRACT FOR A LAB REPORT**: Ability to write a concise summary of the whole report.	**WRITING THE ABSTRACT** Read the section in your writer's notebook that pertains to the parts of a good abstract section. Write the abstract for your report. The following statements should be addressed in the abstract: 1. The abstract is a very concise summary of the whole report that is normally written after the	• The abstract fits the criteria explained in the prompt. • It is sensible enough to include in the	• Each team works together to complete the organizer. • Discussions about the information are encouraged. • Each team member is responsible for filling in the organizer in his or her own writer's notebook.

		paper is complete. 2. The abstract should indicate the purpose of the study and summarize the main findings. 3. You should try to have something about each section (Introduction, Method, Results, and Discussion) in your abstract. 4. The first line of this page should say, “Abstract” and should be centered. 5. This abstract should be no longer than 200 words. 6. The abstract is not indented. 7. All numbers reported in the abstract (even those less than 10) should appear in numeral form.	draft of the report.	**Notes:** *Time may have to be adjusted depending on the ability of the team to input the required information into the organizer.* **Accommodations and Interventions:** *Model, modify, repeat directions; read prompts aloud; Provide struggling students with sentence stems.*
1 hr and 30 mins	**DEVELOPMENT**: Ability to construct an initial draft by piecing together the components of the lab report with coherence.	**FIRST DRAFT** Write an initial draft complete with opening, development, and closing; insert and cite textual evidence and evidence from the web quests, hands on activity, and the film. Use the template provided to you on the class web page **physicsehretbanks.wikispaces.com** to assist you in writing the initial draft. You may type directly in to the template. Back up your work and don't forget to save your work frequently.	• Provides complete draft with all components. • Writing adheres to the rubric • Supports the writing with evidence and citations. • Completed within the allotted time period	• Encourage students to re-read prompt partway through writing, to check that they are on track. • Teacher provides a detailed template embedded with outlined notes for each component of the lab report. **Notes:** *If the teacher does not provide students with a format for writing (template), then they will invent their own! Teacher should be specific in detailing what is expected. On the template, each section contains a mini outline for students to follow as they enter information.* **Accommodations if needed:** *Read assignment aloud, allow extended time, provide an outline in addition to the template, provide graphic organizer.*
1 hr	**REVISION**: Ability to refine the text by focusing on concepts such as sentence structure and coherence, including line of thought, language usage, and tone as appropriate to audience and purpose.	**PEER REVISION** Pair up with your literacy partner and exchange reports. Answer the following questions about your partner's report: 1. Are all parts of the report included (abstract, introduction, methodology, results, conclusion)? Does each section make sense? 2. Should the order of any sentences be changed? 3. Are pictures and tables labeled correctly? Are they relevant to the report or do they just take up space? 4. Does the writer state whether the data supported or rejected the hypothesis? 5. Do all facts stated appear to be correct? 6. Has information used from other sources been cited correctly? After you have answered these questions, sign the bottom and return the questions and the report to your partner.	• All questions are answered for each report. • Partner has signed the revision questions sheet.	• Instruct students to pair up with their literacy partner, exchange reports, and respond to the questions on the revision questions sheet located in their writer's notebooks. • Each partner must sign the revision questions sheet. **Notes:** *Encourage students to be kind and respectful with their corrections. Some students may be apprehensive to share their writing with others. Remind students that the purpose of having someone else read their work is that someone else will see mistakes faster than the writer him or herself. The writer's brain automatically fills in missing or incorrect information; another person's brain will not and the mistake will be immediately noticed.* **Accommodations and Interventions:** *Extended time, checklist read aloud, preferential partnering,individual instruction from teacher.*
1 hr	**EDITING**: Ability to proofread and format a piece to make it more effective.	**PEER EDITING** Pair up with a classmate. Read his or her final draft and proofread for sound spelling, capitalization, punctuation, and grammar (be considerate and respectful). Sign the draft and return it to your partner.	• Provides partner with corrections to make regarding sound spelling, capitalization, punctuation, and grammar.	• Students pair up with literacy partners again for editing. • As the students are working together, set up a "teacher workstation" where they can elect to receive individual instruction from the teacher. • Briefly review selected skills that many students need to improve. **Accommodations and Interventions:** *Extended time, individual*

				instruction, preferential partnering, directions read aloud.
10 mins	**COMPLETION**: Ability to submit final piece that meets expectations.	**PRODUCT DELIVERY TO TEACHER** Turn in your complete set of drafts, plus the final version of your piece.	• Product is turned in to the teacher as directed.	• Teacher can choose to have students submit the final draft electronically by email, sharing on Google drive, or transfer from flash drive. This facilitates keeping exemplar papers.

Instructional Resources

No resources specified

Section 4: What Results?

Student Work Samples

Approaches Expectations

Student Sample Approaches Expectations

Meets Expectations

Student Sample Meets Expectations

Teacher Reflection

Overall, this module was executed well in the classroom. I did notice that student engagement was high and the students were very satsified with their work. Several students commented that by having the supports for writing, they felt they were better able to write a report that they considered "good." This module was long-it took over 4 weeks to complete everything (including grading the reports), but I feel that the time was well spent.

All Attachments

- **Coupled Safety Assessment of Cable Stay Bridges : https://s.ldc.org/u/5fhvc7z8f5njk3qdz1trwl3yq**
- **Web Quest I : https://s.ldc.org/u/dgir62a6xwqbb1af3kt9galnn**
- **Web Quest II : https://s.ldc.org/u/5xulugy08odpnhdmb7669oaoe**
- **Student Sample Approaches Expectations : https://s.ldc.org/u/2e1u6j31nk0ufugy3dp11yzm9**
- **Student Sample Meets Expectations : https://s.ldc.org/u/9kk2k9rloe2cqifzu6t8dejx8**