



Content Research Synthesis Project (CRSP) Elementary Education—Science Methods

Process: We'll approach this work from a guided inquiry perspective that includes:

1. **Topic Selection:** Choose to focus on either *Force and Motion* or *Earth, Sun, and Moon*.
2. **Engaging:** Take the related online content pre-test through the Professional Development Indexer on the NSTA Learning Center. <http://learningcenter.nsta.org/indexer/default.aspx>. As you do this, write on the provided template about what you already know about the topic as well as what you would like to know. When you are done with the pre-test, add on any additional prior knowledge and wonderings you have.
3. **Exploration/Research:** Participate in a guided learning process to deepen your content knowledge by completing the related NSTA Learning Center SciPack and learning from at least two additional approved quality resources. Jot notes as you do this work. Keep track of your references throughout this process as you will need to cite your sources throughout your project and include a reference list at the end. .
4. **Explaining/Synthesis:** When you complete your research, organize your content knowledge into the provided template. Think about this as a synthesis of information that could provide a detailed review for a colleague on this topic or as the content knowledge adults should have on the topic. This is NOT what you would present to children and is NOT about ways to teach the content. This IS your place to show you understand content deeply. You might think about it as showing you are *really smart* about science. Fully explore the content, include substantial supporting details, make connections, blend text with figures, support all information with citations, and use a satisfactory range of resources to fully explore the content.
5. **Evaluation:** Complete the online post-test of content knowledge that is part of the SciPack until you score high enough to earn your certificate.
6. **Reflection:** Now that you have thoroughly researched your topic, it is time to reflect. How has your thinking changed? In what ways will this information inform your teaching? Think about this particular topic and also science planning and teaching in a more general sense. Thoughtfully complete these sections on the template.

The Bigger Picture: Upon completion of the elementary education program and with guidance provided in EDEL 446 and EDEL 339, elementary education majors will select one of the four CRSP assignments completed in methods courses to revise and submit on Task Stream for your portfolio **Electronic**

Evidence 2: Depth of Content Knowledge.

Portfolio Requirement: The teacher candidate will analyze/evaluate multiple sources of content information in order to provide an in-depth paper and synthesis of the content related to their field of study. The teacher candidate will prepare a synthesis of this information in order to provide a detailed multi-media review which demonstrates depth of content knowledge in the discipline.

Synthesizing Your Learning: Within your synthesis of information, there are 5 domains you need to address related to the science content. They include:

1. Big Idea

Concisely (no more than two to three sentences) describe/define your topic. Your definition should not be quoted from another definition. Rather, you should construct your definition using a synthesis of a variety of sources. It often helps to write this part after the key concepts and related details.

2. Key Conceptual Ideas and Related Details

Your selected topic likely contains several key ideas or important features. What are they? For each, provide details that demonstrate your growing understanding of the topic. You should provide written details as well as examples and illustrations (see section titled Examples and Illustrations). This section is the “meat” of your CRSP assignment. It should go deep and include citations.

3. Real World Connections

Why is your topic important for people to understand? What connections exist between your topic and real world phenomena or human experiences? Address these questions here.

4. Curricular Connections

In this section, describe the connections that exist between your topic and other science topics. Additionally, describe connections between your topic and other subject areas (mathematics, science, social studies, language arts, art, music, etc.)

5. Wonderings

Based upon the information you included in the Engage section, address any remaining wonderings you listed that have not been addressed in the other four domains.

Within your synthesis of information and each of the domains listed above, you should have 3 components including Claims, Evidence, and Examples/Illustrations.

Claims and Evidence:

Claims are the pieces of information which you find through your review of the literature. Literature reviews require all claims to be supported by evidence. To facilitate this process, we have included linked columns in the template. Your content information should be written in the claims column. Your connected citations should be aligned in the evidence column.

Examples and Illustrations:

Often times content is best represented in examples and illustrations. This leads to the third linked column in the research section of the template. In this column you should either include figures or refer to attached figures. The idea here is not only to simply copy figures others have created but to create your own figures as part of your synthesis of information. (Ex: "See Figure 1: Plant/Animal Venn Diagram.") The format for figures is up to you. Some graphic organizer suggestions include a Venn diagram, semantic feature analysis, semantic map, concept definition map, and a Frayer map. Templates for these graphic organizers are available for your use.

Sources: You will need *quality* science content resources to complete this research, at least two in addition to the required online NSTA SciPack. Choose from the following list, or ask about other resources that you might like to use.

- *Stop Faking It! Finally Understanding Science So You Can Teach It* book series by Bill Robertson
- Content-related articles in NSTA journals (*Science & Children*, *Science Scope*, and *Science Teacher*), especially the Science 101 columns *Science & Children*
- Science background or content sections in STC and FOSS teacher guides
- Any of the books in the *Uncovering Student Ideas in Science* series (Keeley et al.)
- Hazen, R. M., & Trefil, J. S. (1992). *Science matters: Achieving scientific literacy*. New York: Anchor Books.
- American Association for the Advancement of Science (AAAS). (1989). *Science for all Americans*. New York: Oxford University Press. ISBN: 0-19-506771-1. Complete text available online at <http://www.project2061.org/tools/sfaol/sfaatoc.htm>.
- NASA resources
- Science textbooks and encyclopedias
- *A Private Universe* video documentary, available online at <http://www.learner.org/resources/series28.html>
- Additional resources found through the NSTA Learning Center

Compiling Your Work: Your final product should include:

- Completed CRSP template
- Reference list APA style
- NSTA SciPack Certification of Science Content Proficiency

An Academic Honesty Reminder: As you work on this project, I encourage you to once again review the Writing Center's Guide to Avoiding Plagiarism. <http://www.wcu.edu/11733.asp> Pay particular attention to what you need to document and how. Remember to use exact quotes sparingly and that if you use an exact quote, it must be in quotation marks and properly cited. Contact the Writing Center if you would like help. 227-7197. Any student who is found to have engaged in cheating, fabrication, plagiarism, or facilitation of academic dishonesty will receive an automatic final course grade of F.

Content Research Synthesis Project (CRSP) Elementary Education

Name:

Course:

Date:

Topic:

Engage	
What I Think I Know	What I Wonder

Research: A Thorough Literature Review			
Domains	Claims	Evidence	Examples & Illustrations
Big Idea			
Key Conceptual Ideas and Related Details			
Real World Connections			
Curricular Connections			
Wonderings (if applicable)			

Reflections	
How My Thinking Changed	How This Will Inform My Teaching

*Add on a reference list, APA style and your NSTA SciPack Certification of Science Content Proficiency.

Rubric for CRSP Assignment—Science

Domains	0	1	2	3	4	5
Engage (5%)	Section not completed	Knowledge shared is unrelated to the topic. Questions are unrelated or not included.	Very limited knowledge shared about the topic. Questions are unrelated or not included.	Articulates knowledge of the topic but does so in a way that lacks clarity. Questions are included, yet they do not lead to an in depth investigation	Clearly articulates existing knowledge on the topic and poses questions, yet the questions do not lead to an in depth investigation	Clearly articulates existing knowledge on the topic and poses several pertinent questions directly related to the topic
Big Idea (15%)	Section not completed	Uses one poor reference to arrive at a weak definition of the topic.	Uses one source and simply restates/paraphrases the definition provided.	Uses one source to arrive at a quality definition.	Uses multiple sources to arrive at a definition. Definition may lack clarity or conciseness.	Synthesizes multiple sources of information to arrive at a concise description/definition of the topic.
Key Conceptual Ideas & Related Details (50%)	Section not completed	Low quality sources are used and little, if any, evidence is provided to support stated claims.	Some sources are of questionable quality (e.g. Wikipedia) and multiple claims lack supporting details	Sources are generally scholarly, yet claims may lack supporting details in two to three areas.	Sources are generally scholarly, yet claims may lack supporting details in one area.	Student uses a variety of scholarly sources to arrive at the conceptual ideas that form the topic. Details are provided which support each conceptual idea presented.
Real World Connections (5%)	Section not completed	Weak or unrelated connections to the topic are presented with no support from scholarly sources.	Weak connections are made to the topic that have limited support from scholarly sources.	Multiple connections are drawn from scholarly sources, yet two to three connections lack detail or are not fully supported.	Multiple connections are drawn from scholarly sources, yet one connection lacks detail or is not fully supported.	Real world connections are drawn from scholarly sources and are directly tied to the topic at hand. Significance of the topic is well documented.
Curricular Connections (5%)	Section not completed	Weak or unrelated connections to the topic are presented with no support from scholarly sources.	Weak connections are made to the topic that have limited support from scholarly sources.	Multiple connections are drawn from scholarly sources, yet two to three connections lack detail or are not fully supported.	Multiple connections are drawn from scholarly sources, yet one connection lacks detail or is not fully supported.	Connections to other topics within the subject area are provided and are clearly linked to the chosen topic. Furthermore, connections are made to other subject areas.
Wonderings (if applicable) (5%)	Wonderings not addressed	Vague references to wonderings provided.	Address part of, yet misses substantial details in addressing wonderings initially posed that were not addressed elsewhere in the literature review.	Somewhat addresses wonderings initially posed that were not addressed elsewhere in the literature review. Multiple details are missing.	Substantially addresses wonderings initially posed that were not addressed elsewhere in the literature review. One or two details may be missing.	Directly addresses wonderings initially posed that were not addressed elsewhere in the literature review.
Reflections (5%)	Section not completed	Either reflections on process or connections to teaching are missing.	Reflections on process in relation to what s/he has learned and information on how this knowledge informs teaching are included, yet each area lacks significant depth.	Reflections on process in relation to what s/he has learned and information on how this knowledge informs teaching are included, yet one area lacks significant depth.	Student reflects on the process in relation to what s/he has learned and includes information on how this knowledge informs teaching. May lack some depth in one area.	Student reflects upon the process of the CRSP assignment in relation to what s/he learned from the review. In light of the findings, the student clearly articulates how this knowledge informs his/her teaching.
Reference List (5%)	Section not completed	Incomplete. Significant issues with number of references, quality of references, and/or APA formatting.	Fewer than 3 sources. Issues with quality of the sources and/or APA formatting.	Complete reference list with at least 3 sources. May have some formatting errors.	Complete reference list with at least 3 quality sources. May have some formatting errors.	Complete reference list with at least 3 quality sources and accurate APA formatting.
NSTA Sci Pack Certificate (5%)	Missing	Not applicable	Not applicable	Not applicable	Not applicable	Included