

Module 5: Workshop 15 Lesson Plan

<p>Overall Learning Goals Strategies for Developing Common Core Skills in Content Areas (Math & Science): to train administrators and adult educators <i>to develop test readiness strategies</i> to further cement Common Core skills in content areas to better prepare their ESOL, ABE, and pre- HSE student constituency for the TASC exam.</p>	<p>Lesson Topic Science Components – Building/Activating background knowledge and analyzing texts about Life, Earth & Science, Technology, and Application of the Sciences, including identifying claims and evidence in a problem-solving test environment.</p>
<p>Curriculum Developer Lizelena Iglesias</p> <p>Workshop Trainer</p>	<p>Date</p> <p>Location</p>
<p>Intended Audience</p> <ul style="list-style-type: none"> • Instructors (content was designed as a workshop for Instructors). • Note: Sample student material is included for Instructors to analyze during the workshop. Instructors may also use sample student materials in their classes. 	
<p>Standards Alignment</p> <p>The Common Core CCSS ELA/Literacy Standards:</p> <ul style="list-style-type: none"> • CCSS.ELA-Literacy.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. • CCSS.ELA-Literacy.WHST.6-8.1.c Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. • CCSS.ELA-LITERACY.RST.6-8.5 Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. • CCSS.ELA-LITERACY.RST.6-8.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. • CCSS.ELA-LITERACY.WHST.6-8.1.b Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. <p>Next Generation Science and Engineering (NGSS) Standards:</p> <ul style="list-style-type: none"> • Biological Evolution: Unity and Diversity <ul style="list-style-type: none"> ○ HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. ○ MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. • NGSS Scientific and Engineering Practices <ul style="list-style-type: none"> ○ Constructing explanations (for science) and designing solutions (for engineering). ○ Engaging in argument from evidence. 	
<p>Goals and Objectives (SWBAT)</p> <ul style="list-style-type: none"> • Facilitators will analyze building background knowledge teaching strategies. • Facilitators will engage in a building background knowledge activity. • Facilitators will use textual evidence to answer text-based questions about science concepts. • Facilitators will use the CRE model to argument in science. • Participants will Identify evidence to explain the bottleneck effect in a population • Participants will use evidence to make a claim about how genetic variation is important in helping populations survive in unpredictable environments 	



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- Specifically:
 - Facilitators will build upon knowledge of activating background knowledge strategies in science while close reading science texts and will engage in the Claim, Evidence, and Reasoning model used in science argumentation.
 - Participants will build upon knowledge of activating background knowledge strategies in science while close reading science texts and will engage in the Claim, Evidence, and Reasoning model used in science argumentation.
 - Students will become familiar with close reading strategies to analyze complex science texts.

References (APA Style)

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- Carrier, S. (2011). Effective Strategies for Teaching Science Vocabulary. LEARN North Carolina: UNC-Chapel Hill, NC.

Technology and Handouts

Technology Needs

- AV cart with projector, laptop, and speakers will be provided.
- Laptop or tablet computer for each student with access to Internet.
- Latest version of Adobe Flash installed on laptops.

Presentation Needs & Handouts

- Chart Paper.
 - Markers.
- Each item listed below will be available in PDF format.
- Handout 1 - Video-Questionnaire copies.
 - Handout 2 - First Word Activity Handout Copies.
 - Handout 3 - Reflection on first word activity.
 - Handout 4 - Lesson Scenario Assessment copies.
 - List of teaching strategies to activate/build background knowledge from the PDF <http://www.classhelp.info/Biology/Strategies%20for%20Activating%20Prior%20Knowledge.pdf>
 - Handout 5 - Excerpt of science text for analysis.
 - Handout 6 - Genetic variation helps rescue endangered



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- panthers article.
- Handout 6 - Vocabulary Think Chart.
- Handout 7 - Text Based Questions. Exit Slip 1.
- Handout 8 - Does air have matter? / Exit Slip 2.
- Handout 9 - Cheating Cheetahs Prosper article.
- Handout 9 Text based questions.
- Handout 9 - Vocabulary Sort Cards Handout.
- Handout 9 - Exit Slip 3.

Lesson Plan Activities

Part 1: Activating Background Knowledge about Evolution

Lesson Content

The focus of this lesson plan is on building students' background knowledge around the definition of the word evolution and its relevance for developing new information relative to the content.

Opening/Background

- Facilitator will begin this activity by quoting Robert Marzano with regards to a student's background knowledge and its relevance for developing content. This can be found in the workshops opening Power Point slide.
- According to Mr. Marzano, "What students *already know* about the content is one of the strongest indicators of how well they will learn new information relative to the content".

Lesson Materials

- PowerPoint presentation for the workshop.
- Science teacher video modeling activating and building background knowledge
<https://www.youtube.com/watch?v=A2C8ASvt6ZI>
- 1 Questionnaire for the video per group. See Handout 1.
- First Word Activity Handout. See handout 2.
- Reflection Questions after the First Word Activity. See Handout 3.
- Lesson Scenario Wrap-Up Assessment. See handout 4.
- Strategies for activating prior knowledge. See PDF.
- PDF <http://www.classhelp.info/Biology/Strategies%20for%20Activating%20Prior%20Knowledge.pdf>

Questions to Answer

Immediately after the activity, the facilitator asks the group the following questions. These questions will be found in the Power Point accompanying the lesson. See Handout 3.

- How was your experience coming up with words relevant to the definition of the word evolution?
- Did you learn something new from the other groups?
- Would you use this strategy in your classrooms? How?

Opening/Background

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Teacher Focus

Facilitator will ask participants to do Two Minutes Talk to answer the following question: As an adult educator, what is the relevance of this quote to you?

- Facilitator will have participants pair up. When the exercise begins, one participant will begin talking to his or her partner about the question. The facilitator will keep time with a stopwatch.
- At two minutes, the facilitator will tell participants to switch and the other person begins talking.
- It is okay for the second person to repeat some of the things the first person said, however, they are encouraged to try and think of new information to share.
- Have a few groups share some of their responses with the entire class when the activity is done.

Lesson Activities

- Activity 1: Facilitator will now present a 7 minute video which shows a science teacher modeling Activating Background knowledge: <https://www.youtube.com/watch?v=A2C8ASvt6ZI>



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- After watching the video tell participants to turn into groups and discuss the following questions about the video. These questions will be on the Power Point for this lesson and copies of the questions will be made for each group as well. See Handout 1.
 - What specific strategy or strategies is this teacher using to activate and build prior knowledge?
 - What are the students doing? What is the teacher doing?
 - How does the teacher scaffold the strategy?
 - What did you like? What you didn't like?
- Facilitator will bring the participants together and will ask if they know more strategies to activate and build background knowledge in the classroom. Facilitator will list all the ideas on the board or on an easel pad.
- Activity 2: Facilitator will now split the participants into groups to engage in The First Word activity.
 - The purpose of this activity is to activate students' prior knowledge of a concept, idea, or skill. This is a modified activity from <http://www.classhelp.info/Biology/Strategies%20for%20Activating%20Prior%20Knowledge.pdf>. See Handout 2.
 - Description: The First Word is a variation on traditional acronyms. By going through the process of analyzing words and creating related sentences, students will gain a deeper understanding of the meaning.
 - The First Word Procedure:
 - Provide with the following the word EVOLUTION written vertically on a page.
 - Working in small groups, participants should generate a word, a short phrase or sentence that begins with each letter of EVOLUTION which offers important information or key characteristics about this topic.
 - Participants will illustrate their "First Words" for posting around the classroom. Notice that sharing "First Words" will allow students to identify important concepts that may have been left out of their own work.

Wrap Up/Assessment

- Facilitator will wrap up this part of the workshop by splitting participants into groups and provide a lesson scenario where teachers will have to use a strategy to activate student's background knowledge for the given scenario. See Handout 4.
- A list of strategies with their description will be provided to each group.
- Facilitator will provide participants the following references for further reference using this strategy:
 - <http://www.ascd.org/publications/books/113005/chapters/Background-Knowledge@-The-Glue-That-Makes-Learning-Stick.aspx>
 - <http://www.classhelp.info/Biology/Strategies%20for%20Activating%20Prior%20Knowledge.pdf>

Part 2: Analyzing Scientific Texts about Genetic Variation

Lesson Content

The focus of this lesson plan is on building students' analytical skills in reading scientific texts about genetic variation and its relevance for developing new reading and writing skills relative to the content.

Lesson Materials

- Science text about phototropism to analyze implications for instruction.
- Genetic Variation helps rescue endangered panthers article.
- Vocabulary Think Chart handout.
- Text dependent questions handout.
- Exit slip.

Lesson Activities

- Activity 1: Facilitator will give participants a science text to read and after they read it, they will be asked what they think the implications would be for science instruction.
 - Facilitator will ask participants to Turn and Talk to share answers. Facilitator will ask to share answers as a whole class.
 - Facilitator will say: there is no doubt that the main goal of reading is to comprehend the text, but what does it take to comprehend a text and what strategies can we use to enhance comprehension?
- Activity 2: Facilitator will tell participants that they will engage in a close reading analysis of a science text "Genetic variation helps rescue endangered panthers" found at http://evolution.berkeley.edu/evolibrary/news/101201_panthers
 - Copies of the article will be distributed.
 - Before the reading, the facilitator will ask participants to define the word endangered (at risk of extinction).
 - Have participants scan the document and ask how this text is organized.
 - Read the Title aloud: "Genetic variation helps rescue endangered panthers."



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- What can we predict from the title?
- What do you know about panthers?
- What do you know about endangered species?
- Can you name a differing example of a rescued endangered species?
- During the reading, the facilitator will project the Text from the Power Point and. Read aloud, asking students to underline the target vocabulary words (bolded) from the reading as they listen and read along.
- Activity 3: After the first reading, the facilitator will say that we are going to engage in a close reading activity to understand this text.
 - Re-read the first paragraph aloud and ask some text based questions:
 - Right there question: Identify the causes that led the panthers to almost extinction
 - Right there question: According to the article why were the panthers in such bad conditions
 - Re-read the second paragraph aloud and ask some text based questions:
 - Based on this paragraph infer the concept of inbreeding:
 - What was the overall purpose of the plan to rescue the panthers?
 - How would you relate genetic variation with the evolving of the species?
 - Re-read the third paragraph aloud and ask some text based questions:
 - Which sentence of the paragraph most clearly explains the definition of genetic variation?
 - How are adaptations and evolution connected?
 - Re-read the fourth paragraph aloud and ask some text based questions:
 - Paraphrase the explanation given about how bringing heterozygote genes improve the health conditions of the Florida panthers
 - Re-read the fifth paragraph aloud and ask some text based questions:
 - How can the diagram help you understand the definitions of a homozygote and heterozygote versions in a gene?
- Activity 4: After the reading, the facilitator will have participants split into groups and give each the Vocabulary Think Chart hand out and the text based questions handout.
 - It is ok to have groups with overlapping questions and vocabulary words as it helps enrich the larger discussion.
 - For this activity, groups should be given a tablet for thesaurus.com

Wrap Up/Assessment

- Hand out a question to each participant and tell them that will be their exit slip: Directions: You have the last minute of this part of the workshop to answer to:
 - How does understanding evolution help us rescue endangered populations?
 - How does knowledge of evolutionary history help us make conservation decisions?

Part 3 - Teacher Workshop-Scientific Argumentation-CER Model

Lesson Content

The focus of this professional development workshop is on training teachers on scientific argumentation utilizing the CER model.

Lesson Materials

- https://www.youtube.com/watch?v=S_xeMUxriMs
- <http://static.nsta.org/files/PB304Xweb.pdf>
- <https://www.youtube.com/watch?v=WQTsue0IKBk>
- <https://www.teachingchannel.org/videos/support-claims-with-evidence-getty>
- Does air have matter? Handout.
- Exit slip.

Question to Answer

Facilitator asks the groups to share their answers and after every group presents their results, participants will be asked how the arguments and explanations are similar or different?

Opening/Background

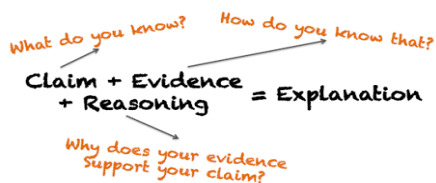
- Participants get into groups and are presented with this question: Does air have matter?
- Participants will be asked to make a claim and support their claim by designing an experiment that will prove their claim one way or another.
- Participants will be given a graphic organizer to present their answers back to the large group.



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Lesson Activity

- Activity 1: Facilitator plays the following 2 minute video about the importance of scientific curiosity:
https://www.youtube.com/watch?v=S_xeMUxriMs
 - Facilitator says that the NGSS give us science practices to engage students with.
 - Two of those practices are:
 - Constructing explanations (for science) and designing solutions (for engineering).
 - Engaging in argument from evidence
 - In scientific argumentation, a scientist will make claims based on observable evidence and this evidence must be connected with the claim.
- Activity 2: Facilitator says: Let's watch this Audi commercial.
 - The above article is from the article Designing Science Inquiry: Claim + Evidence + Reasoning = Explanation to identify the components of an explanation by asking them to identify the claim, the evidence, and the reasoning behind this little girl stating that his dad is an alien.
<https://www.youtube.com/watch?v=WQTsue0IKBk>
 - Facilitator asks:
 - Do you think the girl has enough evidence to prove that his dad is an alien?
 - How does she organize her claim?
- Activity 3: Facilitator will show the CER model from the Power Point to the class to participants.



- Let's watch a 2-minute video of this strategy in action <https://www.teachingchannel.org/videos/support-claims-with-evidence-getty>
- Facilitator will say: how can we integrate this practice into science instruction?
- Activity 4: Facilitator shows one more example from the Power Point that accompanies this lesson.
 - Facilitator will split participants into groups and have them engage in the science practices 6 and 7 by using the CER model.

Wrap Up/Assessment

Exit slip: What do you think will be the most challenging aspect about incorporation argumentation into your classes?

Lesson Part 4: Closing Reading Analysis

Lesson Content

The focus of this lesson plan is to further build students' analytical skills in reading scientific texts, specifically on how to do a close reading analysis of a science text "Cheating Cheetahs Prosper" and its relevance for developing new reading and writing skills relative to the content.

Student Focus

Each group will present their answers and words. Students will have to have answers written down on their notebook to exit the classroom.

Opening/Background

- The facilitator will begin the class by activating prior knowledge showing a picture of a cheetah from the PowerPoint and will ask students if they know this animal and what they know about it.
- Participants should then turn into groups and brainstorm about it.
- After a brief discussion the teacher will play a 3 minute YouTube video about cheetahs to further engage students on the topic. <https://www.youtube.com/watch?v=V8vejVgIHg>
- The facilitator will now mention to students that in addition to all the amazing characteristics these big cats have they display a very interesting mating behavior that will be discovered by reading the article Cheating Cheetahs Prosper.
- Briefly describe materials that will be utilized in workshop. The materials needed for this teacher workshop are listed below. The use of each material is explained in the Lesson Activity section.
 - Participants will need copies of the first part of the article Cheating Cheetahs Prosper.
 - Text-Based questions to be answered in groups after reading the article.
 - Vocabulary index cards packages.



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Lesson Activities

- Activity 1: Participants will engage in a close reading analysis of a science text “Cheating Cheetahs Prosper” found at http://evolution.berkeley.edu/evolibrary/news/070701_cheetah
 - Copies of the article are distributed to each student
 - Before the reading, ask participants to define the word population (organisms of the same group or species, which live in a particular geographical area, and have the capability of interbreeding)
 - Have participants scan the document and ask how this text is organized.
- Activity 2: Read the Title aloud: “Cheating Cheetahs Prosper.”
 - During the reading, project the text from the Power Point and read aloud, asking students to underline the target vocabulary words (bolded) from the reading as they listen and read along.
 - Ask the following questions:
 - What can we predict from the title?
 - What do you know about mating behaviors in animals?
 - Do you know of examples of animals that always stay with same mate?
 - Never stay with the same mate?
- Activity 3: After the first reading, the facilitator will say that we are going to engage in a close reading activity to understand this text.
 - Re-read the first and the second paragraph aloud and ask some text based questions:
 - Identify the mating behavior of the female cheetahs
 - What evidence did the scientist use to prove this behavior?
 - Re-read the third paragraph aloud and ask some text based questions:
 - Based on this paragraph define the concept of genetic variation.
 - Re-read the fourth paragraph aloud and ask some text based questions:
 - How would you relate genetic variation, natural selection and population?
 - Re-read the fifth paragraph aloud and ask some text based questions:
 - What sentence best define the term bottleneck?
 - What the bottleneck effect on the cheetah population? Cite exactly from the text
 - Re-read the 6th paragraph aloud and ask some text based questions:
 - Find exactly where in the paragraph you can find evidence that proves that the trait of mating with multiple males has evolved in cheetahs through generations.
 - Re-read paragraphs seventh and eighth and ask some based-texted questions:
 - Paraphrase the explanation given about how this particular female mating behavior in cheetahs is perhaps and adaptation.
- Activity 4: After the reading, have participants split into groups and give each the Vocabulary Sort Cards (Left column contains correct definition) and hand out and text based questions handout.
 - It is ok to have groups with overlapping questions and vocabulary words as it helps enrich the larger discussion.
 - For this activity, groups should be given a tablet for thesaurus.com

Wrap Up/Assessment

- Hand out a question to each participant and tell them that will be their exit slip: Directions: You have the last minutes of the class to answer to this question:
 - How does understanding evolution help us rescue endangered populations?
 - How does knowledge of evolutionary history help us make conservation decisions?

Project/Homework

- Using the internet, investigate at home what other populations have gone through bottleneck.
- Be sure to bring at least one example to class and explain what cause the population to through this.



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