

Standard I **Element C**

LEVEL 4 AND LEVEL 5 PRACTICES

The impact of successful implementation of the professional practices referenced in Element C will be students who apply skills and knowledge learned to engage in developing a explanations and multiple representations of complex concepts, who utilize questioning to self-direct their learning, and who synthesize concepts within and across disciplines.

STUDENTS:

9 ***Develop a variety of explanations and multiple representations of concepts.***

“Students’ Learning Strategies With Multiple Representations: Explanations of the Human Breathing Mechanism”

<https://onlinelibrary.wiley.com/doi/abs/10.1002/sce.21128>

“Abstract

As part of a long-term research study to enhance science learning, this paper reports on an exploratory study aimed at identifying initial beliefs and practices of a group of teachers and students (Years 4–6) in Australia when the students engaged with multiple representations of the same science concepts.”

<https://www.tandfonline.com/doi/abs/10.1080/09500690600718294?src=recsys&journalCode=tsed20>

10 ***Apply skills and knowledge learned in the classroom to engage in more complex tasks.***

“4. To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned.”

“7. To become self-directed learners, students must learn to monitor and adjust their approaches to learning.”

<https://www.cmu.edu/teaching/principles/learning.html>

“A Handbook for the Art and Science of Teaching”

Robert J. Marzano and John L. Brown

<https://www.youtube.com/watch?v=Twp5wlpNQeU>

11 ***Generate questions that lead to further inquiry and self-directed learning.***

There’s a video that demonstrates a student asking questions that lead to further inquiry under “Gallery”

<https://www.ssla.ca/student-generated-questions.html>

http://houstonisdpsd.org/site_content/17-effective-practice-pages/243-student-generated-questions

12 ***Synthesize concepts to create original thinking within and across disciplines.***

“Problem posing is a higher-order, active-learning task that is important for students to develop. This article describes a series of interdisciplinary learning activities designed to help students strengthen their problem-posing skills, which requires that students become more responsible for their learning and that

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faculty move to a facilitator role. Developing students' problem posing skills and allowing them to grapple with course content can lead to deeper levels of understanding and improved critical thinking. In turn, students are more likely to be able to move their newfound knowledge beyond the classroom."

https://blackboard.oberlin.edu/bbcswebdav/pid-99666-dt-content-rid-193429_1/orgs/OC-CTIE/Nardone-Lee_Critical%20Inquiry_CT-59-1.pdf

"Nursing students must learn higher-order thinking skills of analysis and synthesis to manage complex data for decision making in healthcare."

<http://journals.sagepub.com/doi/abs/10.1177/0193945915621720>

"What exactly is "thinking" and what are the 8 foundational thinking skills that cut across all disciplines."

https://www.nesacenter.org/uploaded/conferences/FTI/2016/handouts/Mark_Church/D_MakingThinkingVisible_Summary_TheMainIdea.pdf

Classroom Examples

Kindergarten science: Students are working on Colorado Academic Standard 2: Life Science, Grade Level Expectation 1—To live and grow, animals obtain food they need from plants or other animals, and plants need water and light.

Students are learning how scientists make observations using the five senses and scientific tools, such as a magnifying glass. In previous lessons, the teacher taught students about each of the five senses and provided activities for them to learn about various objects using their senses. They have learned about the special tools scientists use and had opportunities to observe objects using them. The teacher now connects this learning to a study of plants. (*Scaffolds questions, concepts, and skills based on a sequence of learning.*) Students are told they are going on a "field trip" around their school to collect leaves and look at different plants. (*Implements: Content based instructional strategies that best align to the learning objective.*) As scientists do, they will use their senses to make observations. As the students observe various plants, the teacher asks the following questions to guide their observations and discoveries: (*Implements: Questioning techniques to support disciplinary inquiry.*)

- In what part of the yard did we find this plant?
- What do you notice about this plant that reminds you of another plant?
- How would you describe the plant (short/ tall, color, feel, smell)?
- What can we learn about the plants in our yard from our observations?
- What do you think the plant needs in order to grow?

When students return to the classroom, the teacher provides magnifying glasses and plants like the ones from the schoolyard for students to continue their observations using the senses of touch, sight, and smell. (*Uses instructional materials that are accurate and appropriate for the lesson being taught.*) She continues to question students to lead them to discover that plants can have different types of leaves, sizes, colors, textures, and smells. Students make observations and draw a picture of the plant that includes as many details as they can. (*Implements: Questioning techniques to support disciplinary inquiry.*) The teacher shows her drawing and explains to students how she is being careful to draw the many details she noticed.

During the day's writing block, the teacher reminds students that it is important for scientists to communicate their findings with others. Acting as scientists, they write words to use in a simple sentence about their drawing of the plant. As she writes her sentence, the teacher explains that it tells something she learned about the plant and that the words they choose for their sentences should tell what they know or learned about the plant when they were observing and drawing it. She also shows students that her sentence uses a capital letter, has spaces between the words, and ends with a period. (*Implements: Content based instructional strategies that best align to the learning objective.*) The lesson concludes with students sharing their drawing, words, and sentence with a peer.

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Elementary reading, writing, and communicating: Students are working on Colorado Academic Standard 2: Reading for All Purposes, Grade Level Expectation 1 –Comprehension and fluency matter when reading literary texts in a fluent way.

Fourth-grade students are comparing and contrasting the adventures and experiences of characters in stories. Prior to this lesson, the teacher and students created charts of characters’ adventures and experiences as they read different texts. The teacher begins the lesson by having students preview the definitions of adventure, compare, and contrast. She models the expectations for student work and shares her thought process for how she compared and contrasted two characters’ adventures. *(Scaffolds questions, concepts, and skills based on a sequence of learning.)* She also refers to the previously created charts and demonstrates how to transfer the information to a Venn diagram. She charts the questions she asked herself as a support for students. *(Uses instructional materials that are accurate and appropriate for the lesson being taught. Implements: Multiple models and delivery methods to explain concepts accurately. Encourages and provides opportunities for students to make connections to prior learning.)* She tells students they will use their Venn diagrams in the next day’s lesson to analyze how the characters’ adventures had an impact on the ending of each story.

Middle school dance: Students are working on Colorado Academic Standards 2, 3, and 4.

Standard 2: Create, Compose, and Choreograph, Grade Level Expectations 1 and 2--Correlation between choreographic intent and choreographic product; Create abstract movement using imagery

Standard 3: Historical and Cultural Context, Grade Level Expectation 2-- Observe and participate in a variety of dance forms from around the world

Standard 4: Reflect, Connect, and Respond, Grade Level Expectation 1--Communicate choreography through written, oral, and practical applications

Eighth-grade students are learning about structure and form in dance compositions, and the teacher asks them to choreograph a well-structured short dance work. He draws upon students’ working knowledge of structure and form in short poems with specific structures, such as a traditional Japanese Haiku by facilitating a workshop in which students select a Haiku and deconstruct its elements (5 syllables/7syllables/5 syllables). *(Encourages and provides opportunities for students to make connections to prior learning.)* Then, students watch dance videos and performances that emulate poetic intent. Students also research and discuss the various dance forms and choreographic techniques, as the teacher guides them in making concrete connections between the forms they find within poetry and the organization of a dance work (e.g., experimenting with a 5-step sequence, 7-step sequence, 5-step sequence to mirror the Haiku syllabic form). *(Implements: Multiple models and delivery methods to explain concepts accurately.)*

He next provides students with floor diagrams to use in researching common choreographic forms, such as ABA, Narrative, or Variation on a Theme. *(Uses instructional materials that are accurate and appropriate for the lesson being taught.)* Using improvisation, discussion, and reflection, students determine the most effective dance patterns to complement their Haiku’s form. Throughout the lesson, the teacher explicitly models proper technique, vocabulary, and artistry within dance sequences for students to follow and commit to memory. *(Implements: Content-based instructional strategies that best align to the learning objective.)* Once he determines students’ level of mastery of learned dance sequences, the teacher guides them in using their learning to create a final dance performance that symbolizes the meaning and intent of their selected Haiku.

Planning/Coaching Questions

- How did you scaffold questions, concepts, and skills to support student learning of the content?
- How will you select accurate and appropriate instructional strategies and materials for each lesson?
- How will you plan for and implement review of previously learned concepts or skills in my lessons?

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- How will you ensure the instruction and student activities align to the learning objective(s) and criteria for student mastery?
- How will you provide multiple models and delivery methods to explain concepts accurately?
- What are the likely student misconceptions that will arise during this lesson? How can I address those misconceptions during instruction?
- How will I engage ensure tasks are challenging and provide opportunities for students to ask questions and construct new meaning?
- How will I utilize questioning techniques to engage students in disciplinary inquiry?

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