# SCIENCE
# Adolescence to Young Adulthood

## Component 2:

Differentiation in Instruction

## Component 3:

Teaching Practice and Learning Environment

## Component 4:

Effective and Reflective Practitioner

Contributors:
Stacey Harris
Jeremy Mohn

## Component 2: Differentiation in Instruction

a. **Knowledge of Students (KOS)**

- ❖ Did you give a detailed description of your class that was focused on information that would be most applicable to your learning goals and instructional activities?
- ❖ Did you describe the relevant characteristics of any students with exceptional needs and abilities that may have influenced your planning for this instruction?
- ❖ Did you tie your knowledge of teaching science to specific knowledge about this group of students as you anticipated potential challenges and stumbling blocks?

**b. Goals/Connections (G/C)**

- ❖ Did you clearly identify the major idea in science that you chose as the focus of your instruction? Is it truly a "major" idea that strengthens an understanding of the unifying themes/crosscutting concepts of science?
- ❖ Did you identify the overarching standards and scientific practices (i.e., NGSS, state science standards) that set the expectations for what your students should know and be able to do? Did you specifically connect your learning goals to these overarching standards?
- ❖ Did you outline the goals for student learning in connection to the major scientific idea(s)?
- ❖ Did you explain how your learning goals were relevant for the students you have described at this time? Were these learning goals appropriate and attainable by the students?
- ❖ Did you clearly demonstrate that the learning goals were measurable and observable?
- ❖ Did you connect the learning goals to students' interests, prior knowledge, needs, and abilities?
- ❖ Did you explain why you chose your instructional activities and how they aligned to the goals?
- ❖ Did you clearly explain how the instructional activities were sequenced and organized to build on students' interests, prior knowledge, and developing understandings?
- ❖ Did you describe the entire sequence of instructional activities in addition to the three featured activities?

**c. Instruction (INS)**

- ❖ Did you explain how your instructional activities are sequenced and organized to develop student understanding of the major scientific idea(s)?
- ❖ Did you explain how your instructional activities are based on student interest, backgrounds, experiences, and prior knowledge?
- ❖ Did you discuss how you facilitated in-depth, fair, and equitable learning for your students?
- ❖ Did you identify inherent challenges in teaching the selected major scientific idea(s) **and** explain how you designed your instruction to meet these challenges?

- ❖ Did you describe how the instructional activities promoted scientific thinking and reasoning?
- ❖ Did the explain how the instructional activities provided you with insight into students' conceptual understanding?
- ❖ Did you discuss specific examples of instructional resources you selected to support your teaching and extend student learning?
- ❖ Did you describe how the use of relevant technologies contributed to student learning about the major scientific idea(s)?

**d. Students' Conceptual Understanding (CU)**

- ❖ Did you show how the three featured instructional activities worked together to further students' understanding of the major scientific idea(s)? Was there a strong and meaningful connection between the featured activities?
- ❖ Did you explain how the featured instructional activities facilitated understanding of the major scientific idea(s) and encouraged students to explore them within a broader scientific context?
- ❖ Did you show how each instructional activity furthered the students' understanding of the major scientific idea(s) in relation the learning goals?
- ❖ Did you demonstrate how each of the featured instructional activities yielded rich evidence of students' scientific thinking and reasoning?
- ❖ Did you clearly describe how the featured instructional activities allowed students to overtly demonstrate their developing conceptual understanding?
- ❖ Did you demonstrate a strong intentional connection between the instructional activities, the learning goals, and the selected major scientific idea(s)?

**e. Assessment/Feedback (ASFB)**

- ❖ Did you demonstrate an integrated approach to assessment (including multiple assessment strategies) that furthered the learning goals and enhanced your instruction?
- ❖ Did you provide sufficient rationale for the assessments, including the culminating assessment, in terms of the instructional context and learning goals for these students?
- ❖ Did you explain how your assessments addressed the inherent challenges in teaching the selected major scientific idea(s)?
- ❖ Did you identify each of the featured students' strengths and weaknesses, gaps in prior knowledge, and misconceptions from his/her work? Did you explain how this impacted their ability to grasp the major scientific idea(s)?
- ❖ Did you describe the salient characteristics of each of the three pieces of work for each student and what the work tells you about the students' growth in understanding and/or their continued challenges or misunderstandings?
- ❖ Was the feedback for each of the featured students specific to that student and only that student? Is the feedback detailed enough to help them further their personal understanding of the material?

- ❖ Did you explain how your feedback encouraged and developed your students' scientific thinking, reasoning, and communication?
- ❖ Did you show how your specific feedback or further instruction guided the featured students to a deeper understanding of the major scientific idea(s)?

**f. Connections (Conn)**

- ❖ Is it clear how you provided students with a context for the science featured in the instructional sequence? What connections did you make to the students' backgrounds, experiences, interests, and/or other disciplines and areas of study?
- ❖ Did you select activities that drew on students' own backgrounds and experiences and/or involved them in issues relevant to their local community?
- ❖ Did you make clear and overt connections between the major scientific idea(s), instructional activities, student analysis, feedback, and next steps?

**g. Pedagogy/Content Knowledge (PCK)**

- ❖ Throughout your commentary, is your language (explanations, vocabulary, terminology, etc.) scientifically accurate and course appropriate? In other words, how did you demonstrate a strong command of the science content?
- ❖ Did you clearly establish the selected major scientific idea(s) and learning goals as central to science and justify them as appropriate for both your students and your specific teaching context?
- ❖ How did you demonstrate your ability to utilize appropriate science pedagogy in your instructional sequencing, your decision-making, and your analysis of student performance?

**h. Reflection (R)**

- ❖ In relation to the instructional sequence, did you discuss what worked **and** what did not work in advancing student understanding of the selected major idea? (Cite specific examples.)
- ❖ Did you analyze your teaching practice for the strengths and weaknesses revealed through your chosen instructional sequence?
- ❖ Did you discuss what you could do better or differently and why? Did you cite evidence from student responses to support your statements?
- ❖ Did you discuss what went well and what you want to repeat and why? Did you cite evidence from student responses?
- ❖ Did you clearly explain specific modifications to your future teaching because of this experience?
- ❖ Did you analyze the usefulness and appropriateness of your culminating assessment? How effective was the culminating assessment in illustrating student understanding of the major idea?

## Component 3: Teaching Practice and Learning Environment

**a. Knowledge of Students (KOS)**

- Aside from the Information asked for in the guiding questions, what else do you know about these students as learners (e.g., learning styles, interests, individual personalities, cliques/groups, etc.)?
- Did you provide some individual examples of different learning needs for some of your students?

**b. Goals/Connections (G/C)**

- Did you have specific goals for the videos and did your activities align with the goals?
- Did you explain how students' prior knowledge affected the goals you set?
- Did you articulate clear and logical sequencing for your instructional goals?
- Did you explain the link between prior knowledge and the activity in the video?
- Did you explain why the goals were appropriate for these specific students at this time?
- Did you articulate how your instructional approach and resources specifically support student learning of these goals?
- Did you clearly link the learning goals of the lesson with the students' long-term learning goals?
- Did you clearly justify why this lesson Is being taught as a whole-class lesson, small-group lesson or other instructional format? (The contents of the two videos combined must represent different instructional formats **and** different teaching strategies.)

**c. Instruction (INS)**

- Did you provide evidence that you support students in the development of building ideas, helping one another, and articulating discoveries?
- Did you demonstrate how you facilitate instruction so that it was student driven? Did they take responsibility for their learning?
- Did you demonstrate how you get students back on track if they are not understanding?
- Did you demonstrate how you extend the lesson if the students are understanding?
- Did you demonstrate how you equip students with skills that support collaboration?
- Did you make any modifications in response to student needs? Did you explain how you knew to make these modifications and describe their impact?

**d. Learning Environment (LE)**

- Did you explain the steps you took to establish a safe and equitable environment?
- What evidence shows that students are willing/able to communicate different viewpoints without repercussions?

- ❖ Is the learning environment conducive to scientific reasoning and discourse?
- ❖ Did you connect your instructional format to the needs of your students, the content, and the learning goals? Did you clearly explain the connections?

**e. Engagement (ENG)**

- ❖ Does the video show that the students appreciate, or are learning to appreciate, diverse opinions?
- ❖ Did you cite specific examples of significant student-student interaction?
- ❖ Does the video should show both teacher-student and student-student interaction?
- ❖ Did you cite examples of how student discourse relates to the topic even when you are not with them (such as how one group continues working when you leave to work with another group)?

**f. Assessment (ASMT)**

- ❖ Did you identify specific instances in each video where student learning was monitored and evaluated?
- ❖ Did you identify specific instances in each video where you made instructional adjustments (if any) and tell why you made them?
- ❖ Did you identify specific instances in each video where you provided constructive feedback? (Remember that feedback is not always verbal.)
- ❖ Did you show how your content knowledge allowed you to correct and re-direct misconceptions during the lessons seen on the video?

**g. Analysis (ANA)**

- ❖ Did you cite specific examples from the video that show students meeting the goal(s) and explain how they show this?
- ❖ Did you cite specific examples from the video that show students' needs for the future and explain how they show this?
- ❖ Did you explain how did your planning and actions during the lesson enhanced student attainment of the goal(s)?

**h. Reflection (R)**

- ❖ Did you describe how your past experience impacted your actions before and during the lesson?
- ❖ Did you explain and provide clear evidence to support your actions before, during, and after the lesson?
- ❖ Did you discuss what went well and what you want to repeat and why (citing evidence from the video)?
- ❖ Did you discuss specific next steps and why you chose them?

- Did you discuss what you could do better or differently and why (citing evidence from the video)?
- Did you answer to what extent you achieved your goals (citing evidence from the video)?
- Did you tell how you would modify your teaching as a result of this activity and why? Is there anything you would seek out to improve your practice (collaboration with a colleague, observation of a colleague, training on a strategy, etc.)?

# Component 4: Effective and Reflective Practitioner

***Do the forms and collect the evidence before beginning work on the written commentary.***

**a. Contextual Information**

- Have you identified the type of school/program and grade/subject configuration in which you teach?
- Did you include the number of students and courses you teach?
- Did you include information necessary to understand your portfolio entry (information about space, staff, access to technology, etc.)?

**b. Knowledge of Students (KOS)**

- Have you collected statistical, anecdotal, and empirical evidence?
- Did you talk to previous teachers, school counselors, special education staff, ESOL staff, and other professionals?
- Did you survey parents to find out about technology available at home (e.g., internet access, laptops, cell phones), study habits, social concerns, etc.?
- Did you survey students to find out about the same things as you would with parent surveys as well as learning styles, interests, participation in activities, etc.?
- Did you get all you can from permanent records and administrative sources; e.g., attendance records, previous grades, standardized test scores, pertinent medical records?
- Did you include information that you collected at the beginning of the year as well as later in the year? (The assessor needs to know that you could adjust your teaching based on the knowledge you have about the class at any time during the year including the first week.)

**b. Use of KOS (USE)**

- Did you use the information collected to describe the entire class?
- Did you cite specific details from the attached evidence in your description in the answer to question 2 on the Group Information and Profile Form?
- Did you analyze and synthesize the information to discern patterns from the information you attached?
- Did you note those students who are outliers from the general pattern of the class for each trait you used in the whole class description?
- Did you analyze all the information to determine what was useful in describing the class?
- Did you not only rank the information from most to least important but also tell how you

made that determination?

**c. Goals and Connections (G/C)**

- ❖ Did you tie the assessments to the goals and to the needs of this class of students at this point in time?
- ❖ Did you use these sentence stems for the last question on the Instructional Context Form: "The formative assessment ties to the goals because…"; "The formative assessment ties to the class' strengths/needs because…"; "The summative assessment ties to the goals because…"; "The summative assessment ties to the class' strengths/needs because…"?
- ❖ Do the strengths or needs you used in the sentence stems clearly show up in your description of the class in question 2 on the Group Information and Profile Form?
- ❖ Does your summative assessment cover all your goals, either directly or indirectly?

**d. Assessments (ASMT)**

- ❖ Did you tell in the commentary how you used the description of the class in planning for the **types** of assessment you would use; e.g., visual, hands-on, written auditory, etc.?
- ❖ Will the assessments give you measurable data that can be reported in some way, usually in a spreadsheet?
- ❖ If you used a rubric, is it tied directly to the goals and will it measure each goal separately?
- ❖ Did you tell how you guaranteed that the assessment **results** are fair, consistent, and accurate?

**e. Analysis and Use of Data (AUD)**

- ❖ Did you cite specific details from the results of the assessments when you presented your analysis in the commentary?
- ❖ Did you describe patterns of learning regarding the goals and note outliers when you discussed the results of the assessments?
- ❖ Did you tell how you altered instruction because of the formative assessment results?
- ❖ Did you tell how the summative assessment results impacted/will impact instruction of future units?
- ❖ Did you tie the alterations/future plans to the results, goals, and class description?

**f. Feedback (FB)**

- ❖ Can you describe clearly how the results of the assessments provide feedback to the students in a form they can use to improve their learning? For example, does the rubric have an individual criterion focusing on each part of the goal; does the rubric have clear descriptors so the student knows precisely what must be done to move to the next level; how does a student know why one multiple choice answer is better than another?

**g. Student Self-Assessment (SSA)**

- Is the self-assessment example developmentally appropriate; i.e., kindergarteners probably just state how they think they are doing while seniors also give rationale for the decision and pinpoint perceived weaknesses/strengths?
- Did you clearly state how this helped drive your instruction and planning for the unit from that point forward?

**h. Professional Learning Need (PLN)**

- Does your professional need highlight something that was **learned** by you or your colleagues or both you and your colleagues?
- Did you answer these questions with question 1 on the Description of Professional Learning Need Form: "What was the need"; "How did you know it was a need"; and "What did you do to meet the need"?
- Did your answer to question 2 on the Description of Professional Learning Need Form tell how the evidence you attached ties to the action you took to meet the need, thus proving that you took the action you said you did?
- Does the commentary clearly answer the question "What was the impact of my action on student learning?"
- Did you cite examples from the attached evidence when answering the previous question?

**i. Student Need (SN)**

- Does the student need highlight something that was **needed** but out of the ordinary?
- Was the need school-wide or class specific or even student specific? Did you state this in the commentary?
- Did you answer these questions with question 1 on the Description of a Student Need Form: "What was the need"; "How did you know it was a need"; and "What did you do to meet the need"?
- Did the action you took require collaboration, leadership, and/or advocacy on your part? (While the directions and the guiding questions often use just the word "collaboration," any of these is appropriate for this section.)
- Do you know what true collaboration entails?
- Did your answer to question 2 on the Description of a Student Need Form tell how the evidence you attached ties to the action you took to meet the need, thus proving that you took the action you said you did?
- Does the commentary clearly answer the question "What was the impact of my action on student learning?"
- Did you cite examples from the attached evidence when answering the previous

question?

**j. Reflection (R)**

- ❖ Did you tell how effective your efforts at gathering information for knowledge of students was for this class?
- ❖ Did you discuss what you could have done better or differently or more efficiently? Did you discuss what other types of information you might have gathered?
- ❖ Did you discuss the effectiveness of your assessments in measuring your students' performance and what you learned about effective assessment during the unit?
- ❖ Did you discuss what you could have done better or differently or more efficiently in terms of the assessments (including self-assessments)?
- ❖ Did you discuss the impact on both your professional learning and work to meet student needs? (Even though the commentary has only one question in the reflection section about this, you want to discuss both aspects.)
- ❖ Did you discuss specific future plans relating to the above parts?
- ❖ Did you answer the question of why for each of the above questions in this section?