

Planning for Effective Science Instruction

Component II of the Science Classroom Observation Protocol: Science Content is Intellectually Engaging

Name: Deb Donovan

Curriculum Title: STC – Catastrophic Events

Grade Level: 7

Target Lesson: Lesson 15 – Plate Tectonics

CTS Study Guide: Plate Tectonics AND Earthquakes and Volcanoes

Page: 182 AND 177

Element A: Science content is significant, accurate, and worthwhile

Indicators:

- Science content is explicit and apparent to students.
- Science content is primarily focused on big ideas supported by relevant concepts, facts, and terms.
- Science content is within the bounds of an agreed upon body of knowledge.
- Science content is accurate.
- Science content is developmentally appropriate and scaffolded appropriately.
- Science is portrayed as a dynamic body of knowledge that changes based on the best available evidence.

Drawing upon the indicators for this element of effective instruction (left-hand column) and what you learned from Section III of your CTS Summary, **identify a specific point in the lesson** where you can make the science content “**explicit and apparent to students.**”

The last activity of the lesson involves reading an essay about the theory of plate tectonics and how plate tectonics has caused the Earth's continents to move over time. My CTS indicates that students may have trouble with this concept if they do not understand how slow rates of movement interact with long periods of time to produce measurable change. This part of the lesson could be more explicit in terms of the science content.

Based upon your experiences in the Content Immersion, **brainstorm strategies** you could use to make the science content “**explicit and apparent to students.**”

- Practice calculating amount of change using small rates of movement and long periods of time.
- Whiteboard ideas about the how the continents have moved over time and share ideas in group discussion.

Planning for Effective Science Instruction

Element B: Science content builds on students' prior ideas or experiences.

- Indicators:
- Students reveal their preconceptions about the science content, the underlying related concepts, or the nature of science.
 - Students reveal their underlying thinking and reasoning and the source of their preconceptions.
 - Students recognize links between their preconceptions or previously learned science concepts and the activities or experiences in the science lesson.

Drawing upon the indicators for this element of effective instruction (left-hand column) and what you learned from Section IV of your CTS Summary, **identify a specific point in the lesson** where you can create an opportunity for students to **“reveal their preconceptions about the science content.”**

At the beginning of lesson 15, students could be prompted to reveal their preconceptions about how the surface of the Earth has changed over time. My CTS revealed that some students believe the Earth has always looked as it does now.

Based upon your experiences in the Content Immersion, **brainstorm strategies** you could use to allow students to **“reveal their preconceptions about the science content.”**

- Use a probe with a picture of Earth as it currently looks and two other pictures (one as it currently looks and one as it looked 200 million years ago). The probe should include a question or statement prompting students to choose the picture they think most closely represents the Earth 200 million years ago and to explain why they chose that representation. (This is the basis of the final reading of the lesson).
- Whiteboard responses to the prompt above.
- Questioning students about a plate boundary map (from curriculum).
- Notebook entries about plate movement.

Element C: Science content is intentionally connected to the classroom activities and experiences.

- Indicators:
- Student actions and interactions focus on understanding important and relevant science content.
 - Students generate and explore questions about the science in the lesson.
 - Students can articulate the intended science content of a lesson, activity, or experience.

Drawing upon the indicators for this element of effective instruction (left-hand column) and what you learned from Section II and IV of your CTS Summary, **identify a specific point in the lesson** where you can create an opportunity for students to **“articulate the intended science content within the lesson, activity, or experience.”**

At the end of lesson 15, students could be prompted to summarize the reading into an explanation of how plate tectonics has changed the surface of the Earth over millions of years.

Based upon your experiences in the Content Immersion, **brainstorm strategies** you could use to allow students to **“articulate the intended science content within the lesson, activity, or experience.”**

- White-boarding and class discussion.
- Answering directed questions relating plate tectonics to the surface of the Earth.
- Use calculations to explain how plate tectonics could account for the difference in the Earth's surface between 200 million years ago and the present.