Question, Claim, Evidence, and Explanation (QC2E)

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Time Frame 50-60 minutes

Essential Question(s)

How does QC2E support higher-order thinking?

Summary

In this session, participants will reinforce their understanding of authentic teaching and learning using the instructional strategy QC2E (question, claim, evidence, and explanation). They also will work in content areas to create meaningful questions related to their disciplines.

Learning Goals

- Participants will connect authentic teaching and learning principles with the QC2E instructional strategy.
- Participants will identify how the QC2E strategy can be a useful tool to support argumentation and the use of text-based evidence.

Attachments

- Authentic Learning and Teaching—QC2E.pdf
- Chain Notes—QC2E.docx
- Chain Notes—QC2E.pdf
- ELA Strategy—QC2E.docx
- ELA Strategy—QC2E.pdf
- Instructional Strategy Note Sheet—QC2E.docx
- Instructional Strategy Note Sheet—QC2E.pdf
- Math Strategy—QC2E.docx
- Math Strategy—QC2E.pdf
- Presentation Slides—QC2E.pptx
- Science Strategy—QC2E.docx
- Science Strategy—QC2E.pdf
- Social Studies Strategy—QC2E.docx
- Social Studies Strategy—QC2E.pdf
- Template—QC2E.docx
- Template—QC2E.pdf
- Verbal Prompts—QC2E.docx
- Verbal Prompts—QC2E.pdf

Materials

- QC2E Presentation Slides (attached)
- Chain Notes handout (attached)
- Instructional Strategy Note Sheet (attached)
- QC2E Template (attached)
- QC2E Science Strategy (attached)
- QC2E ELA Strategy (attached)
- QC2E Math Strategy (attached)
- QC2E Social Studies Strategy (attached)
- QC2E Verbal Prompts (attached)
- Authentic Learning and Teaching handout (attached)
- Pens or pencils
- Highlighters
- Sticky notes
- Plastic spoons
- Scratch paper

Engage

Presenter's Note: Preparation

Before beginning the session, have all handouts and materials available on a table for participants (aside from the content-area–specific handouts). All participants should receive Authentic Learning and Teaching, the Chain Notes handout, the Instructional Strategy Note Sheet, and the QC2E Template.

Introduce yourself and welcome participants to the session using the attached **Presentation Slides**.

Display **slides 1–4**, briefly discussing the essential question. Inform participants that the Chain Notes strategy can be a form of engagement, formative assessment, or an exit ticket. Ask participants to get in groups of four to begin. Make sure each participant has a copy of the attached **Chain Notes** handout and ask: *Why is argumentation important to college and career readiness?*

Give participants a few minutes to write their answers to that question individually on the handout.

Presenter's Note: Chain Notes

The Chain Notes strategy is meant to engage participants and stimulate their prior knowledge. It allows participants to dig deeper with their thoughts in each round and move beyond their initial thoughts and beliefs.

After participants have completed their responses, ask them to pass their papers to the right. Participants will read the statement on the paper, and then they must write an additional statement.

The new statement cannot be a repeat of what was previously written. The new statement should build on or extend the previous thoughts or ideas; participants can agree or disagree with one another's comments, but only after reading the statement(s) already on the paper.

Participants will continue to rotate the papers around the table until everyone receives their original paper.

Once the activity is finished, go to **slide 5**. Allow participants a brief moment to share out any comments or statements they agreed or disagreed with from their groups.

Sample Responses

- "Argumentation is important for college and career readiness because students need to think critically about problems and research, and defend their stances on situations that arise in the real world."
- "Students who continue their education to work on a master's or doctorate will have to establish their stances and argue their positions."
- "Argumentation is not necessary for careers because employees will not need to defend their beliefs to their coworkers."

Inform participants that several new instructional strategies will be introduced to them throughout the session. These strategies are tools used to support and guide higher-order thinking in an authentic way. Make sure each participant has a copy of the attached **Instructional Strategy Note Sheet**, and encourage participants to use it to jot down their ideas for personalizing a strategy they plan to use as an instructional tool in their classrooms. Once all the new strategies are modeled, the session will allow time for participants to reflect on how to use the strategies.

Go to **slide 6** to briefly highlight the session objectives. This will provide a roadmap of where you will go together during the session and will let participants know what to expect.

Explore

Display **slide 7** and divide your participants into small groups. In the interest of time, you may have each group represent one content area for the following activity.

Introduce the chart on the slide and inform participants they will be adapting it for each content area. Make sure they understand that, no matter the content area, each group will make a claim about the question or problem, provide evidence for the claim, and provide reasoning (explanation) that links the evidence to the claim.

Presenter's Note: Definitions

- **Claim***:* An assertion or conclusion that answers the original question or problem.
- **Evidence***:* Scientific data that supports the student's claim that must be appropriate and sufficient (can come from investigation, observations, text, or existing data).
- **Explanation***:* Justification that links the claim and evidence. Show why the data counts as evidence to support the claim using appropriate scientific principles.

Briefly walk through the four provided activities from which participants must choose.

Presenter's Note: Content Area Activity Slides

Use **slides 8–13** to present the four activities to the group. Quickly introduce the four different subjects. Groups will each be given one of these four activities so that all four content areas are covered.

Social Studies: Participants will read FDR's "Four Freedoms" speech using Why-Lighting as a reading strategy to identify key parts of the speech. They will use the question, "Which of the four freedoms are most important to support in other countries?" to make a claim. They will use evidence from the text and prior knowledge to support their claim. Lastly, they will write an explanation linking the claim and evidence together.

Presenter's Note: Why-Lighting

In this strategy, participants highlight sentences or passages in readings that seem important to them and their understanding. In the margins, they write a brief statement or notes as to WHY they highlighted that passage.

Alternative Questions for Social Studies

- "What does FDR's 'Four Freedoms' speech reveal about the variety of different attitudes, priorities, and political philosophies encompassed by the word 'freedom'?"
- "Does his speech obligate the United States to defend the rights he names in other countries?"

ELA: Participants will read an excerpt from "Four Skinny Trees" by Sandra Cisneros using Why-Lighting as a reading strategy to identify key components of the excerpt. They will use the question, "What do the trees represent?" to make a claim. They will use evidence from the text and prior knowledge to support their claim. Lastly, they will write an explanation linking the claim and evidence together.

Science: Participants will analyze the chart displaying four liquids. They will use the question, "Are any of the liquids in the data set the same substance?" to make a claim. They will use evidence from the data set and knowledge about mass, density, melting point, and color to support their claim. Lastly, they will write a scientific explanation linking the claim and evidence together.

Mathematics: Participants will analyze the chart and graph provided to make a claim for the question, "Can you model the height of a projectile flung from a catapult over time with a function in the form y = mx + b?" They will use evidence from the chart, graph, and activity to support their claim. Lastly, they will write an explanation linking the claim and evidence together.

Presenter's Note: Hands-on Activity

Math groups can use a plastic spoon and a small, wadded-up piece of paper to create a catapult and visually see the movement in action.

Explain

Once groups have had time to write their claims, find supporting evidence, and write an explanation linking the claim and evidence, provide a few minutes for a group representative to share out explanations.

Sample Responses: Social Studies

- **Claim**: The most important freedom to support in other countries is the freedom from want.
- **Evidence**: In the speech, FDR addresses multiple things that stem from the desires and emotions of others: "will secure to every nation a healthy peacetime life for its inhabitants," "the moral order," "a good society is perpetual, peaceful..."
- **Explanation**: The most important freedom to support in other countries is the freedom from want because a peaceful society is going to promote a healthy environment for its people. The moral order will be positive and will create a life of not needing or wanting. They will have an understanding of others' needs and will be willing to help support one another when a need or desire arises.

Sample Responses: ELA

- **Claim**: The narrator learns about strength from the trees.
- **Evidence**: Toward the end, the text says, "They teach," referring to how the trees teach the narrator. There is another line that says the trees grow "despite concrete." Also, the narrator can hear their secrets and "their strength is their secret."
- **Explanation**: The narrator notices the trees' quiet strength, and she learns how to be strong from them. Even though the trees have little soil, they push through the hard concrete. Given these observations and the textual evidence above, it is clear that the line "They teach" toward the end refers to the trees' lesson on how to be strong and resilient.

Sample Responses: Science

- **Claim**: Liquids one and four are the same substance.
- **Evidence**: Liquid one has a density of .93 g/cm3 and a melting point of -98 degrees Celsius with no color. Liquid four has a density of .93 g/cm3 and a melting point of -98 degrees Celsius with no color.
- **Explanation**: Both liquids have the same density, melting point, and color. They do have a different amount of mass, but that could be due to the quantity of the substance being observed. Liquids one and two have the same mass and color, but given that the density and melting points are different, they cannot be the same substance. Liquid three is not like any of the other substances because it has no similarities to any of the other three substances when looking at mass, density, melting point, and color.

Sample Responses: Mathematics

- **Claim**: This data cannot be modeled using a function in the form of y = mx + b.
- **Evidence**: The chart, graph, and hands-on activity are all evidence that we cannot use y = mx + b.
- **Explanation**: First, we imagined what the data might look like and decided the path of a projectile does not look like a straight line. Then we collected our own data using a rubber-band catapult that we made to model this relationship and graphed it. You can see in the graph that this data should be modeled with a quadratic function of the form y = ax2 + bx + c. The quadratic equation used to model this data is y = (-1/2)x2 + 2x + 5.

Optional Slide

If you would like to show participants an example of the completed strategy for math, unhide **slide 14**. You can do so by right-clicking on the slide in the left-hand navigation panel and deselecting "Hide Slide" in the dropdown menu.

Extend

After the group has shared a few of their explanations, display **slide 15**. Make sure each participant has a copy of the attached **Authentic Learning and Teaching** rubric.

As a group, examine the QC2E strategy using the rubric. Questions to stimulate conversation include the following:

- How does QC2E support higher-order thinking?
- How does this strategy connect to authenticity?
- Did you notice any components of authenticity?
- Where in the lesson did you see the connections?
- What were the strengths and weaknesses of authenticity in this session?

Bring the discussion to a close after a few minutes.

Go to **slide 16**. Make sure each participant has a blank copy of the attached **QC2E Template**, and have them discuss how they would use QC2E in the classroom with other participants in their same content area.

Evaluate

Display **slide 17**. Have participants individually use the 3-2-1 strategy to wrap up the session. Participants will write three things they learned from this session, two questions they still have about the QC2E strategy, and one way they can use it in their classroom.

Presenter's Note: 3-2-1

3-2-1 is a great closing strategy. It can be used as an exit ticket and an evaluation tool.

Remind participants to fill out the Instructional Strategies Note Sheet. This will be a great reference tool for planning lessons once they are back in the classroom.

At the end of the session (and if time allows), participants may share out one of their two questions. This provides an opportunity for you, as the presenter, to clear up any misunderstandings or misconceptions about QC2E. It also provides an opportunity for participants to reflect on their learning.

Follow-up Activities

Research Rationale

The Question, Claim, Evidence, and Explanation strategy provides the support needed to reach the higher-order thinking processes that students often struggle with. Students are allowed to make their claim using new and prior knowledge. They then find actual text-based evidence that supports their claim and, therefore, creates a solid argument in the explanation and reasoning.

“In a study of scaffolding scientific explanations conducted by Katherine L. McNeill, David J. Lizotte, and Joseph Krajcik (University of Michigan) and Ronald W. Marx (University of Arizona), the following trends were synthesized: 1) Explanations are rarely a part of classroom practice (Kuhn, 1993; Newton, Driver & Osborne, 1999); 2) Students have difficulty using appropriate evidence (Sandoval & Reiser, 1997) and including the backing for why they chose the evidence (Bell, 2000; Linn, 2000) in their written explanations; 3) Students typically discount data if it contradicts their current theory (Chinn & Brewer, 2001); and 4) During classroom discourse, discussions tend to be dominated by claims with little backing to support their claims (Jimenez-Aleixandre, Rodriguez & Duschl, 2000, as cited in BSCS Center for Professional Development, 2008, p. 16).

Resources

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