Supporting Students in Science
Thinking and Writing

Workshop #2: Learning Tasks & Teaching Strategies

Kate McNeill & Mandy Knight
Boston College

Agenda

- Activity - Discuss Learning Task
- Discussion - Lessons Learned & Questions
- Presentation - Videos of Teaching Strategies
- Activity - Integrate teaching strategy into future lesson

Snack/Break

- Discussion - Share Teaching Strategies
- Presentation - Video of Classroom Talk
- Activity - Analyze Classroom Talk
- Logistics and Wrap-up

Activity: Discuss Learning Task

- Work in Grade Level groups from the previous workshop
- Share samples of student writing
- Discuss the writing and the lesson:
  - How did you introduce CER?
  - What went well during the lesson?
  - What challenges arose?
  - What were the strengths and weaknesses of your students' writing?
  - What did you learn that you hope to address or apply in your next CER lesson?

Discussion: Lessons Learned and Questions

- What did you learn that you hope to address or apply in your next CER lesson?
  - Challenges? Successes?
- What did you learn from your discussion with your colleagues?
- What remaining questions do you have?

Teaching Strategies

1. Discuss the framework
2. Connect to everyday examples
3. Provide a rationale
4. Connect to other content areas
5. Model and critique examples
6. Provide students with feedback
7. Have students engage in peer critique
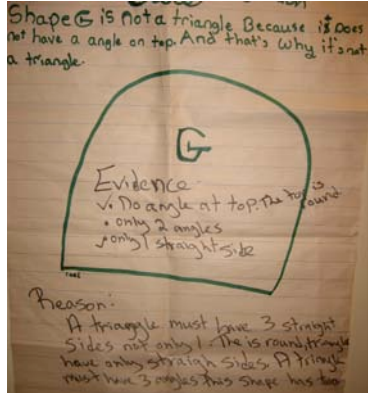
Discuss the Framework

Discuss the Framework

Provide a Rationale

Provide a Rationale

Connect to Other Content Areas

Connect to Other Content Areas

Connect to Other Content Areas

Shape G is not a triangle Because is Does not have a angle on top. And that's why it's not a triangle.

Evidence
• No angle at top. The top is
• only 2 angles
• only 1 straight side

Reason:
A triangle must have 3 straight sides not only 1. The is round. triangle have only straigh sides. A triangle must have 3 angles this shape has too

Model and Critique Examples

Model and Critique Examples

Provide Students with Feedback

Providing Students With Feedback

Have Students Engage in Peer Critique

Have Students Engage in Peer Critique

Teaching Strategies

1. Discuss the framework
2. Connect to everyday examples
3. Provide a rationale
4. Connect to other content areas
5. Model and critique examples
6. Provide students with feedback
7. Have students engage in peer critique

Activity: Integrate Teaching Strategy

- Work in Grade Level groups
- Select a teaching strategy to integrate in a lesson between now and the next workshop.
- On a large post-it, record the following:
  1. Question you will ask students
  2. Example CER - illustrate components (short)
  3. Teaching Strategy

Break!

Share Teaching Strategies

- Read through the examples created by the different groups
- What teaching strategies intrigue you that you might consider using in your classroom?
- Other than time constraints, what do you think will be challenging about integrating the teaching strategies into your classroom?

Classroom Talk

- Science is a way of knowing - writing, talking, doing, thinking and reasoning (Michaels et al, 2008).
- Scientific inquiry requires students to play an active role and engage in science talk (Duschl et al., 2006)
- Traditionally science classrooms have been dominated by teacher talk and in an IRE pattern (Crawford, 2005).
  - I = Initiate (Teacher)
  - R = Respond (Student)
  - E = Evaluate (Teacher)
- Creating a classroom culture around CER where it becomes part of the norms of classroom talk supports students in producing stronger science writing (McNeill, 2009).

Classroom Talk - 5th Grade

Question:

How can you design a car to go the fastest?

CLAIM
Circle ONE of the following.

A. My car will go the fastest, because I will make it really strong.
B. The car with the lightest load being pulled by the largest force will go the fastest.
C. How fast a car goes is determined by how far it travels in a certain time.

EVIDENCE
Circle TWO of the following.

A. The car with only one block on the car took 1 second to travel across the table while the car with three blocks took 3 seconds.
B. We always built our cars carefully and they traveled really fast.
C. Car companies, like Ford, try to build light cars because they will travel faster.
D. The car that was pulled by 5 washers took 2 seconds to travel across the table while the car with 1 washer took 7 seconds.
E. Our group had a lot of fun building and testing our cars, except for the one day that our car kept breaking.
F. Our experiments showed that light cars travel faster.

REASONING
Circle ONE of the following.

A. The data from our experiments shows us how to build our car. Since the data shows that fast cars have a light load and fast cars are pulled by a large force then this is how we should build our car.
B. Since car companies and race cars have cars that are really light and have large engines this means we should design our car in the same way. It should have a light load and be pulled by a large force.
C. The speed was determined by how many seconds it took for the car to travel across the table. The car with less blocks had a lighter load and it traveled faster. The car that was pulled by more washers was pulled by a greater force and it traveled faster.

Classroom Talk - 5th Grade

Activity: Analyze Classroom Talk

- Read the two examples of classroom talk
- Which discussion do you think would provide the students with more support to engage in CER writing?
  - Why? What are the characteristics of the discussion that make it different?
- What are some challenges in supporting students in science talk?
- What are some strategies to support students in science talk?

Conclusions

- In the first workshop, we focused on introducing the framework, identifying places in your curriculum where it makes sense to include CER, and designing learning tasks.
- Today, we went the next step to discuss different teaching strategies and ways to include CER in your science talk to make it a part of your classroom culture.

Logistics and Wrap-up

- Before you leave today
  - If you are comfortable, hand in samples of student work

- Before May 9 Workshop
  - Read Chapters 3-4
  - Try another CER Learning Task with your students that incorporates a teaching strategy. Collect samples of student writing.
  - Bring 6 samples of student writing (2 stronger, 2 middle, 2 weaker)

Contact information

- Workshop Webpage
  - http://bpssciencecer.weebly.com
- Kate McNeill's contact information
  - Kmcneill@bc.edu
- Mandy Knight's contact information
  - knightam@bc.edu