



Assessing Student Work Samples

Let's Brainstorm...

Please put your name on a blank sheet of paper and respond to the following question:

How would you assess the MEL diagram and/or explanation task to gauge whether students are learning?

Compare your written responses with a table partner and revise your response based on their feedback and suggestions

Let's discuss...



Well-designed assessment can play a key role in students' science learning



Viewpoints diverge about how to assess three-dimensional learning

Teacher 1

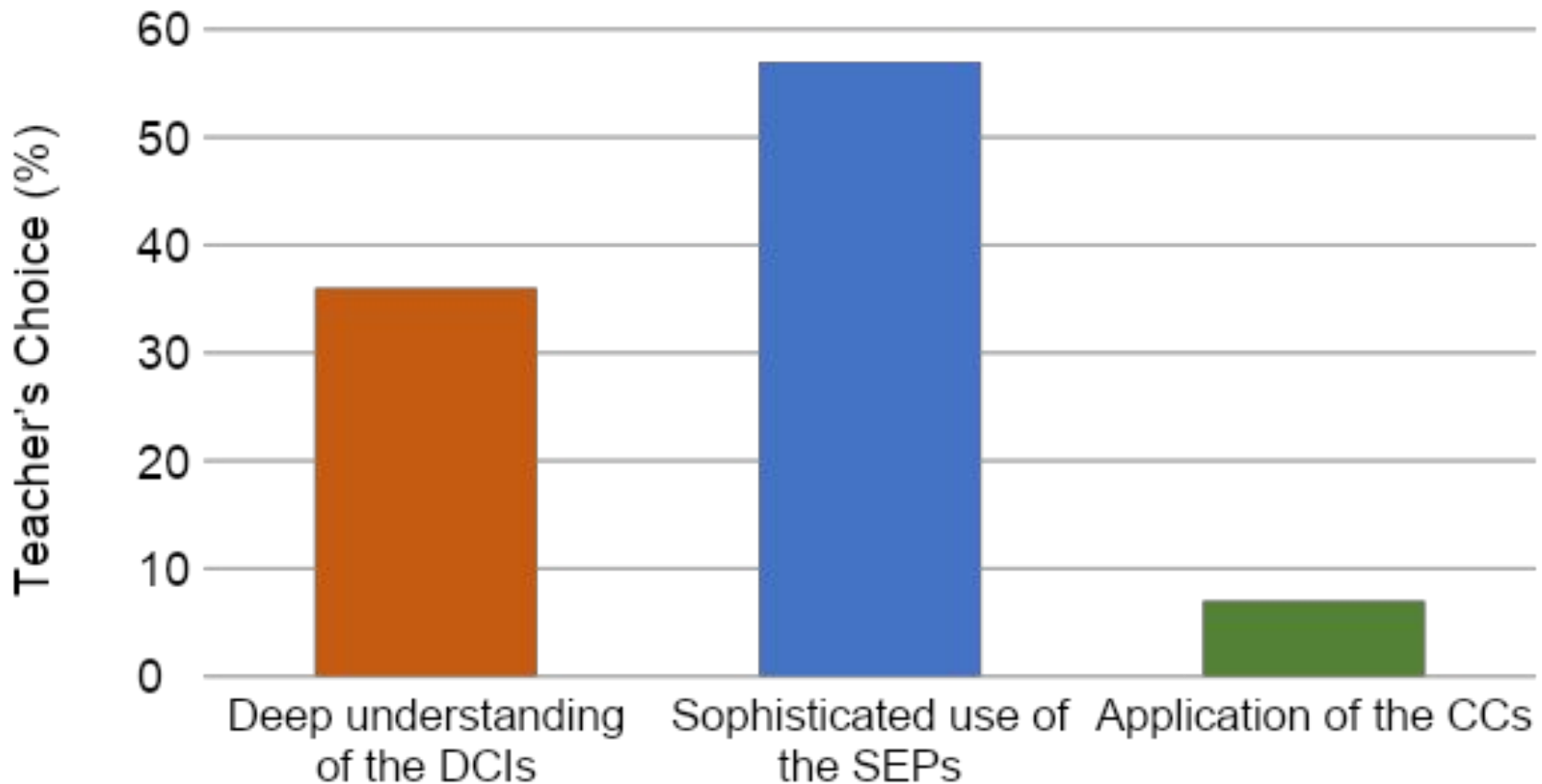
Assessments should cover all 3 dimensions, but *the most important aspect of student learning is their understanding of the DCIs* because they are ideas needed to explain the world around them.

Teacher 2

Assessments should cover all 3 dimensions, but *the most important aspect of student learning is their understanding and ability to use the SEPs* because they are the ways students can explain the world around them.

Which viewpoint is closer to yours? Why?

Recent research shows that most science teachers have the perspective that SEPs are the most important aspect



Badrinarayan et al. (2019)

We recommend only assessing the explanation task (not the diagram) and only in a formative assessment mode

Evidence # 1 strongly supports | supports | contradicts | has nothing to do with Model A because:

It not only contradicts Model B, but this evidence provides direct answers or evidence to back up "sustain the biosphere" and in the benefits listed, "global cycle's support is critical to human welfare"

The MELs grant students agency to take responsibility for their own learning

A MEL activity is one lesson in a unit of instruction to fully develop students' understanding of a few standards

The MEL2 Team has developed a working draft rubric that focuses on four SEPs (scientific & engineering practices)

MEL Explanation Task Rubric

Science & Engineering Practice	Mastery	Approaching	Developing
<i>Engaging in Argument from Evidence</i>	<ul style="list-style-type: none"> The student's written explanation accurately and precisely identifies the strength or weakness of the evidence to model link. These strengths and weaknesses are based on integrating how well the evidence supports or contradicts a particular model and compares how the evidence might support or contradict the other models. Reasoning shows clear justification from the detailed data in the evidence texts. 	<ul style="list-style-type: none"> The student's written explanation accurately identifies the strength or weakness of the evidence to model link, but the student's analysis may not be precise and integrated. In particular, integration of the how well the evidence supports or contradicts a particular model and comparison to other models is missing. There is little or no justification from the detailed data in the evidence texts and the explanation relies primarily on the evidence statement. 	<ul style="list-style-type: none"> The student's written explanation has some inaccurate information in identifying the strength or weakness of the evidence to model link. There is little or no integration and justification for how the evidence supports or contradicts a particular model or the justification between the evidence and the model is incorrectly applied.
<i>Analyzing and Interpreting Data</i>	<ul style="list-style-type: none"> Clearly uses data from the evidence texts to identify patterns that 	<ul style="list-style-type: none"> Does not clearly use data from the evidence texts to support the 	<ul style="list-style-type: none"> There is limited or no use of data from the evidence texts to support

This is an analytical rubric, gauging:

1. Levels of performance
2. Criteria (i.e., the SEPs)
3. Detailed descriptors

Please take a look at the rubric...

What do you notice?

Would you use all four SEPs when assessing student work?

Would you use only one SEP? Or some other combination?



What Does it Look Like?

Developing

- *"Ev. #1 is stating that a lot of increases in temp. are being"*
- *"Fracking fluids and wastewater can be the cause of normal tectonic"*
- *"Show increase and decrease since Industrial Revolution."*

Statements are incomplete, erroneous, don't make sense, unrelated or wrong.

Approaching (-)

- *"Talks about how human activity affects Earth"*
- *"E3 has nothing to do with MA because it doesn't talk about fracking at all and just totally goes to natural causes."*
- *"they talk about two different things."*

Statements are correct but superficial, restate the obvious but no elaboration.

What Does it Look Like?

Approaching (+)

- *"The evidence talks about how the sun's energy is decreasing, but model B is stating how the Sun's energy is increasing"*
- *"In Model A its talking about fracking causing earthquakes and evidence #1 said that fracking causes stress on the crust."*
- *"Because the climate is currently changing due to the sun and the energy released"*

Statements provide correlation between model and evidence, provide additional elaboration

Mastery

- *"Most earthquakes occurs near a fracking site which may tell us that fracking causes earthquakes." "E3 has nothing to do with MA because it doesn't talk about fracking at all and just totally goes to natural causes."*
- *"If the increase in greenhouse gases which keep Earth's energy from escaping to space is caused by humans then it is human's responsibility the climate increase."*

Statements elaborate on relationship between model and evidence with clear or implied, cause-and-effect relationship

Norms for looking at student work

Please...

1. Be in the spirit of dialogue
2. Try to focus on what the students' actually write (i.e., what you observe)
3. Try not to focus on what you might infer from the students' writing
4. Try not to focus on what you think the students should know or be able to do
5. Be aware of your biases

Classroom Rules

**Be ready to
dream big**
**be kind to
everyone**
raise your hand
**say please
and
thank you**
do your best
use your imagination
**listen to
your teacher**

Let's score some...

Please locate the student samples of the wetlands MEL diagram and explanation task in your packets

With a partner, please use the rubric to score Question #3 of the explanation task on all the samples

You may use 1, 2, 3, or all rows of the rubric to score

Let's discuss...

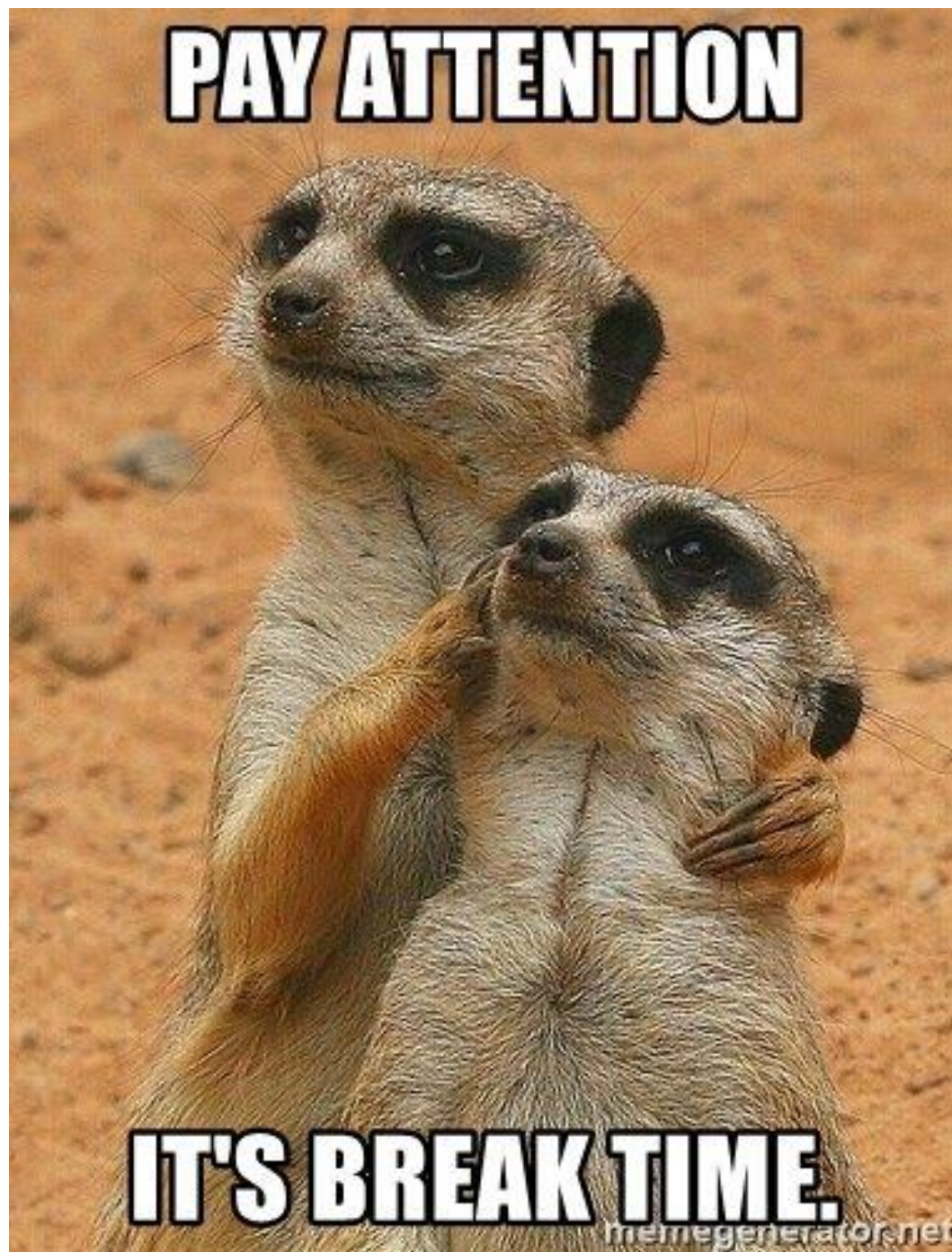


This working draft rubric has strengths and limitations

Which rows [SEPs] of the rubric were easier to use? Which [SEPs] rows were more challenging to use? Why?

What other things did you notice? What other thoughts about assessment do you have?

PAY ATTENTION



IT'S BREAK TIME.

memegenerator.net

ACKNOWLEDGEMENTS



The material in this Webinar is based upon work supported by the NSF under Grant No. DRL-1316057 and Grant No. DRL-1721041. Any opinions, findings, conclusions, or recommendations expressed are those of the authors and do not necessarily reflect the NSF's views.

