Welcome to this webinar covering engagement and re-engagement strategies supporting the Common Core standards for mathematical practices.

The targets for this webinar are:

- Defining student engagement and disengagement
- and Reflections on engagement strategies within three math practice standards (MP1, MP3, MP4)

Please have readily available the handouts that accompany this webinar, which are titled "reflection tool“, "collegial discussions”, and “collaborative learning guide”.

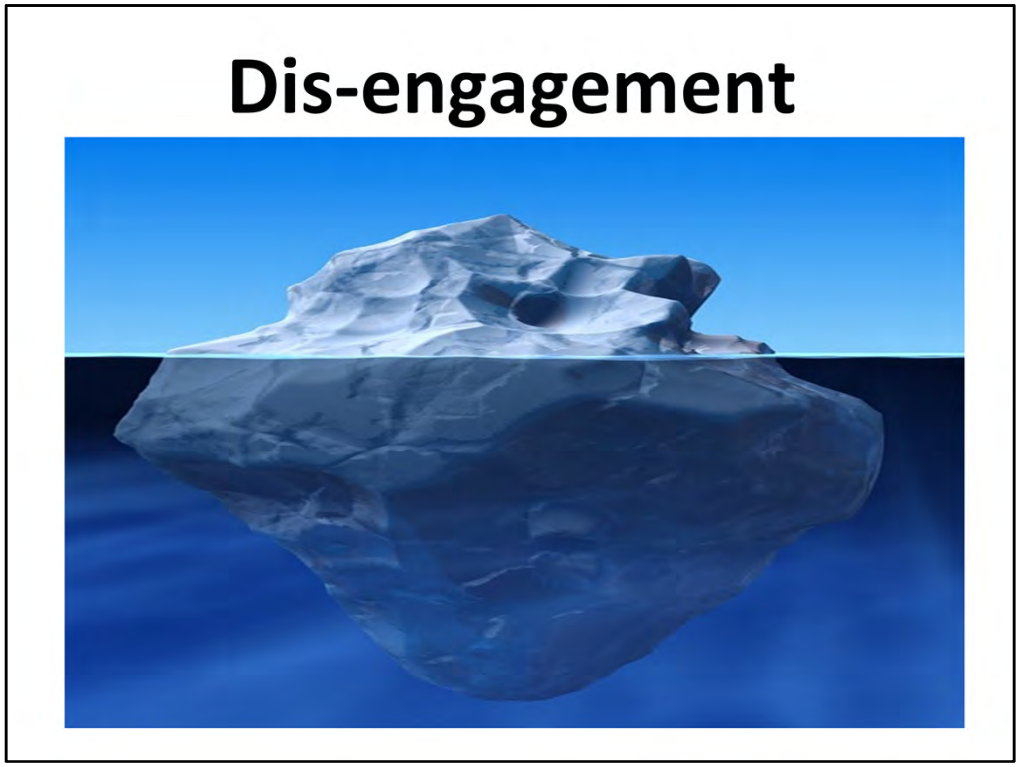
Notice the yellow starburst. The moments when these appear throughout this webinar are called step outs, which highlight specific engagement strategies. This starburst illustrates the importance of identifying targets for lessons. Identifying targets is a precept to the lesson objective.

Engagement

A "working" definition for student ENGAGEMENT encompasses one's sense of connectedness to school, level of participation, use of meta-cognitive strategies and intrinsic interest in learning.

Observable engagement behaviors include: taking notes diligently, asking questions, having deep discussions with peers, following directions, even presenting or experimenting in class.

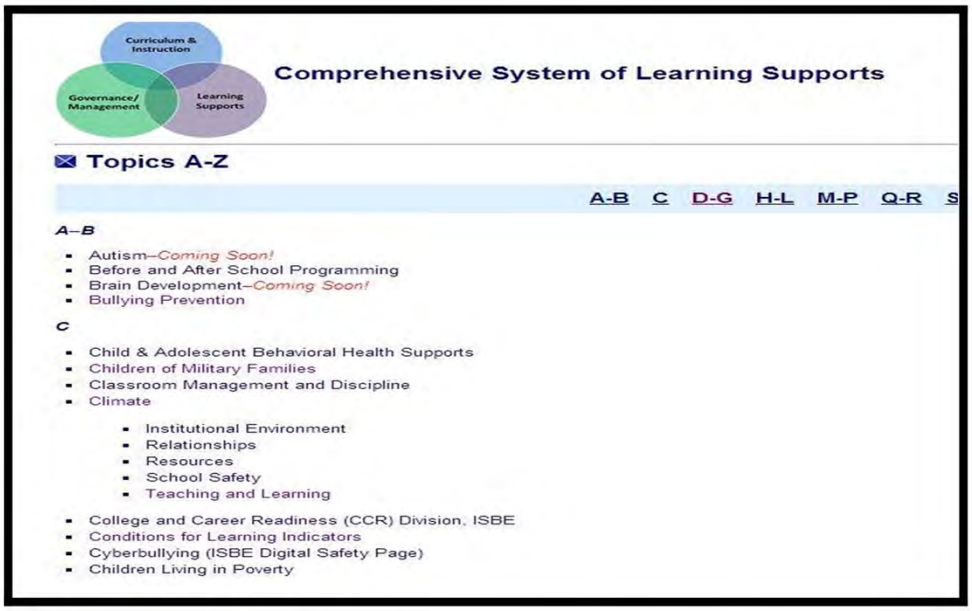
An attitude of engagement might include factors related to student motivation, values of learning, individual interest, and belief in self success.



The causes of disengagement are many times invisible and, like the hidden mass of an iceberg, can be life interrupting when not identified or responded to with early intervention.

Disengagement might be identifiable through observations of student misbehavior, distractedness, peer withdrawal or low academic performance.

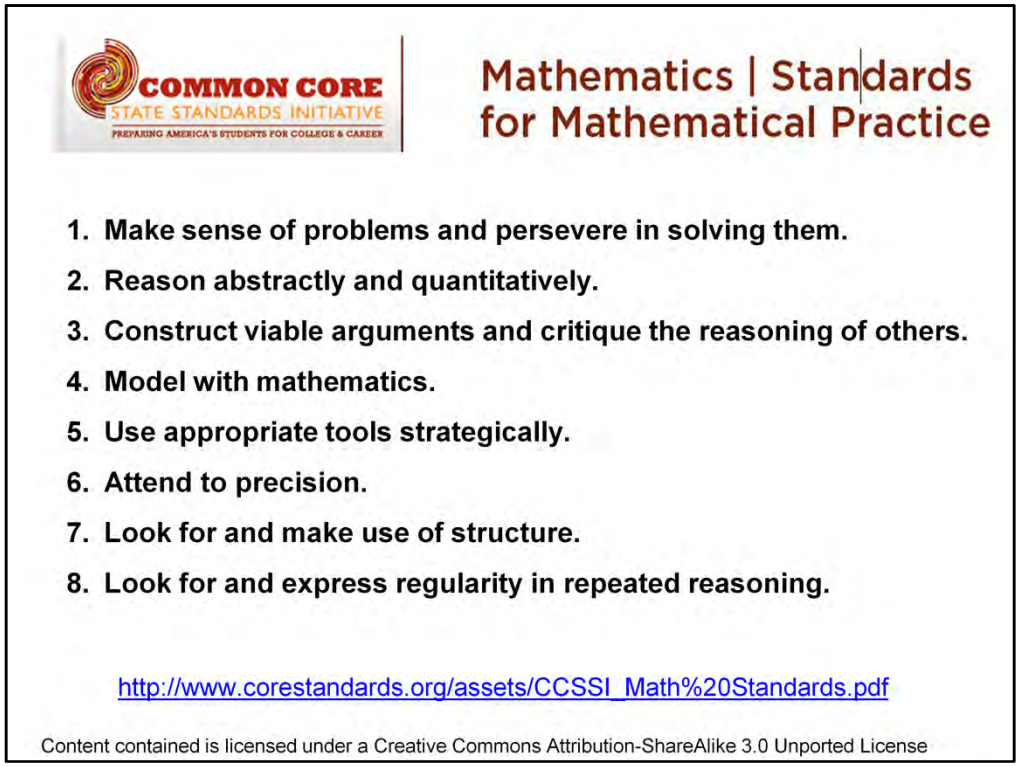
Longitudinal studies indicate that students who are disengaged are at a greater risk of school conduct behaviors, academic probation, or dropping out of school. (Wise Ways for Conditions for Learning Indicators: Retrieved from: http://www.isbe.net/learningsupports/html/conditions.htm)



http://www.isbe.net/learningsupports

Even though teachers are creative and supportive in observing and managing behavior, the multifaceted influencers such as trauma, bullying, hunger, substance abuse, or unidentified learning disabilities are not always within their scope of influence. However, educator and school building awareness of local barriers can be a pre-correction for re-engaging students. However, most importantly, is the infusion of daily engagement strategies throughout all lesson planning and delivery.

Detailed information on addressing barriers to learning is available at www.isbe.net/learningsupports



Engagement strategies are embedded in the language within the mathematical practice standards. These practice standards guide the development of mathematical proficiency for all students.

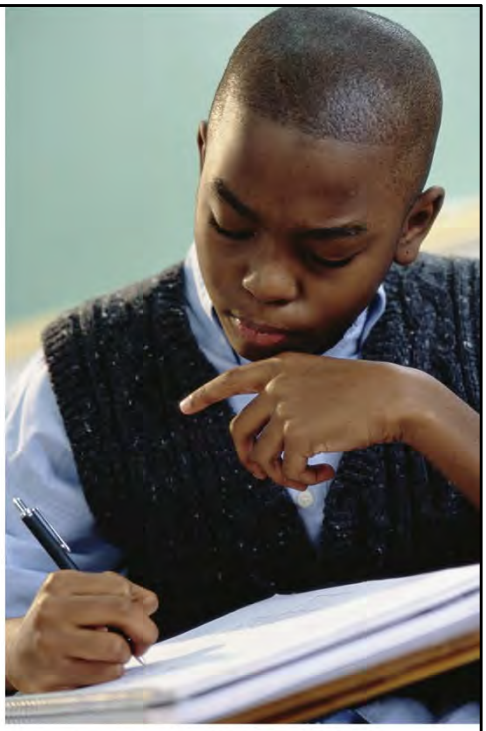
Please take a moment to reflect on some of the actual language of the mathematical practice standards (pause).

Some notable language -- analyze, conjecture, compare, explain, and draw conclusions --- are all supported by student engagement strategies. In order to delve deeper into the engagement strategies, this webinar will reflect upon three of the eight mathematical practice standards.

Step out: This worddle is offered as a visual cue of the language associated with engagement. Teachers may consider previewing and/or reviewing new language with students new concepts are introduced.

Math Practice Standard 1

Make sense of problems and persevere in solving them.

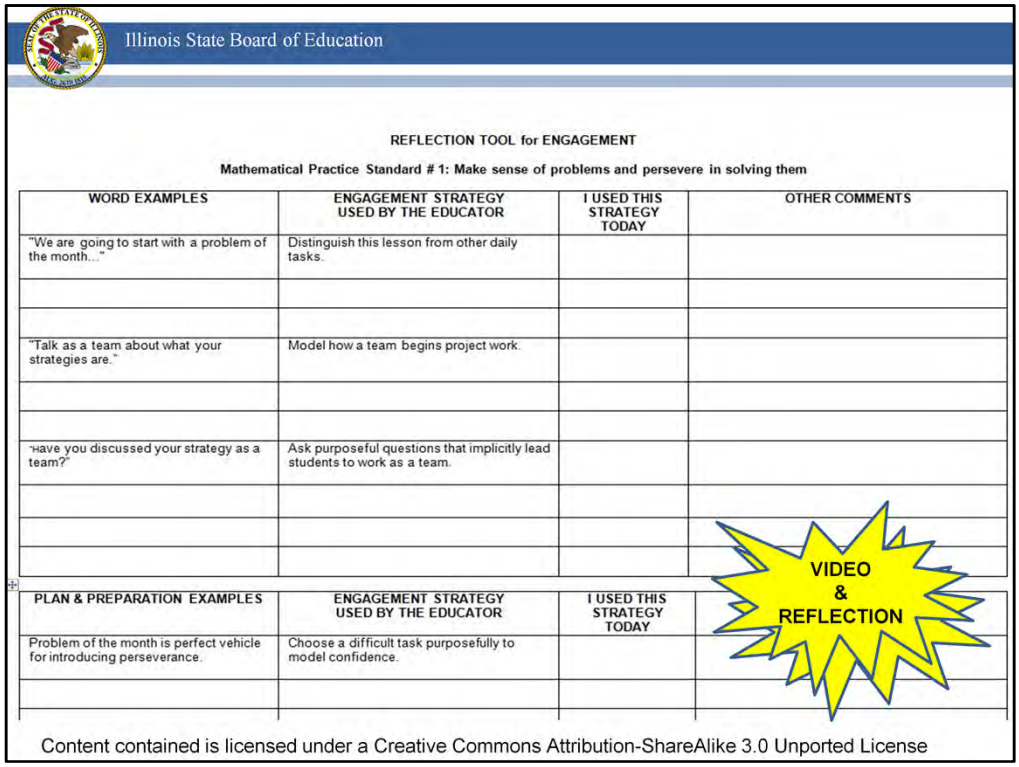


The first standard for mathematical practice states that mathematically proficient students will be able to make sense of problems and persevere in solving them.

Teachers can support student perseverance by helping them set learning goals and persist in the face of challenge and possible failure.

Researchers, Elliot & McGregor, reported in 2001 that a student's learning goals can be further understood by considering a student's
approach to task completion as immediate performance OR as part of life-term learning;

additionally, their self-efficacy on task completion may be from a successful mindset or failure avoidance.



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REFLECTION TOOL for ENGAGEMENT

Mathematical Practice Standard # 1: Make sense of problems and persevere in solving them

WORD EXAMPLES	ENGAGEMENT STRATEGY USED BY THE EDUCATOR	I USED THIS STRATEGY TODAY	OTHER COMMENTS
"We are going to start with a problem of the month..."	Distinguish this lesson from other daily tasks.		
"Talk as a team about what your strategies are."	Model how a team begins project work.		
"Have you discussed your strategy as a team?"	Ask purposeful questions that implicitly lead students to work as a team.		

PLAN & PREPARATION EXAMPLES	ENGAGEMENT STRATEGY USED BY THE EDUCATOR	I USED THIS STRATEGY TODAY	
Problem of the month is perfect vehicle for introducing perseverance.	Choose a difficult task purposefully to model confidence.		

VIDEO & REFLECTION

The teacher in the following video illustrates this research by pre-planning for support during student struggles and how she shared the learning goals. Please observe what the teacher does to encourage all students to forge ahead, regardless of task difficulty.

Please locate the handout titled "reflection tool" for mathematical practice standard #1, add personal reflective notes during the video.

Step out: This webinar uses multi-media for participant engagement. Visual, Audio, and Kinesthetic options are referenced to allow for varied participant learning styles.

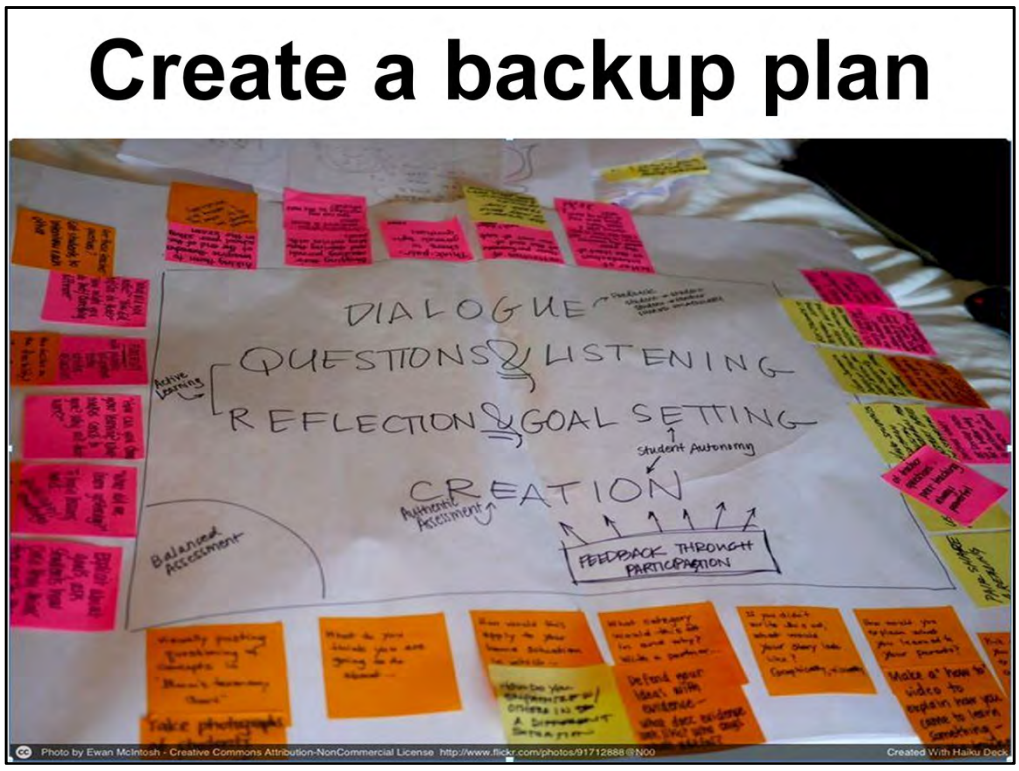
problem of the month: https://www.teachingchannel.org/videos/math-practice-standard-perseverance?fd=1

0-3:40

Compare personal reflections to the following highlighted engagement strategies that support development of making sense of problems and perseverance skills (pause).

Consider first the teacher's inferred pre-planning that might have included:
- acknowledgement of probable student struggles
- purposeful selection of engagement strategies to support continued effort in spite of difficulty

Specific strategies in this video clip include: Utilizing team processing to support individual confidence, modeling discussion within teams, consideration of failure through creating back-up plans, and shared personal experiences as a life-long learner.



Both the observable and inferred teacher engagement choices are supported in her Socratic questions and statements of support, such as:

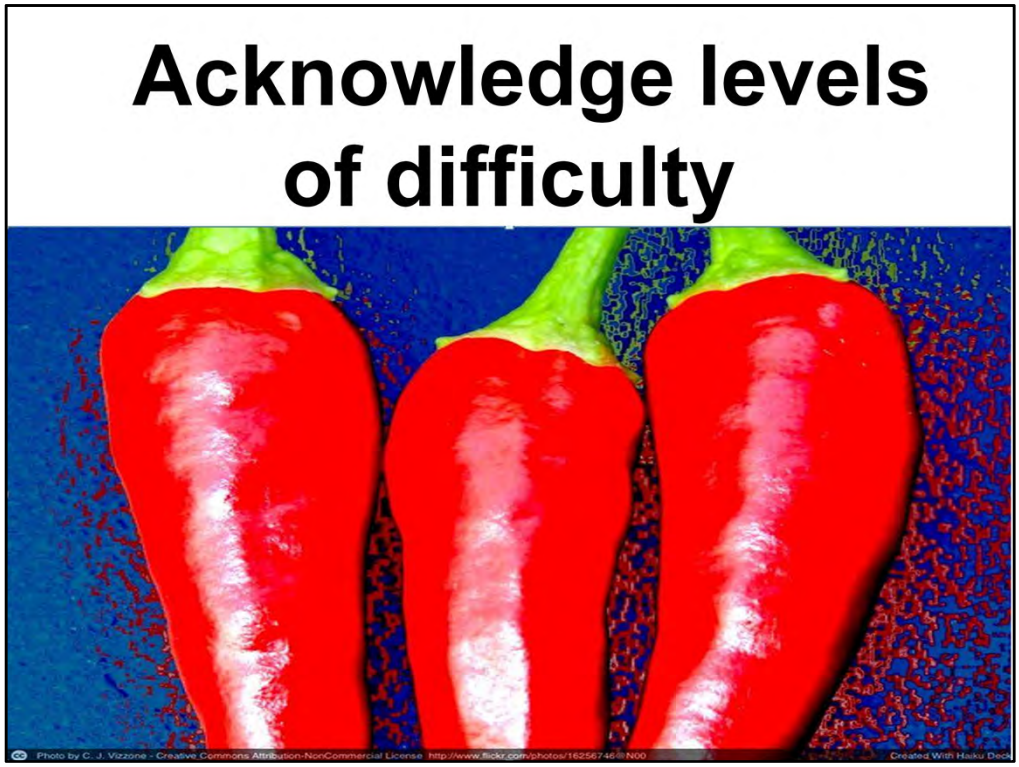
"When I work with a team, it's a really good idea to discuss what strategies we are going to use."

and "Does anyone have a backup plan",

OR "Well, what do you want to do if your first plan doesn't work."

Additionally, this teacher plans and implements learning environmental changes as a visual cue to introduce and reinforce major mindshift work.

She also includes discussion time and language review of those changes to orient her students to the upcoming unknown and challenging experiences.



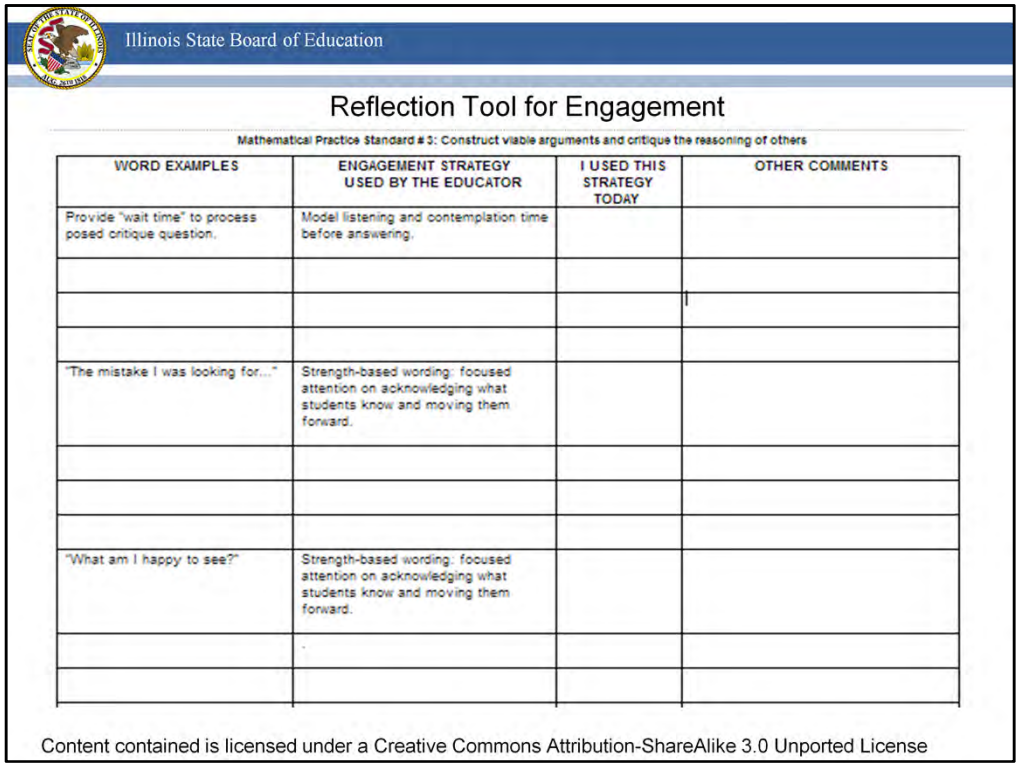
Finally, to support development of perseverance skills, our model teacher connects the student's feelings during upcoming challenges to a current real life shared experience. By relating the conflicting but desirable tolerance of spicy food to the levels of difficulty and payoff of delving deeper, this teacher gives a positive outlook to when students will recognize that they are struggling.

These are just a few engagement strategies, please refer to the complete reflection handout.

Math Practice Standard 3

Construct viable arguments and critique the reasoning of others.

Mathematical practice standard three provides some key opportunities to keep students actively engaged in the learning process through constructing viable arguments and critiquing the reasoning of others. Students are more likely to voluntarily verbalize within a cohesive classroom.



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Reflection Tool for Engagement

Mathematical Practice Standard # 3: Construct viable arguments and critique the reasoning of others

WORD EXAMPLES	ENGAGEMENT STRATEGY USED BY THE EDUCATOR	I USED THIS STRATEGY TODAY	OTHER COMMENTS
Provide "wait time" to process posed critique question.	Model listening and contemplation time before answering.		
"The mistake I was looking for..."	Strength-based wording: focused attention on acknowledging what students know and moving them forward.		
"What am I happy to see?"	Strength-based wording: focused attention on acknowledging what students know and moving them forward.		

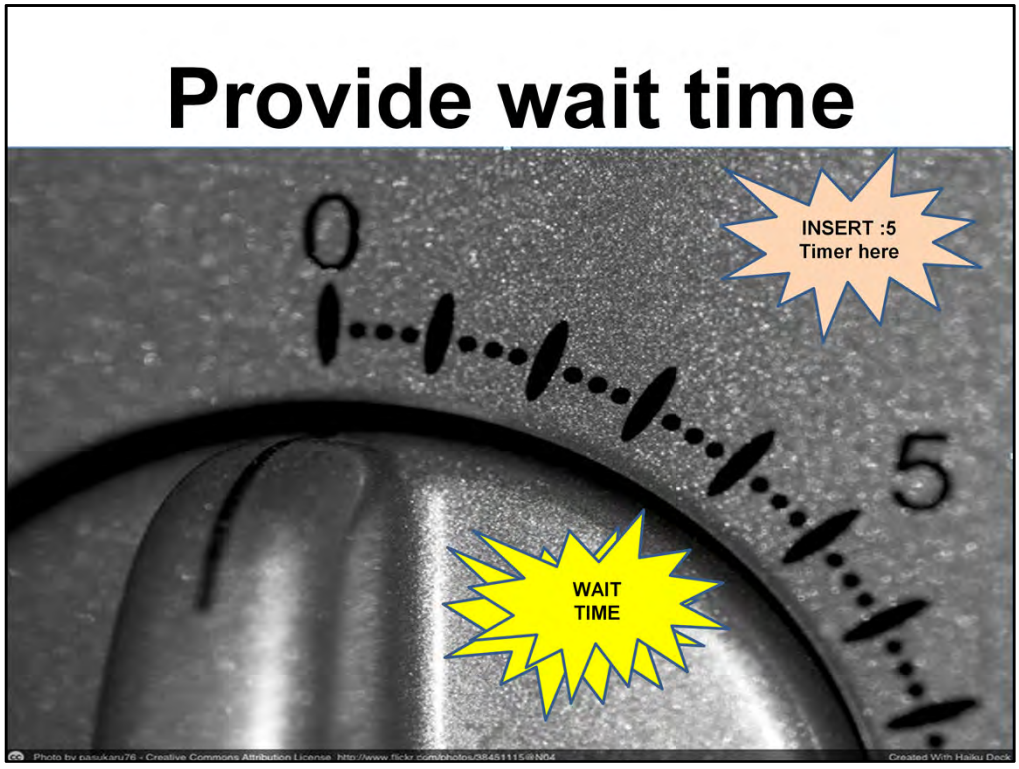
The following video illustrates the power of a teachers' words and actions within a classroom strategy called “my favorite no.” Please note what the teacher does to encourage all students to construct viable arguments and critique the reasoning of others. Please locate the webinar handout titled "reflection tool" for mathematical practice standard #3 and add personal reflective notes.

my favorite no:
https://www.teachingchannel.org/videos/class-warm-up-routine

0-1:25
2:06-3:37
4:28-5:30

Compare personal reflections from the video to the worksheet provided.

Notable engagement strategies that promoted the development of argumentation, conversation and reasoning skills among her students included planning and preparing for a conversational activity, such as a daily warm up activity with verbal classroom or peer interaction.



This exemplar teacher also modeled "wait time" to allow students to process her question as well as to continue the conversation. [sound of timer in background for 15 secs] Did you notice how long 15 secs felt?! Purposeful silence can be difficult to incorporate, but a powerful ally in student engagement.

Step out: Throughout this webinar, "wait time" has been provided to allow for new concept processing and reflection.

Use strength-based wording

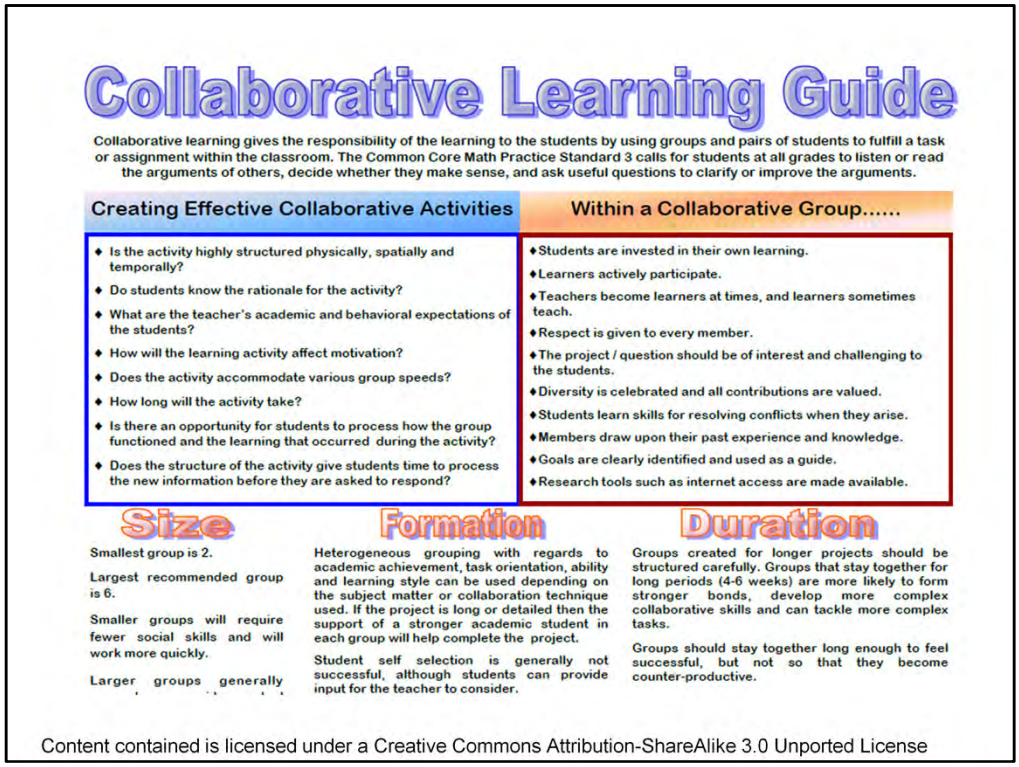
Additionally, this teacher chose strength-based wording to promote confidence in student work, such as:

"the mistake I was looking for ...."
"how far are you from getting it right?"
"my favorite wrong answer that shows good math..."

Finally, this example teacher uses informal assessment of student knowledge through the use of index cards. Along with providing her 'favorite no', she can also gather an aggregate of student knowledge of a particular skill BEFORE formal testing.

Because she chose to REWRITE the incorrect answer during public review, she allowed for student anonymity – which also promotes student engagement in the future.

While these are a few engagement strategies, please refer to the complete reflection handout with more from this video.



Collaborative Learning Guide

Collaborative learning gives the responsibility of the learning to the students by using groups and pairs of students to fulfill a task or assignment within the classroom. The Common Core Math Practice Standard 3 calls for students at all grades to listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

Creating Effective Collaborative Activities

- Is the activity highly structured physically, spatially and temporally?
- Do students know the rationale for the activity?
- What are the teacher's academic and behavioral expectations of the students?
- How will the learning activity affect motivation?
- Does the activity accommodate various group speeds?
- How long will the activity take?
- Is there an opportunity for students to process how the group functioned and the learning that occurred during the activity?
- Does the structure of the activity give students time to process the new information before they are asked to respond?

Within a Collaborative Group.....

- Students are invested in their own learning.
- Learners actively participate.
- Teachers become learners at times, and learners sometimes teach.
- Respect is given to every member.
- The project / question should be of interest and challenging to the students.
- Diversity is celebrated and all contributions are valued.
- Students learn skills for resolving conflicts when they arise.
- Members draw upon their past experience and knowledge.
- Goals are clearly identified and used as a guide.
- Research tools such as internet access are made available.

Size

Smallest group is 2.

Largest recommended group is 6.

Smaller groups will require fewer social skills and will work more quickly.

Larger groups generally

Formation

Heterogeneous grouping with regards to academic achievement, task orientation, ability and learning style can be used depending on the subject matter or collaboration technique used. If the project is long or detailed then the support of a stronger academic student in each group will help complete the project.

Student self selection is generally not successful, although students can provide input for the teacher to consider.

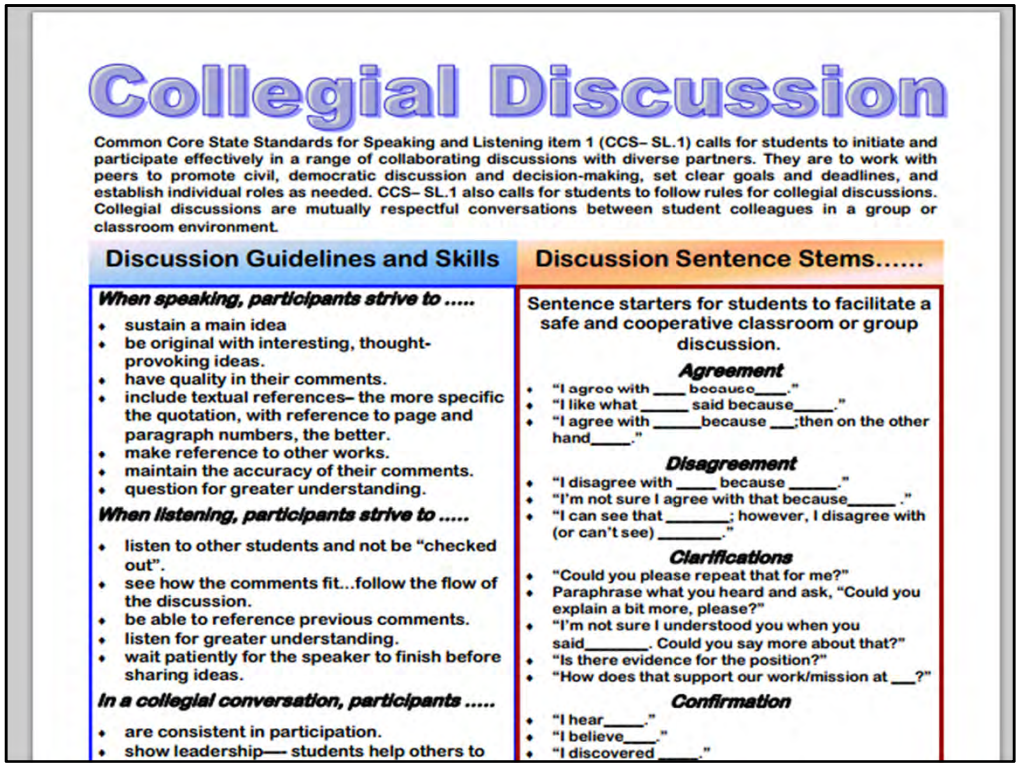
Duration

Groups created for longer projects should be structured carefully. Groups that stay together for long periods (4-6 weeks) are more likely to form stronger bonds, develop more complex collaborative skills and can tackle more complex tasks.

Groups should stay together long enough to feel successful, but not so that they become counter-productive.

When teachers are intentional in their word choices to encourage engagement in the classroom, a teacher models for students how to appropriately critique the work of others.

Included in the handouts for this webinar is a document titled “Collaborative Learning Guide". This progressively deep level engagement strategy must be modeled first by the classroom teacher as part of creating a positive learning environment. This guide offers many pre-planning considerations for safe peer and classroom discussions.



Collegial Discussion

Common Core State Standards for Speaking and Listening item 1 (CCS– SL.1) calls for students to initiate and participate effectively in a range of collaborating discussions with diverse partners. They are to work with peers to promote civil, democratic discussion and decision-making, set clear goals and deadlines, and establish individual roles as needed. CCS– SL.1 also calls for students to follow rules for collegial discussions. Collegial discussions are mutually respectful conversations between student colleagues in a group or classroom environment.

Discussion Guidelines and Skills

When speaking, participants strive to .....

- sustain a main idea
- be original with interesting, thought-provoking ideas.
- have quality in their comments.
- include textual references– the more specific the quotation, with reference to page and paragraph numbers, the better.
- make reference to other works.
- maintain the accuracy of their comments.
- question for greater understanding.

When listening, participants strive to .....

- listen to other students and not be "checked out".
- see how the comments fit...follow the flow of the discussion.
- be able to reference previous comments.
- listen for greater understanding.
- wait patiently for the speaker to finish before sharing ideas.

In a collegial conversation, participants .....

- are consistent in participation.
- show leadership— students help others to

Discussion Sentence Stems.....

Sentence starters for students to facilitate a safe and cooperative classroom or group discussion.

Agreement

- "I agree with ____ because____."
- "I like what _____ said because_____."
- "I agree with _____because ___;then on the other hand_____."

Disagreement

- "I disagree with _____ because _____."
- "I'm not sure I agree with that because_____ ."
- "I can see that _____; however, I disagree with (or can't see) _____."

Clarifications

- "Could you please repeat that for me?"
- Paraphrase what you heard and ask, "Could you explain a bit more, please?"
- "I'm not sure I understood you when you said_____. Could you say more about that?"
- "Is there evidence for the position?"
- "How does that support our work/mission at ___?"

Confirmation

- "I hear_____."
- "I believe____."
- "I discovered _____."

An additional handout titled "Collegial Discussions" has also been included as a reference. This guide offers varied sentence starters to model for and guide students in respectful conversations, even while critiquing the work of others. Some sentence stems with mathematical specificity follow.

When in agreement:

"I agree with John because he is using the correct formula for finding the area of a polygon."

When in agreement:
"I agree with John because he is using the correct formula for finding the area of a polygon."

When not in agreement:

"I disagree with Sue because with different denominators you should....."

When not in agreement:
"I disagree with Sue because with different denominators you should....."

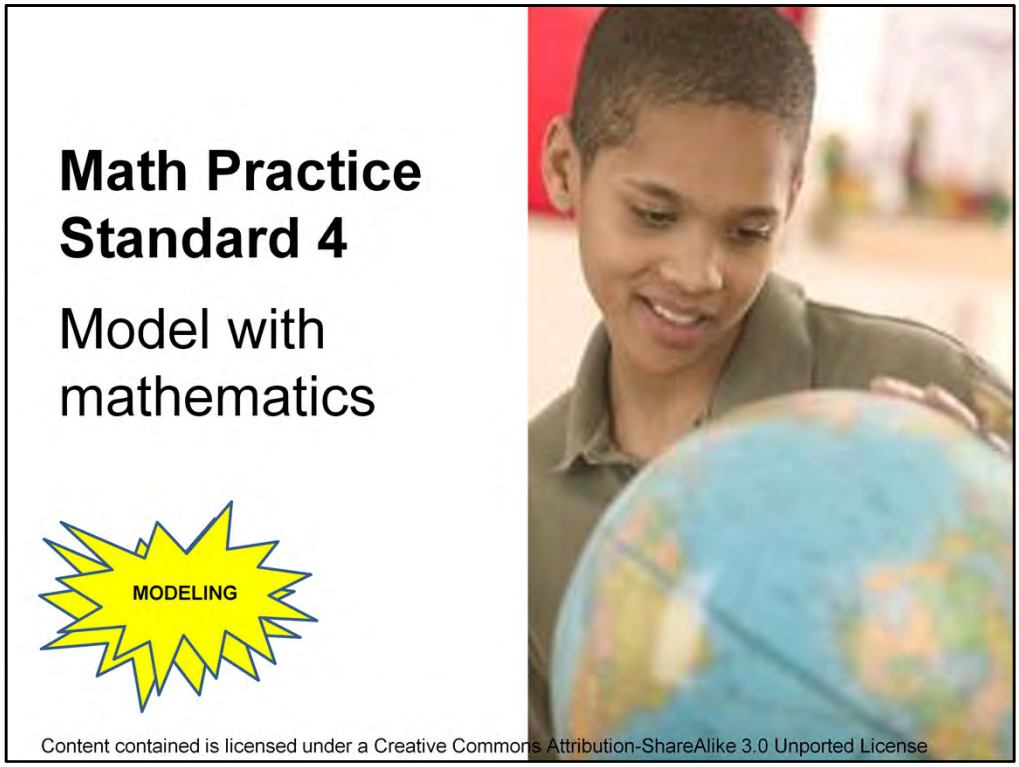
Focused attention on choice of words is important as to emphasize disagreement with another's idea, choice of computation, or specific falsehood – NOT a rejection of the person themselves.

When clarification is needed:

"I'm not sure I understood you when you said the function is ... Could you say more about that?"

When clarification is needed:
"I'm not sure I understood you when you said the function is ... Could you say more about that?"

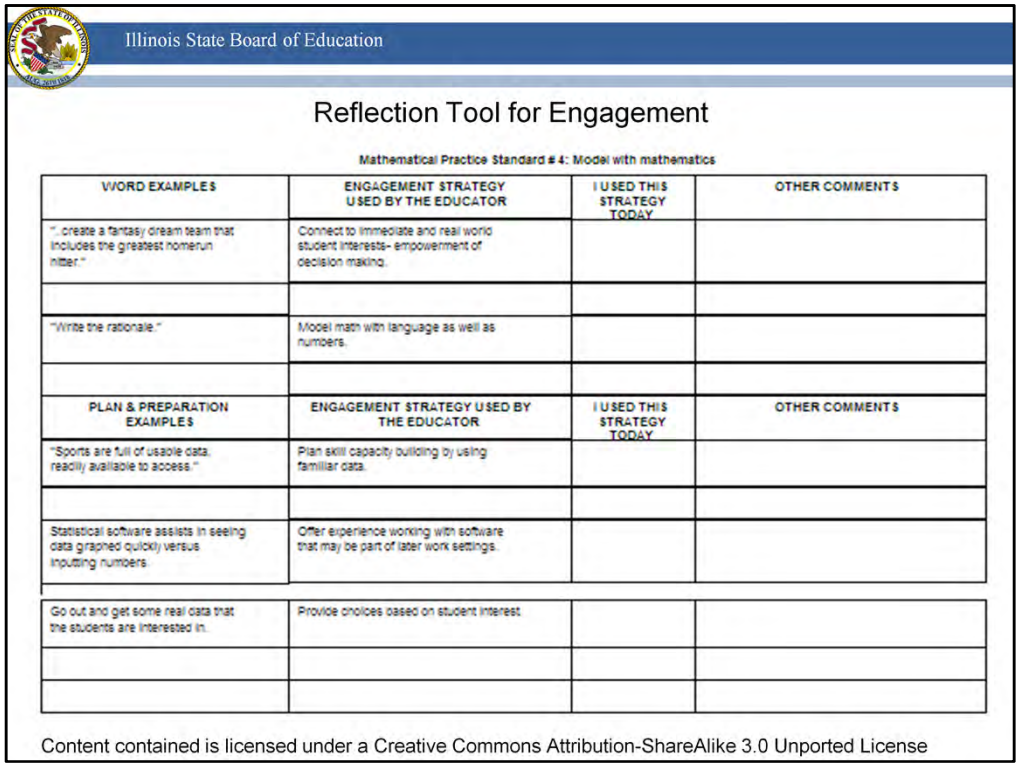
Students' comfort level with when and how to use different sentence starters will vary and be a continual learning process. A teacher may include practice time of these skills through discussions in pairs, then in small groups before attempting it with the whole class. Monitoring the ability level of students with these collaborative and collegial skills will promote EFFECTIVE student engagement.



The final highlighted mathematical practice standard is #4 stating "Model with mathematics." While teachers build mathematical content knowledge and practice skill capacity, the real test will be the mathematical realities of life after graduation. Therefore, teachers offer beneficial foundations when classroom instruction and content mirror daily life.

Research shows that making content relevant to real life intrinsically motivates students. By drawing on this intrinsic motivation, a teacher may need minimal extrinsic rewards to engage students in their mathematical endeavors. ("About Motivation." from UCLA Center for Mental Health in Schools. Retrieved from:http://smhp.psych.ucla.edu/pdfdocs/practicenotes/motivation.pdf)

STEP OUT: Engagement strategy step outs have been highlighted during this webinar to model use of teachable moments for immediate replication back to an educators' classroom.



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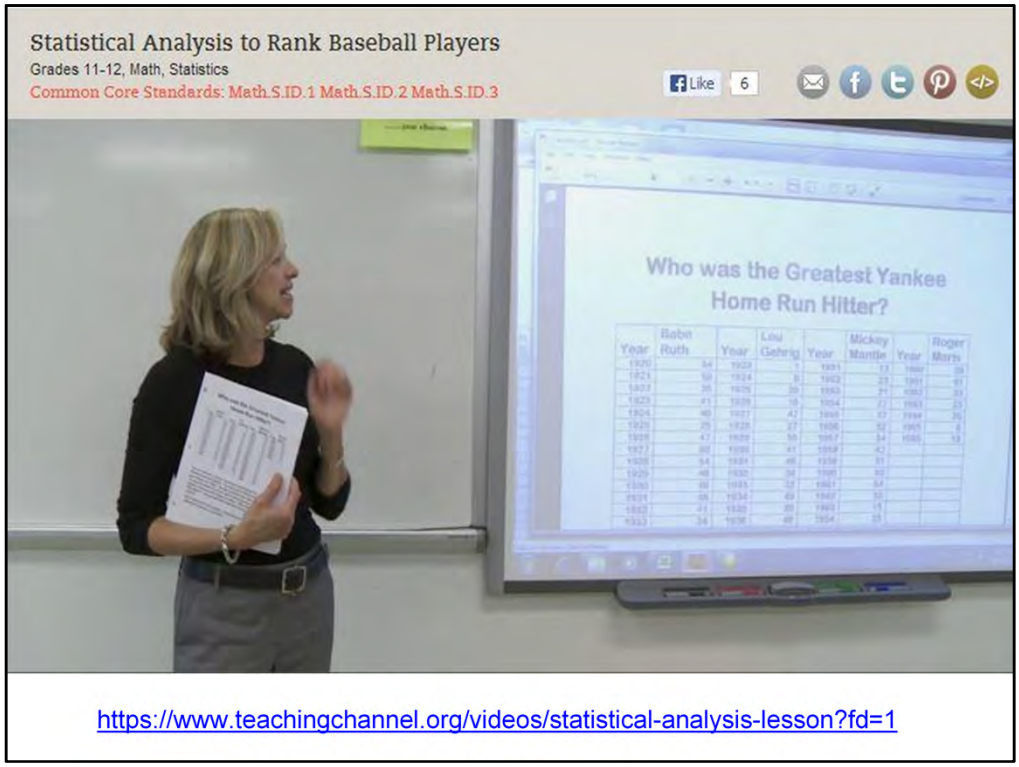
Reflection Tool for Engagement

Mathematical Practice Standard # 4: Model with mathematics

WORD EXAMPLES	ENGAGEMENT STRATEGY USED BY THE EDUCATOR	I USED THIS STRATEGY TODAY	OTHER COMMENTS
"...create a fantasy dream team that includes the greatest homerun hitter."	Connect to immediate and real world student interests- empowerment of decision making.		
"Write the rationale."	Model math with language as well as numbers.		
PLAN & PREPARATION EXAMPLES	**ENGAGEMENT STRATEGY USED BY THE EDUCATOR**	**I USED THIS STRATEGY TODAY**	**OTHER COMMENTS**
"Sports are full of usable data, readily available to access."	Plan skill capacity building by using familiar data.		
Statistical software assists in seeing data graphed quickly versus inputting numbers.	Offer experience working with software that may be part of later work settings.		
Go out and get some real data that the students are interested in.	Provide choices based on student interest.		

The following video shows a teacher using an instructional strategy supporting real-life application of mathematical constructs. Please note how the teacher allowed the students to model mathematics for daily life. Please locate the handout titled "reflection tool" for mathematical practice strategy #4 and add personal reflective notes during the video.



Statistical problem with Yankee baseball
https://www.teachingchannel.org/videos/statistical-analysis-lesson?fd=1

0-3:50
4:15-5:38

Connect to real life

Compare personal reflections from the video to the following highlighted engagement strategies that support development of modeling with mathematics (pause).

This teacher provided a real life connection, fantasy baseball, to initially engage the students to the math data. From the data set of baseball's greatest players in history, she requested that the students make observations, synthesize, and explain conclusions.

The fantasy baseball team assignment allowed the students to connect mathematical content and

practice to the real world. As stated by this model teacher, sports provides an abundance of real life data sets that can be utilized to engage students in a mathematical lesson.

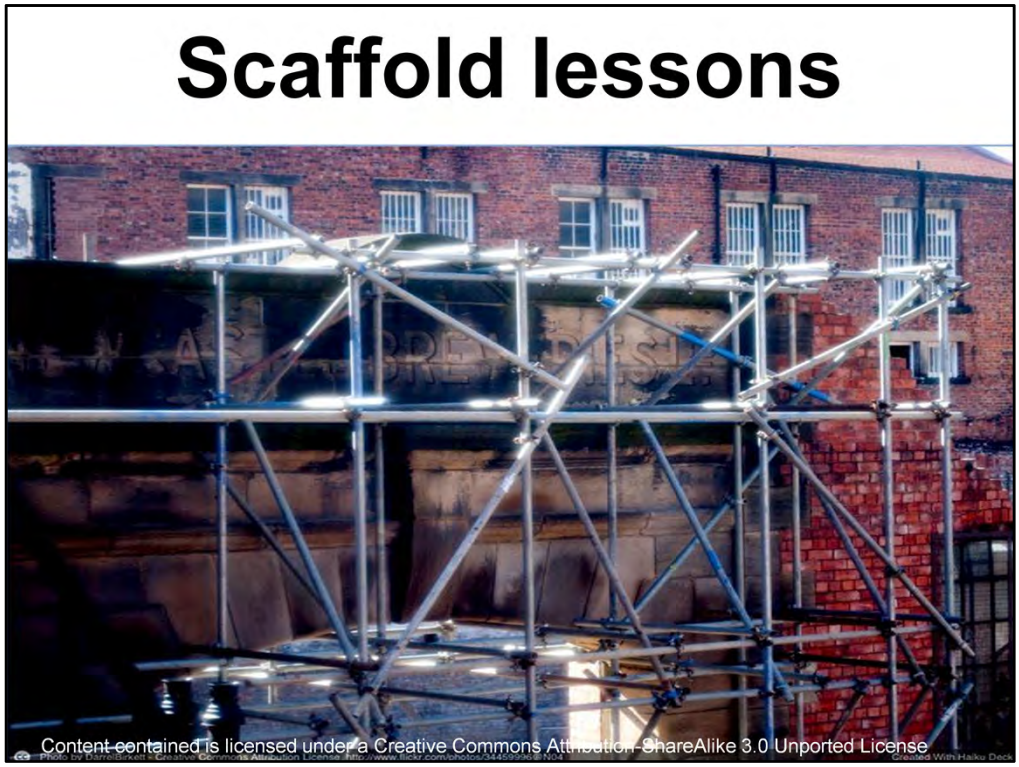
In order to pique the interest of students, a teacher could use a variety of appealing real-life data sets. Examples of other applicable and interesting data sets can include video game scores across age groups, demographics of candy popularity across generations, box office movie sales, or national or state specific youth health statistics.

This teacher furthered student learning through asking probing questions, such as "How do you reconcile that“ when a student pointed out a conflicting observation. The students then were given an opportunity to offer deeper synthesis of this data in their final discussion about ‘Who was the greatest all time player’. This question preplanned by the teacher, did not have a specific right or wrong answer – again allowing for peer discussions.

By guiding students through purposeful questioning along with an opportunity to provide their own opinion – This teacher taps into student intrinsic motivations for engagement with this lesson.

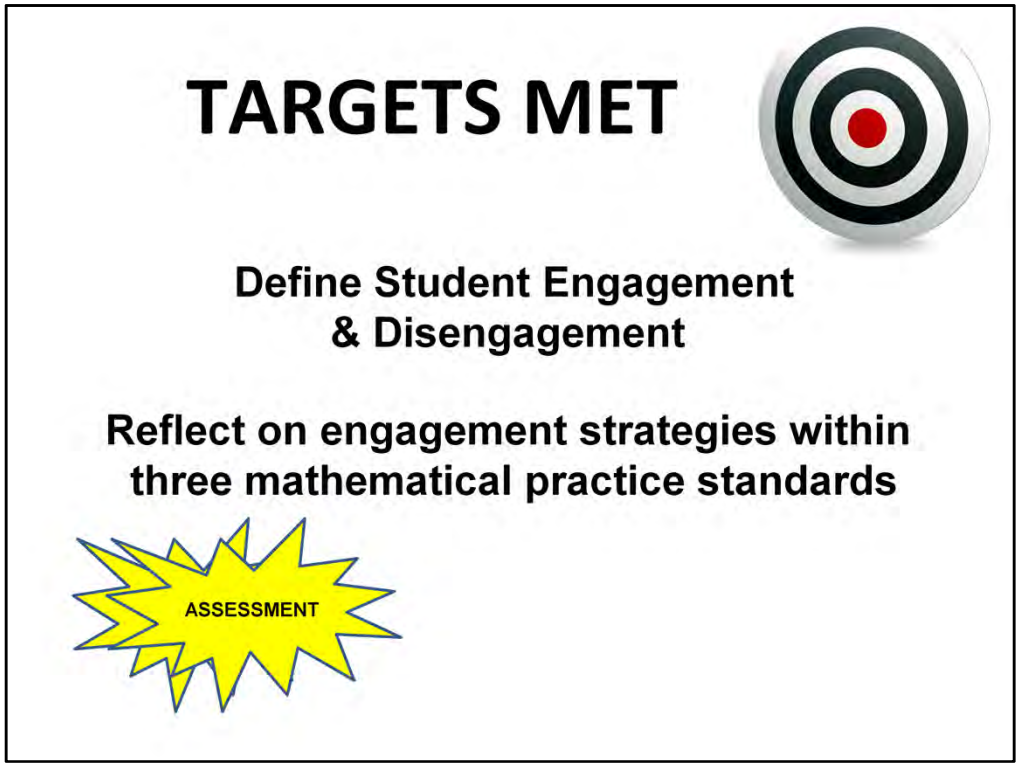
Additionally, this teacher stated that students always work with a partner so learning can be communicated to peers. “A student that can share their learning has made it their own; they haven't just memorized random facts.”

Through practicing their communication of what they’ve learned, students are better equipped to transfer the skills to other applicable lessons.



Finally, the teacher shared that preplanning of this model lesson included considerations for possible adaptability. To be prepared to meet students at their point of understanding and guide them forward through scaffolding, is yet another example of student engagement strategy.

Whilee these are a few engagement strategies, please refer to the complete reflection handout with more from this video.



Through the use of multi-media, wait time and reference handouts, this webinar has defined engagement and disengagement as well as reflected upon engagement strategies within three of the mathematical practice standards.

Highly effective instruction might include continued implementation of varied engagement strategies within mathematical lessons. Please feel free to use the reflection tool to help implement further strategies.

STEP OUT: Highly effective teachers prioritize unit and lesson planning time to include engagement strategies, formative and summative assessments.

This webinar was written and produced by the Illinois State Board of Education's Learning Support Specialist team. Thank you for your time and consideration.

For more information on barriers to learning, social, emotional, physical and behavioral competencies, school climate and more, please visit our learning supports website at: www.isbe.net/learningsupports

Resources

"About Motivation." from UCLA Center for Mental Health in Schools. Retrieved from: http://smhp.psych.ucla.edu/pdfdocs/practicenotes/motivation.pdf

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