INTRODUCTION:
In my middle school (6th and 7th grade) Mathematics classrooms, I've previously relied a lot on one-minute multiple-choice questions or thumbs-up/thumbs-down type questions to gauge student understanding during instruction. This has allowed me to revisit a learning target or clarify misconceptions.

I've recently started including peer-feedback and self-evaluations through guided journal writing to obtain more qualitative responses. Process of collaboration and reflection has impacted student-learning more than it has impacted changes in instruction (at least for this one particular group).

FORMATIVE ASSESSMENT 1: PRE-ASSESSMENT

For this assignment, I wanted to consider adding **pre-assessments** to my list of formative assessments.

- A pre-assessment given at the beginning of a new lesson/chapter is a good way to gather data on what students already know and start where they are at instead of jumping ahead.
- Pre-assessments can also pique interest and help student prepare for new learning.
- A well written pre-assessment and analysis provides necessary information to plan for differentiated learning and eliminate academic tracking.
- It also has the potential to inform the teacher of the various learning targets that needs to be included in the lesson.

The pre-assessment must be focused, quick/short, but comprehensive, ensuring all the prerequisite concepts are being analyzed. The assessment design has to be able to provide answers for the following questions

1. *Can students identify important definitions and concepts needed?*
   Include 2 to 3 traditional fill in the blanks, match the following or multiple choice questions.
2. *Can the assessment measure comfort level (or level of interest) with topic?*
   Include an experiment or short paragraph on the topic and ask the students to respond to an open-ended question in two or three sentences, mindmap, flow chart, bullet points, etc. This would allow for a layered understanding of how students approach the topic.
3. *Can the assessment determine gaps in concepts covered in prerequisite lessons?*
   The previously mentioned open-ended format might work to assessing this requirement . The points highlighted in the short answer or mindmap needs to be mapped against the prerequisites to determine gaps in learning.

EXAMPLE: Prior to teaching Ratio and Proportions to a 6th-grade class, I can include a pre-assessment that evaluates student knowledge of equivalent fractions and multiplication of fractions.

PRE-ASSESSMENT ANALYSIS

SAMPLE QUESTIONS: 10 minutes.

1. Circle the equivalent fraction for ¾
   a. 6/9 b. 15/20 c. 2/3 d.4/3
2. Write three equivalent fractions for 4/5
3. Reduce the following equivalent fractions: 7/21, 45/15, 200/600
4. Tom ate 2/3 of 6 slices of his pepperoni pizza. Sam ate 3/6 of 6 slices of his sausage pizza. Did the two eat an equal amount of pizzas. Use pictures, mindmaps, etc. to show how to solve this problem.

SAMPLE EVALUATION

Green: Accurate.
Yellow: Needs some work. Needs to revise concept.
Red: Inaccurate. Needs to learn concept.

STUDENT NAME	Q1: Student is able to identify equivalent fraction	Q2: Student is able to write three equivalent fractions	Q3: Student is able to reducing Fractions	Q4: Student has used appropriate language skills (Illustrate/mindmap) Chk for terminology: numerator, demonimator, how to read a fraction, graphical representation, etc)	STUDENT ANALYSIS (Helps differentiation)
Student 1					Needs mini-lesson and extra practice
Student 2					Has clear understanding. Needs to check for accuracy.
Student 3					Needs mini-lesson. Needs to check for accuracy. Needs to Build math vocabulary
Student 4					Needs to build math vocabulary.
ANALYSIS OF CLASS STRENGTHS (Helps create learning targets)	Students are able to identify equivalent fractions	Students are able to create equivalent fractions	Students need practice reducing fractions	Include Learning Target: Students use accurate vocabulary	

CONCLUSION

The main reasons I would implement pre-assessments are:

1. Allows for planning of differentiated learning. For instance, I could add mini-lessons for students who need a recap, or include Think-Pair-Share activity to build math literacy.
2. I see pre-assessments helping me organize myself to better serve the actual needs of the students.

FORMATIVE ASSESSMENT 2: SOCRATIC SEMINARS

Group work has greatly impacted student-learning in my classroom. Students often rely on each other to get clarification or work out a problem. Allowing students the freedom to discuss and work in a group on specific problems actually proved beneficial. I've also introduced peer-feedback and self-evaluation to understand how peer groups work and the vocabulary they use to talk about a topic.

Hence, the second formative assessment that I'd like to try in middle school mathematics classrooms is Socratic Seminars. This assessment tool can be used to ensure student-learning is moving in the right direction, to solidify concepts, to clarify misconceptions, and to build math literacy. A Socratic seminar can be conducted during an entire class period after every 2-3 learning targets are covered. The **two goals** of this assessment are:

1. Engage in qualitative math talk and develop math literacy
2. Clarify concepts and questions on the given topic

Therefore, the Socratic Seminar as a formative assessment is designed to be reflective of and benefit student-learning more than informing instruction.

A **disadvantage** of Socratic Seminar concerns ELL/ESL students who might be struggling with articulating ideas in English. **One way** to differentiate is to provide a video lesson where ELL/ESL students can view it multiple times to learn pronunciations, and listen to instruction as many times as they need. Apps like ***EdPuzzle*** might also be used with the video to track their learning. **Secondly**, providing vocabulary lists or mentor sentences that students can use during the discussion may make them feel more comfortable to participate. For instance:

- The facts given to us are _____, _____, and _____.
- I have a question regarding this concept: _____

Finally, creating small groups that discuss one questions in a 10-minute mini seminar before joining a whole group seminar, might also benefit ELL/ESL students.

The evaluations of the seminar will be three-fold:
***Peer-Feedback*:** The peer-feedback is a guided assessment on the discussion norms and abilities of the seminar; not the mathematical concepts. Students will be paired at random. They will receive a feedback form with their partner' name on it just before the seminar begins. They will mark the feedback as the discussion proceeds. After the seminar, students will be allowed to pair up for five minutes and provide feedback to each other from their observations. An additional advantage of the peer-feedback forms is to remind the student that they too are being evaluated on the same criteria and encourage more positive interactions.
Self-Evaluation – Students will be given 5 minutes to complete a guided self-evaluation on both the discussions and the mathematical concepts they have been learning.
Teacher Evaluation – Based on discussion observations, peer-feedback, and self-evaluation, students will receive a list of strengths identified and a list of goals that need to incorporated in order to improve.

EXAMPLE

In this example, I will continue with the class learning ratios and proportions. Assuming that the 6th grade classroom has not participated in a Socratic Seminar, here are some steps I will include

- Establish and practice protocol/rules on how to communicate in a Socratic Seminar
- Create and communicate a rubric with clear objectives and measurement criteria
- Hand out the reading material and questions for discussions
- Include a a peer-feedback, self-evaluation and a teacher-feedback to aid growth in student-learning

RULES TO FOLLOW DURING A SOCRATIC SEMINAR

I will come prepared by reading, taking good notes and writing good questions
I will treat all other participants with dignity and respect.
I will participate in the seminar by taking good notes, engaging in discussion, and developing my mathematical literacy
I will ask good, high-level questions to clarify, understand, or promote high-level thinking
I will provide my responses in a respectful manner with references to the text, my notes, and other points of view

RUBRIC DISCUSSED WITH STUDENTS – focuses on building discussion skills and the mathematical content:

Exemplary • reads closely, takes notes, and develops high-level questions before the seminar • uses prepared text, notes, and questions to contribute to the dialogue • asks for clarification when needed • asks probing, engaging questions • refers directly to the text • makes connections to other speakers • builds on others' comments • considers all opinions	**Exemplary** • Shows clear understanding of the prompt • Able to accurately define the terms and use the proper terms in the right context • Has created a sequence of steps or questions to help solve the problem/answer the prompt • Successfully makes inferences or associations to other mathematical concepts
Competent • comes prepared with marked text, notes, and questions • contributes to the dialogue • responds to questions • refers to text • asks questions • takes notes • is respectful of others' ideas	**Competent** • Has understood the prompt partially • Able to accurately define some terms and use them appropriately • Has created an incomplete sequence of steps or questions to help solve the problem/answer the prompt • Is able to successful contribute or build on inferences or associations to other mathematical concepts
Developing • comes with some text preparation • emphasizes own ideas; may lean toward debate rather than dialogue • ideas not always connected • refers to text • asks a few questions and/or questions are lower level • takes some notes • loses track of conversation • judges others' ideas	**Developing** • Has conflicting thoughts of the prompt or question • Recollects terms but unable to define or use them appropriately • Has created an incoherent sequence of steps or questions to help solve the problem/answer the prompt • Attempts to build on inferences or associations to other mathematical concepts
Needs Improvement • does not participate or participation is inappropriate • repeats same ideas • few or no notes taken • no questions asked • seems lost/overwhelmed with the seminar	**Needs Improvement** • Has not been able to process the prompt or question • Does not recollect terms or definitions and hence unable to use the • Has not created a sequences of steps or questions to aid in solving the question or answering the prompt. • Does not comprehend or contribute to the discussion on inferences and associations

TAKE HOME SHEET – for ratios and proportions

Read the question two times and respond to the prompts: Biologist tagged 900 rabbits in Bryer Lake National Park. At a later date, they found 6 tagged rabbits in a sample of 2000. Estimate the total number of rabbits in Bryer Lake National Park.	
What do I already know? You may include terms and definitions, facts from the question, and other theories you are aware of.	**Do I need more informationto solve the problem?**
What steps must I take to solve the problem?	**What are some good discussions questions on this mathematical concept?**

SOCRATIC SEMINAR PROMPTS – types of questions that promote mathematical discourse

How did you begin to think about this problem Let's look at the differences between proportions and ratios
What concepts must we use to solve this problem? Can the problem be represented in a picture or mindmap?
What additional information would have helped in this scenario? Did you make any assumptions that helped create a solution? Was there information that was not necessary and could be eliminated?
How many steps were you able to create to obtain a solution? How did you organize your thinking? Did someone else approach the problem differently? Is there another possible answer?
What did not work? What would it mean if the sample size was greater?

PEER-FEEDBACK FORM

YOUR NAME: _____ PARTNER NAME: (Filled in by the teacher) **Directions: Each time your partner does one of the following put a check in the box.**									
Asks a new or follow-up question									
Refers to text									
Speaks or responds to another speaker									
Paraphrases or adds on to another speakers ideas									
Interrupts or dominates the conversation									
Reflect on a specific response or question by your partner:									

SELF-EVALUATION

Directions: Score your performance in today's seminar using the following criteria: 4 = Excellent 3 = Good 2 = Showing Progress 1 = Needs Improvement	
I prepared by reading, taking good notes and writing good questions	
I treated all other participants with dignity and respect.	
I participated in the seminar by taking good notes, engaging in discussion, and developing my mathematical literacy	
I asked good, high-level questions to clarify, understand, or promote high-level thinking	
I provided my responses in a respectful manner with reference to the text, my notes, and other points of view	
One clarifying thought or idea that helped with the concepts being learned:	
One area of improvement you want to focus on:	

TEACHER FEEDBACK: Must cover both discussion criteria and math concepts.

STRENGTHS SHOWN DURING THIS SOCRATIC SEMINAR: 1. 2. 3.
GOALS FOR NEXT SOCRATIC SEMINAR: 1. 2. 3.

FINAL ANALYSIS – Includes Learning Targets

Using peer-feedback, self-evaluation, and teacher-evaluation, create a final analysis

	Learning Target 1	Learning Target 2	Learning Target 3	Learning Target 4	Learning Target 5
	Student can write fractions as ratios	Student can write a proportion statement	Student can determine if proportions are true	Student can determine unknown number in proportion	Student can list the differences between ratios and proportions
Student 1					
Student 2					
Student 3					
Student 4					
Reteach or Move Forward					

CONCLUSION:

The reasons I would choose a Socratic Seminar are

1. Since Socratic Seminars are conducted after 2-3 learning targets, students have a chance to improve their understanding and manipulation of concepts.
2. Feedback form three different methods provide a concrete analysis on learning targets that teachers might have to reteach.
3. It serves as the gateway to transition into the next set of learning targets.

FORMATIVE ASSESSMENT 3: END OF UNIT TEST

This is a traditional formative assessment that has to be included as a requirement in our schools. This is a graded assessment that is recorded. Most of my students struggle with test taking as it as been a high stress environment with certain expectation that family, society and the school places on them. I plan to use a game approach here to ease their stress and to ensure they are actively recalling their learning to complete their assessment.

As a homeschooling parent, I've used IXL, a web-based tool for practice and assessments that is compliant with common core and other international standards. However, the questions are created by IXL and teachers do not have the flexibility to incorporate their own questions. For my homeschooling co-op, the in-built assessments have been useful in assessing progress and assigning a grade.

However, for the purpose of my classroom, I would like to try Edulastic, an ed tech tool, with a free-option, that can be integrated with Google Classroom. Edulastic is good for Middle and High School math, especially Algebra I and II, Geometry, and Integrated Math I, II, and III. The assessments can be custom aligned to my curriculum map. Teachers can create assessments from auto-gradable, standards-aligned questions and obtain real-time analysis. With Google Classroom integration, grade books are updated automatically. Video or audio recordings can be included with the questions to assist ESL/ELL students follow the question prompts. Edulastic is best known for Math and ESL assessments.

In addition to a traditional end-of-unit assessment given through Edulastic, I would like to include an online poll about the quiz using Google Forms to have students reflect on how they did by asking questions like

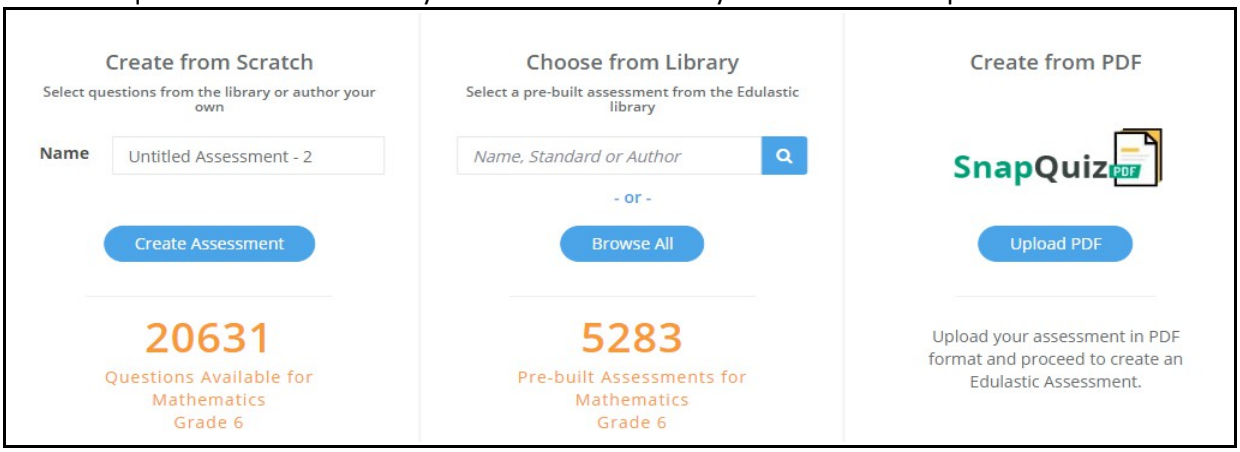
- Did you feel prepared for the test?
- Was the test challenging?
- How would you prepare differently next time?

This feature can be used even if the test was a paper and pencil test instead of using an app like Edulastic. Once again, the reflection process would add qualitative measures to the analysis.

Continuing with the example of a 6th grade classroom learning ratio and proportions, I will demonstrate how Edulastic and Google Forms can be used for end-of-unit formative assessments.

CREATING AN ASSESSMENT

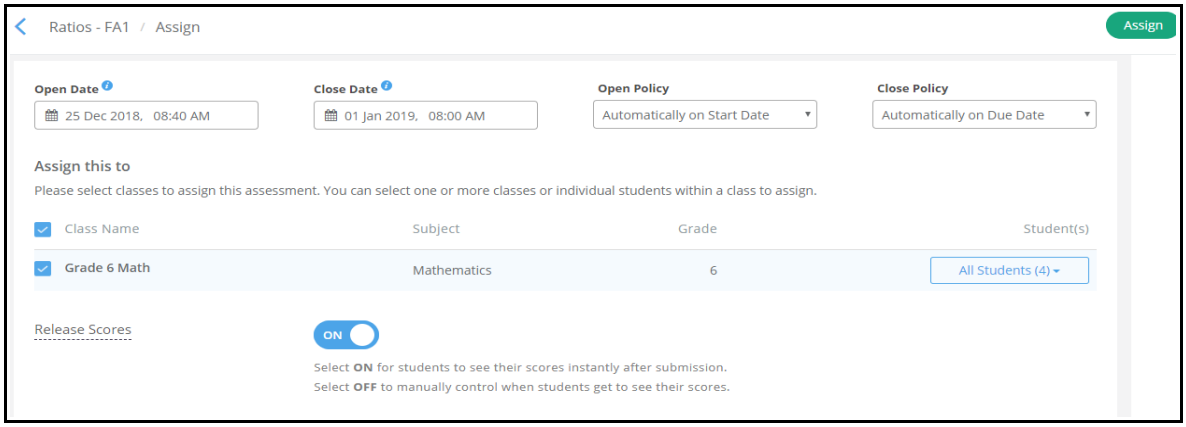
Assessments can be created by authoring our own questions and from selecting questions in the Edulastic library. Also, teachers can upload a PDF document and create an Edulastic assessment. While selecting questions from Edulastic data bank, there are several filters that can be applied to narrow your search criteria.
I used a few questions from the library and created some of my own for this example.



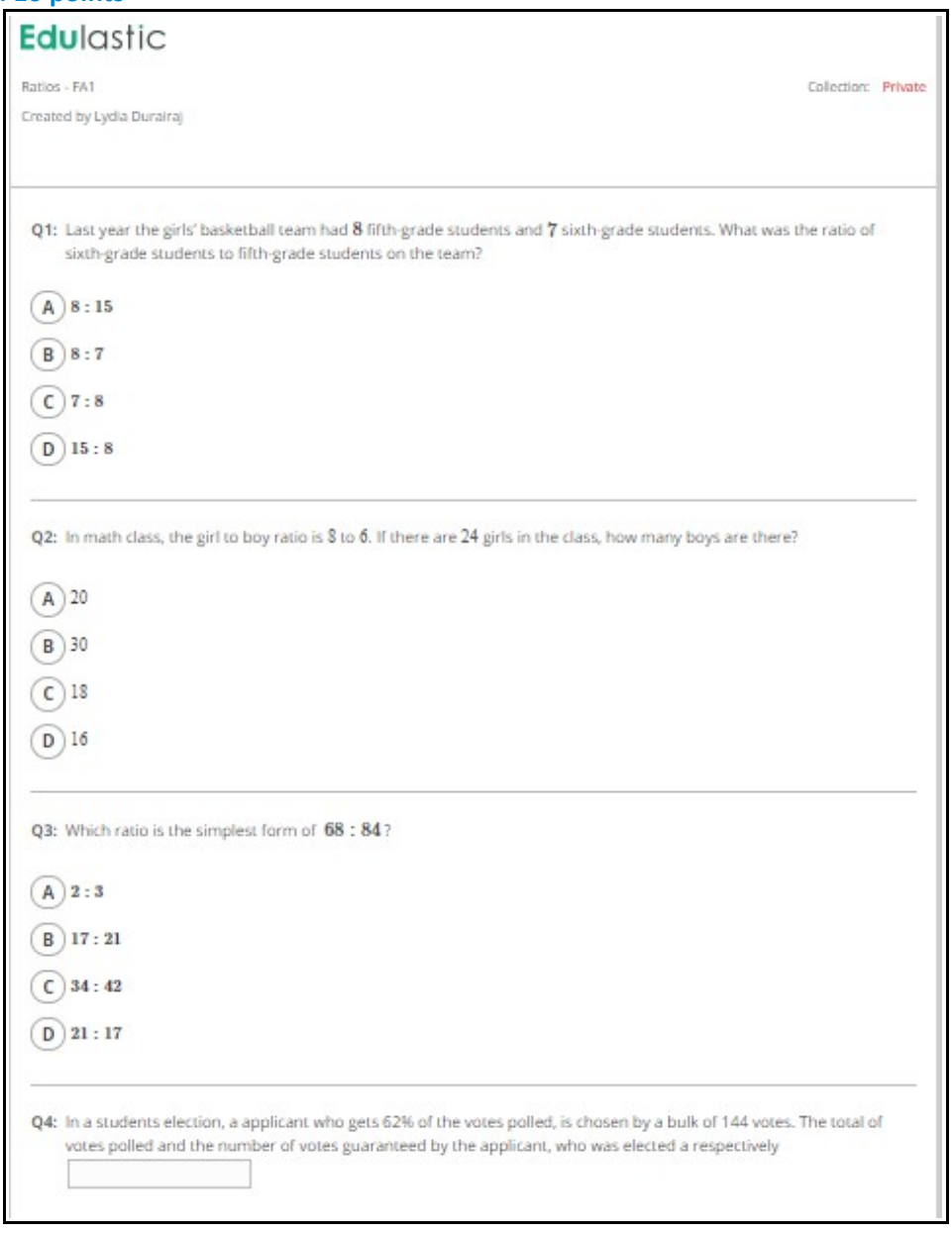
ASSINGING THE ASSESSMENT

The assessment can be assigned to the entire class or select students and the teacher can define the open

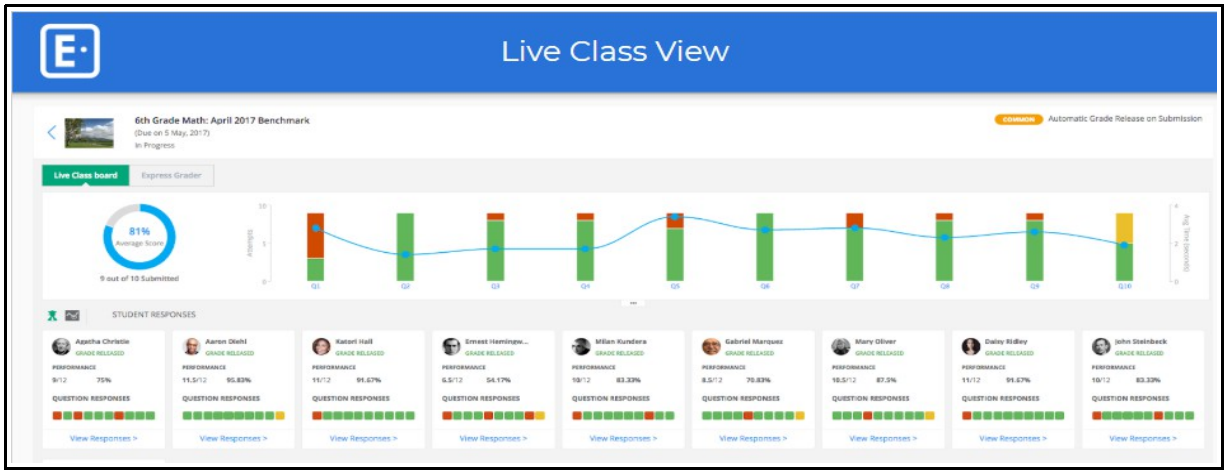
and close date and time. The test can also be printed if any student who is unable to use the online test. The grading can be set to a rubric only with the paid option. With the free version, the answers are checked against the options entered while creating the test. Once students complete the test, scores are automatically calculated and made available to the students. The scores can be automatically uploaded to a Google Classroom grade book.



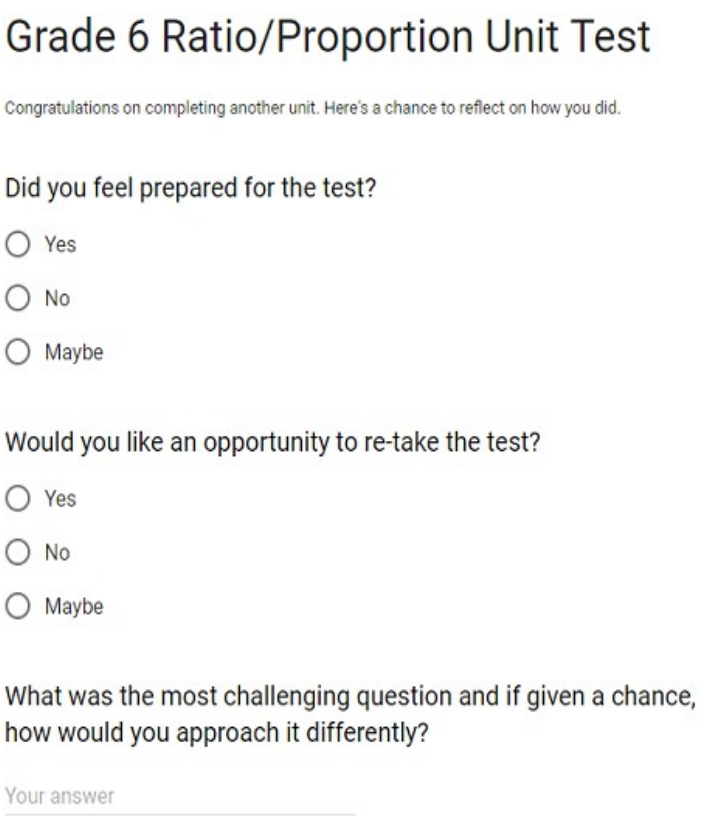
SAMPLE TEST: 10 points



TEST EVALUATION: Here is a sample (not related to the above test) which shows details of students who have completed their exams. It also shows analysis for each question and for each student.



SAMPLE POLL QUESTION – using Google Forms
The poll asks students to reflect on the level of challenge posed by the test. The short answer is looking for a growth mindset in the students who are able to reflect on the steps needed to face a challenge.



An email ID for the student/parent can be recorded in Edulastic. The results can be automatically emailed.

CONCLUSION:
In conclusion, the main characteristics of Edulastic that I liked are:

1. Ease with which tests are created, assigned and graded
2. Ability to add audio, especially to help ESL students
3. Extensive options for graphical representations
4. Extensive Analysis options which identify the problem areas and students who need interventions

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