**What Does 'Mean' Mean?**
By: Katie White

**Subject Area:** Math
**Grade Level:** 3rd grade, but adaptable to upper elementary
**Length:** 2 days, Day 1: 45-60 minutes (to be taught as a review and formative assessment); Day 2: 60-75 minutes

**Objectives:**
1) Students will be able to correctly explain the terms mean, median, mode and range.

2) Students will be able to correctly calculate the mean, median, mode and range of a given set of data.

3) Students will be able to articulate the importance/usefulness of the terms mean, median, mode and range.

**Standards:**
1) Everyday Mathematics (from UCSMP) Grade 3 Grade Level Goals, Content Strand: Data and Chance

Goal 1 Collect and organize data or use given data to create charts, tables, bar graphs, and line plots.

2) CCSS.Math.Content.3.OA.B.5 Apply properties of operations as strategies to multiply and divide.

**Essential Questions:**
- What is data?
- What are the similarities and differences between mean, median, and mode?
- What ways might you use mean, median, and mode in your life?

**Required Technology:**
- Online access to BBC.co.uk and access to http://www.bbc.co.uk/bitesize/ks2/maths/data/mode_median_mean_range/play/
- Student access to Google Docs for sharing their understanding
- Headphones
- (optional) iPad

**Materials:** Projector and screen, student computers &/or iPads, and Internet

**Procedures**

**Day 1:** (procedures 1-7: 25 minutes, 8-14 35 minutes)

Attention Grabber:

1. Ask students to complete the pre-assessment quiz, a Google Form, What does "Mean" Mean? (to be used again at the end of the lesson).

2. Allow students a few minutes to take the quiz, and then share the results. (5 minutes)

3. After students have completed the quiz, ask students to open the Google Doc "What Does "Mean" Mean?" Here they will answer the open ended question: How might you use mean, median, mode and range in your life?
https://docs.google.com/a/jisedu.or.id/document/d/193dmLqC0ebAvCt6QIoVZAQjBcNtx7wc6KPCw4zIKWXo/edit
(5-7 minutes)

4. Students Turn and Talk to their math partner about their answer to the questions.

5. Allow the class to share some answers aloud. Guide sharing to encourage students to find common understandings and differences.

Main Lesson:

6. Remind the students they have been learning about these data terms for several lessons during Everyday Mathematics. Inform them that this is a chance to use these skills and terms in a different and possibly fun way.

7. Model how to find the website via the provided link, http://www.bbc.co.uk/bitesize/ks2/maths/data/mode_median_mean_range/play/. Demonstrate how to start, stop, and rewind the video, and show how to interact with the video. Also, demonstrate how to access the read button (definitions of the terms) and the quiz button.

8. Tell the students the remainder of the class will be spent playing the game, reviewing the terms, and taking the quiz.

9. At this point, instruct students to go to http://www.bbc.co.uk/bitesize/ks2/maths/data/mode_median_mean_range/play/ *and* to use headphones.

11. Once students have all accessed the website and are all wearing headphones circulate the classroom to answer questions and monitor progress.

12. When students are finished, ask them to return to the Google Doc, What Does "Mean" Mean? and ask them to revise their answer based on what they learned while playing the games.

13. Students should finish the video and their Google Doc *revision* answer by the end of the class period.

**Day 2:**

1. Briefly discuss the activities from the previous day.

2. Ask students to share with their math partner what they think is good about the Bamzooki and one thing they learned that they didn't know before playing the games.

3. Students should then open the 2nd Google Form https://docs.google.com/a/jisedu.or.id/forms/d/1gVaNmEOuFYAOAdcFe-SDZutZoH-u3X5QgBHaG3RJEyQ/viewform

Instruct students to complete the questionnaire. This should be the same one as before however a new copy.

4. Once all students have completed the questionnaire the second time. Share the results with the class and compare them with the first results.

5. Ask students to return to the Google Doc and conduct a whole class discussion about how these math terms are used in everyday lives.

7. Ask students to choose one of the four terms and then create their own definitions. Next, instruct them to go to Explain Everything on their iPads *or* create a new Google Doc (Entitled – Data Terms).

8. Now each student will create a definition of one of the terms explaining the following information:

(Use pictures, diagrams, words and possibly narration (with iPads))

- Define the term, e.g. apple: a type of red fruit
- Give an example of how to find the term in a mathematical situation
- Explain one situation where you might use this term in the real world.

Digitally share the Google Doc or Explain Everything document with the class.

Allow students to work alone or with a partner, ensuring each student creates their own.

**Lesson Explanation**

**Content:** The lesson objectives, standards, and essential questions are listed in the

lesson plan. The math terms mean, median, mode and range are difficult to teach because three of the four words begin with the letter "m" which are often confusing. So, students struggle to remember the terms mean, median, mode and range and apply their knowledge of these terms to a question. Also, these terms are not frequently used by students outside of this math unit. By the end of the lesson, hopefully, students will understand these terms and be able to explain them with increased confidence.

**Pedagogy:** Students will begin the lesson by taking a quiz about a topic which they have been studying but many are not fully grasping. The quiz will introduce the students to the main ideas of the lesson and give everyone a starting point. I will use this information as a pre-assessment which will allow me to measure students' understanding of the content at the end of the lesson. Next, students will be given the chance to answer an open ended question via a collaborative document and then share their thinking with classmates to build common understandings. For both the quiz and the open-ended question, students will be pulling from their prior knowledge. Once this framework is in place I will give a brief whole class lesson on how the technology/website works.

Through the website and the lesson surrounding the website, elements of cognitive learning should be present as students bring prior knowledge of these terms with them and apply this knowledge in different situations improving their understanding of the terms. Social constructivism takes place when students collaborate on the Google Doc to share their understanding of how these terms apply to real life situations. Behaviorism is present within the game as students try to answer the questions correctly and are given an audio and visual signal if they make a mistake. The multiple intelligence learning theory is also present in this lesson because the website allows for students to go at their own pace, while viewing, listening to and reading the content.

**Content and Pedagogy:** The 4 terms will be learned through several teaching strategies such as whole class instruction, independent work on the website, collaborative work with the Google Doc and face-to-face discussions (both whole class and partners). This is valuable in giving student with different learning strengths the opportunity to achieve success at least one point during the lesson, in turn, engaging a variety of learners with this sometimes confusing and easily forgotten content.

**Technology:** Students will use BBC.co.uk's interactive video, Google Docs and possibly iPad's Explain Everything App. These technology choices are relevant to the lesson because they take this typical topic and bring it new life. By playing an interactive game to learn the terms, taking an online quiz, and discussing their understanding via a digital collaborative document students are more likely to take an active part in their learning, and they are also held more accountable for their understanding than with traditional lessons of this content. The technology also allows real time collaboration and assessment. It is possible to teach this content

without the use of this website and the Google tools however history shows that students are not fully grasping the meaning of these terms and they will likely be more engaged when using a digital device.

**Technology and Pedagogy:** This website allows students to work at their own pace which gives students with different learning abilities the chance to succeed and feel confident about their learning. The website also allows for cognitive learning when students build on their prior knowledge of the content because the user is able to control where they are in the video and repeat selections if necessary. As students play the games behaviorism learning is taking place when given signals which let the know if they have made a mistake and need to try again. The Google Doc allows social constructive learning to take place when students work collaboratively to share their ideas and learn from each other's answers to the open-ended question.

**Technology and Content:** This website allows for these math terms to be learned because students are challenged to understand their meanings in order to succeed in the games and complete the quiz correctly. The Google Form also measures their understanding of the terms and the Google Doc will show how they can apply this knowledge to their own lives.

**Assessment:** Throughout the lesson students will be learning about the terms mean, median, mode and range and how to use them in different situations. The object of the lesson is to not only memorize the terms but also understand them. Students will show their understanding through both the quiz and the open-ended question on the Google Doc. The quiz will require students to know the definitions. When students give a definition of the terms in either Explain Everything or on a new Google Doc they will also be showing their understanding. These three assessments should be used to measure students learning in this lesson.