

“... there is little evidence that the analysis of student thinking is used to drive instruction in the typical mathematics classroom in the United States” (Weiss et. al., 2003).

Weiss, I. R., Pasley, J. D., Smith, P. S., Banilower, E. R., Heck, D. J. (2003). Looking Inside the Classroom: A Study of K-12 Mathematics and Science Education in the United States. Chapel Hill, North Carolina: Horizon Research Inc.



Reflecting on Practice: Using Formative Assessment to Inform Instruction

Unit 2
Session 5



A Statistical Exploration: Fair share

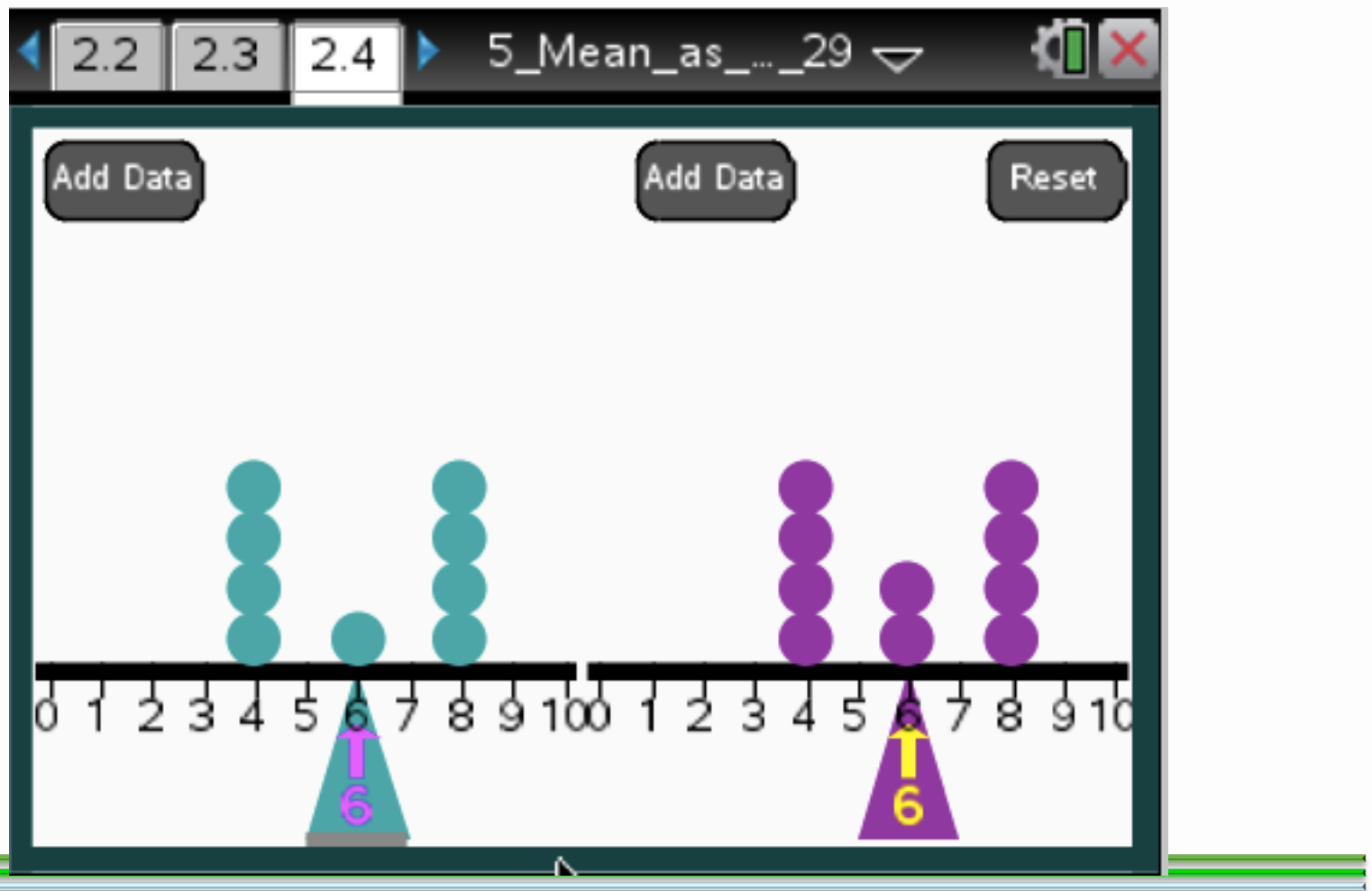
- The total number of goals scored by all 9 teams in the tournament is 54.
- Use post-its and the number line on the chart to make a graph showing number of goals each team might have scored.
- Assume each team scored at least one goal and no more than 10 goals.



In your pairs or trios, rank the tournaments in terms of least to most evenly matched.



Which of the two tournaments has the more evenly matched teams? Why?



Why measures of center & spread?

- The average temperatures in San Francisco and St. Louis are both 57° .
 - Hmmmmmm...



Why measures of center & spread?

- The average temperatures in San Francisco and St. Louis are both 57° .
- Note CCSSM Statistics and Probability, Grade 6:
Summarize and describe distributions.
Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.



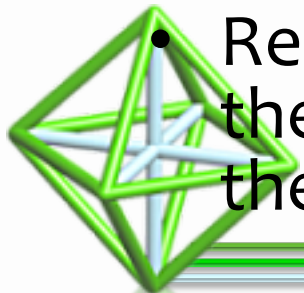
Non-negotiable Key Strategies to Implement Formative Assessment

- *A mathematical goal focuses the lesson on the highest priority learning for that lesson and teachers should collect evidence that students have met that priority.*



Possible goals for the soccer task:

- Understand mean as balance point for a distribution of data
- Understand deviations and, in particular, the mean absolute deviation as a way to describe the typical distance of the data from the mean
- Justify ideas using mathematical language
- Use statistical thinking to create a measure to describe variability in a distribution
- Develop a mathematical model to describe a context
- Recognize that the deviations above the mean are the same in magnitude as the deviations below the mean

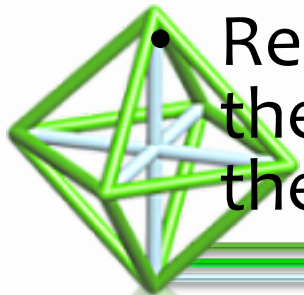


At your tables, choose one of the goals on the slide. What “success criteria” could you use to figure out whether you met your goal?



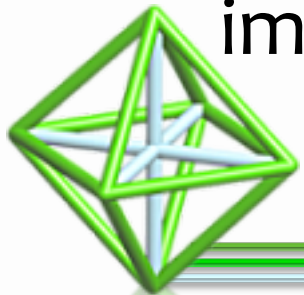
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Learning goals

- A mathematical learning goal is something worthy of knowing and requires **understanding**. Note that goals are not the activities that will lead to the learning; they are not general (explore the Pythagorean theorem) but are what students will know and understand about the mathematics.
- Why are learning goals for lessons important?



Learning Goals

- specify the essential knowledge, skills and dispositions students should take from the lesson;
- shape the structure of the lesson;
- guide the selection of instructional materials and resources;
- suggest interventions to support the learners when well specified;
- provide guidelines for student assessment;
- suggest the types of evidence needed to determine if the goals have been achieved.

www.itma.vt.edu/modules/spring03/instrdes/introduction.htm



- Should the learning goals and success criteria be presented to students at the beginning of a lesson?
- Do they have to be presented at all?



What Wiliam says...

- Embedded Formative Assessment, p.56-57
- “Sometimes telling students where they are going completely spoils the journey!”



Reflective Journal Writing

- As you consider your own classroom practice how are you listening to students? How are you collecting evidence that everyone understands? How might you change your current practice to make these more relevant to student learning?

Exit ticket:

- What questions do you have from this week? What resonated with you and what are you struggling with?

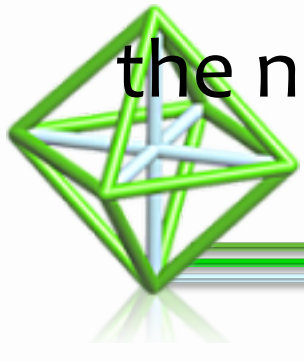


MAD to SD

- $$\text{MAD} = \frac{\sum |x_i - \bar{x}|}{n}$$

- $$\text{SD} = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$$

where x_i = a data value, \bar{x} is the mean, and n is the number of data values.



References

- Franklin, C., & Mewborn, D. (2008) Contemporary Curriculum Issues: Statistics in the elementary grades: Exploring distributions of data. *Teaching Children Mathematics*. 14(1), pp. 10-16.
- Kader, G., & Memer, J. (2008). Contemporary curriculum Issues: Statistics in the middle school: Understanding center and spread, *Mathematics Teaching in the Middle School*. 14(1) pp. 38-43

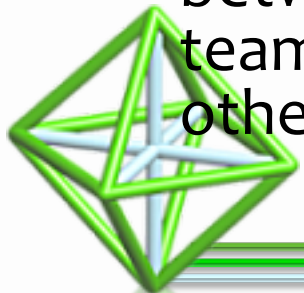


Possible assessment question

Goal:

- understand the concept of deviation and how deviations can be used to describe the variability of a distribution of data. (highest priority learning)
- Recognize the mean as the balance point for a distribution of data. [Secondary goal]

The average number of goals scored by 11 teams in a tournament was 6. Create a distribution of the number of goals scored by the teams in a tournament that fits between two distributions each with 54 total goals; one team had a sum of absolute deviations of 14 and the other 24.

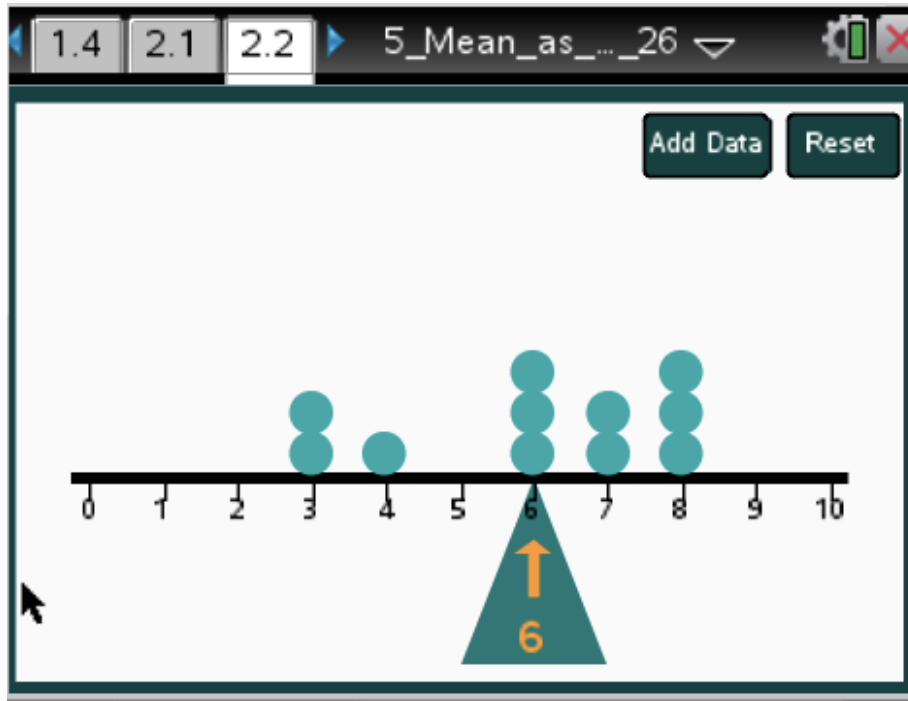


From MAD to standard deviation

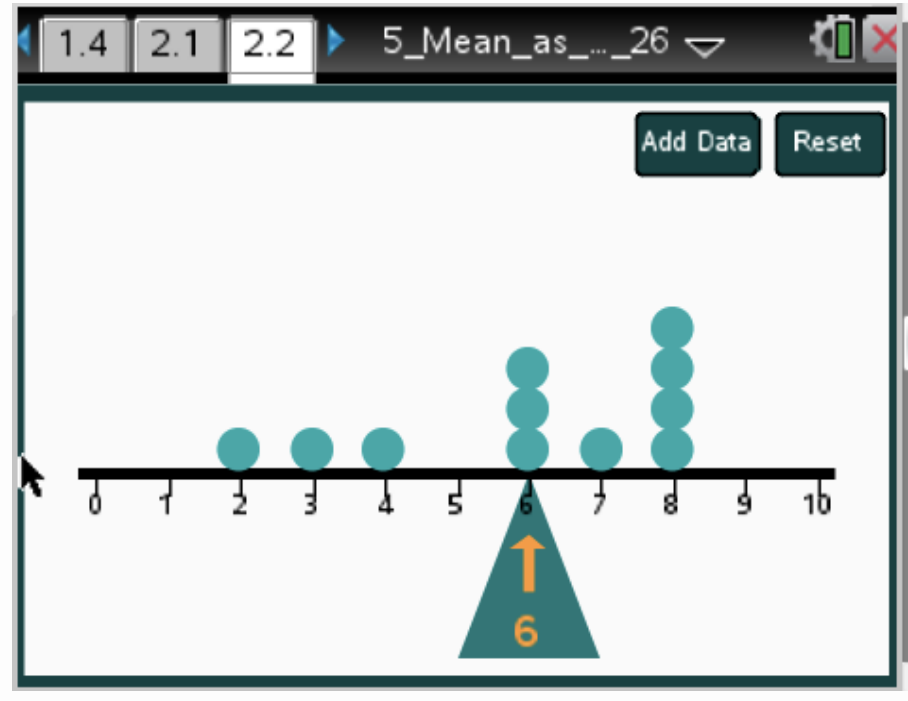
How would you find the standard deviation in the number of goals for teams with scores for the tournament of 2, 6, 8, 2, 8, 7, 3, 10?



$$14/9 = 1.555 < \text{MAD} < 24/9 = 2.666$$



Student A



Student B

