Stats on the Sideline

Measures of Central Tendency

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Grade Level	6th – 7th Grade	**Time Frame**	100 minutes
Subject	Mathematics	**Duration**	2-3 class periods
Course	Middle School Mathematics		

Essential Question

What are measures of central tendency? How are they used by professionals in a sports organization?

Summary

This lesson gives students a sneak peek inside how a sports statistician interprets team and player statistics. Students will analyze basketball player data from the OKC Thunder's 2021–22 season related to measures of central tendency. By the end of the lesson, students will be able to calculate measures of central tendency (mean, median, and mode) for a set of data, support which measure best represents the data, and describe how math is used in the work of sports professionals.

Snapshot

Engage

Students apply previous knowledge to complete a Card Sort related to central tendency, including vocabulary, definitions, example data sets, and sports headlines.

Explore

Students watch a video where a sports statistician talks about the use of statistics and data analysis in his work. Students then reflect on the video using the “How Am I Feeling? What Am I Thinking?” strategy.

Explain

Students complete guided notes on measures of center and spread.

Extend

Students apply measures of center and spread to interpret basketball player data from the OKC Thunder’s 2021-22 regular season.

Evaluate

Students create a sports headline to represent what they believe is the “MVP” (Most Valuable Point of data) of central tendency for the OKC Thunder data.

Standards

ACT College and Career Readiness Standards - Mathematics (6-12)

S301: Calculate the average of a list of numbers
S303: Read basic tables and charts
S304: Extract relevant data from a basic table or chart and use the data in a computation
S402: Translate from one representation of data to another (e.g., a bar graph to a circle graph)
S701: Distinguish between mean, median, and mode for a list of numbers

Oklahoma Academic Standards Mathematics (6th Grade)

6.D.1.1: Interpret the mean, median, and mode for a set of data.
6.D.1.2: Explain and justify which measure of center (mean, median, or mode) would provide the most descriptive information for a given set of data.

Oklahoma Academic Standards Mathematics (6th Grade)

7.D.1.1: Design simple experiments, collect data, and calculate measures of center (mean, median, and mode) and spread (range and interquartile range). Use these quantities to draw conclusions about the data collected and make predictions.

Attachments

- Card Sort—Stats on the Sideline.docx
- Card Sort—Stats on the Sideline.pdf
- Guided Notes, Teacher Guide—Stats on the Sideline.docx
- Guided Notes, Teacher Guide—Stats on the Sideline.pdf
- Guided Notes—Stats on the Sideline.docx
- Guided Notes—Stats on the Sideline.pdf
- Lesson Slides—Stats on the Sideline.pptx
- Practice, Version 1 (6th Grade)—Stats on the Sideline.docx
- Practice, Version 1 (6th Grade)—Stats on the Sideline.pdf
- Practice, Version 2 (7th Grade)—Stats on the Sideline.docx
- Practice, Version 2 (7th Grade)—Stats on the Sideline.pdf

Materials

- Lesson Slides (attached)
- Guided Notes (attached; one per student)
- Guided Notes, Teacher Guide (attached)
- Card Sort (attached; one per group of 3-4 students)
- Practice, Version 1 (6th grade) **or** Practice, Version 2 (7th grade) (attached; one per student)
- Sticky notes (optional; one per student)
- Note cards (optional; one per student)
- Student devices with internet access (optional)

20 minutes

Engage

Teacher's Note: Lesson Preparation

During the Engage phase, students will complete a Card Sort. Print out one of the attached Card Sorts per group. Cut these cards out and mix them up prior to starting the lesson. Keep each set separate. Consider printing on cardstock and storing individual sets in baggies if you want to keep these cards for future use.

Use the attached **Lesson Slides** to guide the lesson. Begin with **slide 3** and introduce the essential questions to students: *What are measures of central tendency? How are they used by sports reporters*? Consider also sharing the lesson objectives on **slide 4**.

Show **slide 5**. Group students into groups of 3-4 and pass out one set of prepared Card Sort cards to each group. Ask each group to try their hands at the Card Sort. As the groups work, walk around the room to see what students remember about central tendency, but do not correct them. Give groups 5-7 minutes to complete this part of the activity.

Show **slide 6**. Using the strategy Three Stray, One Stays, have one person per group stay with their Card Sort to share their reasoning while the rest of the group circulates the room to hear other groups' reasoning and see their Card Sorts. Give the students a few minutes to circulate to the other groups before returning to their original group and discussing what they noticed about how others sorted their cards. Allow students to change their cards if they need. Then ask each group to share out things they noticed while sorting or circulating the room.

Ask students to reflect on central tendencies, range, and outliers and how these concepts can be used in sports. Consider allowing a few students to share out with the class before moving on.

15 minutes

Explore

Go to **slide 7.** Play the ICAP video on the slide: "K20 ICAP - Stats on the Sideline (Middle School)." This video illustrates how a sports statistician processes data to report on and analyze a game.

Embedded video
https://youtube.com/watch?v=rGI8PX4UbNI

Have students reflect on the video using the How Am I Feeling? What Am I Thinking? strategy. Students should share their thoughts with the class or with an Elbow Partner.

Teacher's Note: Guiding the Conversation

It is likely that many students have never heard of contract work or do not know where player and team statistics come from. If students do not mention either of those things, guide the conversation in that direction.

25 minutes

Explain

Go to **slide 8**. Pass out a **Guided Notes** handout to each student. Use the attached **Guided Notes, Teacher Guide** to guide the discussion in this phase.

Teacher's Note: Guided Notes for 6th or 7th Grade

If you are teaching 6th grade math, print and distribute only the **first page of the Guided Notes handout**.

If you teach 7th grade math, print both pages of the attached handout. You may choose to print single- or double-sided to accommodate how you take notes in your classroom. If you use an interactive notebook, have the students glue this handout in for future reference.

Each method of central tendency uses the same dataset except for median. To show both approaches for finding median, the dataset is shown with both one and two middle numbers.

If you have an interactive whiteboard or similar technology in your classroom, unhide **slides 9–14** and go through each slide on your interactive whiteboard, following the teacher's guide. Otherwise, use a document camera to follow the teacher's guide.

20 minutes

Extend

Go to **slide 15**. Invite students to analyze the average points scored by OKC Thunder basketball players during the 2021-22 regular season.

Select the appropriate practice handout for your students: **Practice, Version 1 (6th grade)** or **Practice, Version 2 (7th grade)**. Print and hand out one copy per student.

Ask students to act as sports statisticians and interpret these points of data. Allow students to either work in pairs or in small groups to complete their handouts. Remind students to use their Guided Notes to help them find each measure of center.

20 minutes

Evaluate

Ask students to think back to the sports quotes from their Card Sort. What kind of story can they tell based on their analysis of the data? Have them decide, based on that analysis, which measure of center is their data MVP (or their Most Valuable Point of data). Have students create a headline showcasing which measure of center they have selected and record their MVP and headline on their practice handouts.

Show **slide 16**. Ask students to use the Tweet Up strategy to share their headlines, either by writing their headlines on note cards (option 1 below) or posting it on Padlet (option 2 below).

Option 1: Note Cards

Once students have recorded their headlines on their practice handouts, give each group a note card. Instruct them to write their headline on the front of the note card and what measure of center it represents on the back. Once all the groups are ready, pass out one sticky note to each student. Have students walk around the room to read each headline and guess what it represents by writing their prediction as a hashtag on their sticky note (for example: *#mean*). After all students have guessed, have one member of each group read their headline, reveal their measure of center MVP, and add it as the hashtag (for example: [*headline.] #MVP, #mode*).

Option 2: Digital

Prior to this phase of the lesson, create a Padlet for a digital Gallery Walk.

Once groups have recorded their headlines on their practice handouts, share a link or QR code to guide them to the Padlet. Direct them to create a post for their headline using the "+" button located in the bottom right corner of the page. After all groups have shared their headlines, have students read each headline and comment what measure of center they think each represents. Have them write their predictions as hashtags in the comments (for example: *#mean*).

After students have finished adding their comments, have one member of each group edit their headline post to reveal their measure of center MVP by adding it as the hashtag (for example: [*headline.] #MVP, #mode*).

Resources

- K20 Center. (n.d.). Card Sort. Strategies. https://learn.k20center.ou.edu/strategy/147
- K20 Center. (n.d.). Elbow Partners. Strategies. https://learn.k20center.ou.edu/strategy/116
- K20 Center. (n.d.). Gallery Walk / Carousel. Strategies. https://learn.k20center.ou.edu/strategy/118
- K20 Center. (n.d.). How Am I Feeling?. Strategies. https://learn.k20center.ou.edu/strategy/187
- K20 Center. (n.d.). Padlet. Tech Tools. https://learn.k20center.ou.edu/tech-tool/1077
- K20 Center. (2023, April 12). K20 ICAP - Stats on the Sideline (Middle School). YouTube. https://youtu.be/rGI8PX4UbNI
- K20 Center. (n.d.). Three Stray, One Stays. Strategies. https://learn.k20center.ou.edu/strategy/85
- K20 Center. (n.d.). Tweet Up. Strategies. https://learn.k20center.ou.edu/strategy/130