



# Improving Your Stats

## Decoding the Game



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<b>Grade Level</b>	9th – 12th Grade	<b>Time Frame</b>	80-100 minutes
<b>Subject</b>	Mathematics	<b>Duration</b>	2-3 class periods

### Essential Question

How are measures of central tendency used by statisticians in sports?

### Summary

Students will explore how measures of central tendency are used in the world of sports and will learn how to calculate a weighted average. Students will work through ACT-style practice problems using prior knowledge of mean, median, and mode.

### Snapshot

#### Engage

Students watch an ICAP video featuring a sports statistician to activate prior knowledge about statistics.

#### Explore

Students complete an ACT-style practice problem and create a poster to share their work with their peers.

#### Explain

Students learn how to approach a variety of ACT-style problems about measures of central tendency through an Expert Stay and Stray activity.

#### Extend

Students use knowledge gained to complete new ACT-style practice problems with partners.

#### Evaluate

Students demonstrate their understanding and practice pacing with a timed assessment.

## Standards

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

- S201:** Calculate the average of a list of positive whole numbers
- S302:** Calculate the average given the number of data values and the sum of the data values
- S401:** Calculate the missing data value given the average and all data values but one
- S501:** Calculate the average given the frequency counts of all the data values
- S601:** Calculate or use a weighted average
- S701:** Distinguish between mean, median, and mode for a list of numbers

## Attachments

- [Beat the Buzzer—Improving Your Stats - Spanish.docx](#)
- [Beat the Buzzer—Improving Your Stats - Spanish.pdf](#)
- [Beat the Buzzer—Improving Your Stats.docx](#)
- [Beat the Buzzer—Improving Your Stats.pdf](#)
- [Explore the Score \(Teacher Guide\)—Improving Your Stats.pdf](#)
- [Explore the Score—Improving Your Stats - Spanish.docx](#)
- [Explore the Score—Improving Your Stats - Spanish.pdf](#)
- [Explore the Score—Improving Your Stats.docx](#)
- [Explore the Score—Improving Your Stats.pdf](#)
- [Lesson Slides—Improving Your Stats.pptx](#)
- [Time Crunch—Improving Your Stats - Spanish.docx](#)
- [Time Crunch—Improving Your Stats - Spanish.pdf](#)
- [Time Crunch—Improving Your Stats.docx](#)
- [Time Crunch—Improving Your Stats.pdf](#)

## Materials

- Lesson Slides (attached)
- Explore the Score handout (attached; one per student; printed front/back)
- Explore the Score (Teacher Guide) document (attached; for teacher use)
- Time Crunch handout (attached; one per student; printed front/back)
- Beat the Buzzer handout (attached; one per student; printed front/back)
- Pencils
- Paper
- Markers
- Chart paper
- Sticky Notes

10 minutes

## Engage

Use the attached **Lesson Slides** to guide the lesson. Begin with **slide 3** and introduce the essential questions to students: *How do statisticians use measures of central tendency in sports?* Then share the lesson objectives on **slide 4** to the extent you see fit.

Show **slide 5** and have students watch the “[Real-Time Stats in Sports](#)” video featuring Sam Thomas, a sports statistician.

### Embedded video

<https://youtube.com/watch?v=rGI8PX4UbNI?si=adc05i6NdKuEPQwF>

Transition to **slide 6** and have students reflect on the video and its real-world application by answering the following questions:

- In sports, how could a statistician use mean, median, or mode?
- How do you, or how could you, use mean, median, or mode in your life?

### Sample Student Responses:

- Finding individual player’s stats
- Calculating my grades
- Determining MVP Hall of Fame
- Budgeting or analyzing finances

15 minutes

## Explore

Display **slide 7** and give each student a copy of the attached **Explore the Score** handout, which contains 5 ACT-style questions. Preview the activity with students by explaining to them that each group will be assigned a practice problem to explore. In each group, students will need to work through their problem before creating a poster.

### Teacher's Note: Question 3

Problem number 3 will be teacher-led during the Explain portion of the lesson. When assigning groups their practice problem, make sure not to assign anyone to that problem. Use the **Explore the Score (Teacher Guide)** document for reference, as needed.

Divide the class into 4 or 8 equal groups. If possible, try to have no more than 4 students in a group. Numbering the students off 1-4 could help with this. This may result in multiple groups working on the same problem at one time, but keeping groups smaller will ensure greater individual ownership. Then assign each group one of the following questions to solve: Question 1, 2, 4, or 5.

After 5–10 minutes, show **slide 8** and introduce the poster guidelines. Provide students with chart paper and markers, or direct them to a location in the room where they can grab these supplies when finished with their problem. Explain to students that after they complete their assigned problem, they will create a poster to use for teaching their classmates about how to solve their specific ACT-style practice problem. The posters should have the following information and be completed within 5 minutes:

- Their question number
- The completed problem
- Notes or numbered steps that help explain their work

Use the [5-minute timer](#) on the slide to help students pace themselves on this task.

25 minutes

## Explain

### Teacher's Note: Pacing

If you have a traditional 45-minute class period, this lesson must be paused and resumed the next day. For a smooth transition, consider pausing and resuming the lesson after the first four rounds of the following Expert Stay and Stray activity.

You can begin the next class period by reviewing the essential question and lesson objectives found on **slides 3 and 4**.

Display **slide 9** and introduce the [Expert Stay and Stray](#) strategy. Consider giving students clipboards to more easily take notes. Explain to students that one student from the group will stay at the poster as the expert and explain how to solve their group's problem to their audience. Everyone else from that group rotates (strays) to the next poster to listen and learn from the expert of that poster. Those who are listening need to pay careful attention because during each round a new person stays and becomes the new expert/presenter. Continue previewing the activity by explaining that there will be five rounds, and that everyone will have a turn as the expert. There will be 3 minutes per round. The expert will also use a different color marker to add important information to the poster as they answer clarifying questions from their audience. Alternatively, sticky notes can be an option to add information instead of writing directly on the poster.

Within each group, assign each student a number: 1-4. Show **slide 10** and begin round 1. Direct all *number 1s* to stay at their posters, ready to present. Direct everyone else to move (stray) to the next poster and take notes and ask questions. Remind them that they are preparing to be the next expert. Stress to students that they are practicing a variety of math ACT-style practice problems and should pay attention to key features of each type of problem.

Display **slide 11** and start the [3-minute timer](#). Continue to work your way through **slides 12-17** while students rotate through each of the poster stations.

If time allows, at the end of day one, unhide and show **slide 18**, having students reflect on the practice problems they have encountered and the strategies needed to complete them using the [How Am I Feeling? What Am I Thinking?](#) strategy.

Begin day two by reviewing the essential question and lesson objectives, then display **slide 19**. Have students get their **Explore the Score** handout back out to complete the final round of the Expert Stay and Stray activity, where you are now the expert. Show **slides 20** to display the final problem and introduce the concept of *weighted averages*. If you have the ability to write on slide 20, you can stay there to work out the problem or transition to **slide 21** to show the work.

Consider using a strategy, like [Fist to Five](#), as a formative assessment to gauge students' comfort with the content so far.

20 minutes

## Extend

Display **slide 22** and give each student a copy of the **Time Crunch** handout. Use the slide to preview the activity, which uses a modified version of the [Appointment Clocks](#) strategy. Explain that they will work with three different partners to complete their handout (students will work on two questions per partner). Direct students' attention to the space next to each odd-numbered question where they are to record their partner's name. Explain that they will record a name for each three appointment times.

Move to **slide 23** and direct students to find their first partner and answer questions 1-2 on their handout. Then start the [5-minute timer](#) on the slide.

Repeat this using **slides 24-25** for students' 6 o'clock and 9 o'clock appointments, making sure that students find a new partner for each appointment.

After students finish all of their appointments, transition through **slides 26-32** to review the sample responses for each of the problems. Clarify any confusion as needed while reviewing the questions.

10 minutes

## Evaluate

Display **slide 33** and give each student a copy of the **Beat the Buzzer** handout, and have students keep the paper face down until you start the timer. Discuss with students that the average time per question on the ACT is one minute per question. This handout has five practice questions to complete within five minutes. When all students are ready, start the [5-minute timer](#) and have students begin.

After the timer ends, display **slide 34** and have students check their work. If time allows, discuss with students which problem they answered incorrectly before transitioning through **slides 35-41** to check students' work and clarify misunderstandings.

## Resources

- K20 Center. (2021, September 21). K20 Center 3 minute timer. [Video]. YouTube. <https://youtu.be/iISP02KPau0?si=2VHRShyG44tA3TV9>
- K20 Center. (2021, September 21). K20 Center 5 minute timer. [Video]. YouTube. [https://youtu.be/EVS\\_yYQoLJg?si=fjvuvFWH3vj3B0z9](https://youtu.be/EVS_yYQoLJg?si=fjvuvFWH3vj3B0z9)
- K20 Center. (n.d.). Appointment clocks. Strategies. <https://learn.k20center.ou.edu/strategy/124>
- K20 Center. (n.d.). Expert stay and stray. Strategies. <https://learn.k20center.ou.edu/strategy/2650>
- K20 Center. (n.d.). Fist to five. Strategies. <https://learn.k20center.ou.edu/strategy/68>
- K20 Center. (n.d.). How am I feeling? What am I thinking?. Strategies. <https://learn.k20center.ou.edu/strategy/187>