September 25, 2021
When Fans Are Away, Home Teams Lose Their Sway
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About this Guide

In this Guide, based on the online Science News article “Ghost games’ spotlight the psychological effect fans have on referees,” students will learn about scientific research into bias in sporting events that was made possible by the coronavirus pandemic. Then, students will define and discuss the role of questions in the scientific method before brainstorming a scientific question of their own.

This Guide includes:

Article-based Comprehension Q&A — Students will answer questions about the online Science News article “Ghost games’ spotlight the psychological effect fans have on referees,” which describes research into a phenomenon in sports known as home field advantage. A version of the story, “When fans are away, home teams lose their sway,” appears in the September 25, 2021 issue of Science News. Related standards include NGSS-DCI: HS-ETS1.

Student Comprehension Worksheet — These questions are formatted so it’s easy to print them out as a worksheet.

Cross-curricular Discussion Q&A — Students will discuss the definition and importance of scientific questions, explore questions that scientists were able to investigate because of the coronavirus pandemic and brainstorm their own scientific questions. Related standards include NGSS-DCI: HS-ETS1.

Student Discussion Worksheet — These questions are formatted so it’s easy to print them out as a worksheet.
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Article-based Comprehension, Q&A

**Directions for teachers:** Ask students to read the online *Science News* article “‘Ghost games’ spotlight the psychological effect fans have on referees,” which describes research into a phenomenon in sports known as home field advantage, and answer the following questions. A version of the story, “When fans are away, home teams lose their sway,” appears in the September 25, 2021 issue of *Science News.*

1. **What does the term ‘ghost games’ mean, according to the Science News article?**

   Ghost games, as defined by the *Science News* article, are sports games played in empty or nearly empty stadiums.

2. **Why did sports teams play in ‘ghost games’?**

   Soccer teams played in empty stadiums due to pandemic restrictions — officials limited or banned spectators from attending games.

3. **What is home field advantage?**

   Home field advantage is the phenomenon where sports teams tend to do better when competing in their own stadium.

4. **What is one scientific claim made by the scientists as described by the article?**

   Fans influence home field advantage.

5. **What evidence supports the scientists’ claim? Be sure to state where the evidence comes from.**

   Scientists compared the outcomes of European soccer games from the 2018–2019 season with game outcomes from the fan-limited 2019–2020 season. During the “ghost game” season, home team win rate decreased by 8.3 percentage points (from 48.1 percent to 39.8 percent) while the loss rate increased by 8.4 percentage points (from 27.6 percent to 36 percent). And foul calls against home teams increased by 26 percent compared with just 3 percent for away teams.

6. **What reasoning is given for why the evidence supports the claim?**

   Referees exhibit a bias toward home teams by issuing those teams fewer foul calls when fans are present compared with when fans are absent. That bias may influence the outcomes of soccer matches in the home teams’ favor.
7. How might the research be useful to referees, according to sports psychologist Michael Leitner?

Leitner hopes that the research can help referees become more aware of their biases and train against those biases.

8. What’s another question that you could study using data from ‘ghost games’?

Student answers will vary. A student might say: Does fan presence influence the average intensity of athletes’ performance?
Student Comprehension Worksheet

Directions: Read the online Science News article “‘Ghost games’ spotlight the psychological effect fans have on referees,” which describes research into a phenomenon in sports known as home field advantage, and answer the following questions. A version of the story, “When fans are away, home teams lose their sway,” appears in the September 25, 2021 issue of Science News.

1. What does the term ‘ghost games’ mean, according to the Science News article?

2. Why did sports teams play in ‘ghost games’?

3. What is home field advantage?

4. What is one scientific claim made by the scientists as described by the article?

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7. How might the research be useful to referees, according to sports psychologist Michael Leitner?

8. What’s another question that you could study using data from ‘ghost games’?
Cross-curricular Discussion, Q&A

Directions for teachers:
Have students discuss and answer the first set of questions with a partner, then review the questions as a class. Next, have students read one of the following online Science News articles. Choose the article that works best for your students, or consider letting your students choose.

“Ghost games’ spotlight the psychological effect fans have on referees”
“What the pandemic can teach us about ways to reduce air pollution”
“The ratpocalypse isn’t nigh, according to service call data”
“5 reasons you might be seeing more wildlife during the COVID-19 pandemic”

With a partner, students should answer the second set of questions based on the article they’ve read and then use the last set of prompts to come up with a scientific research question of their own. The provided example answers for the second set of questions are based on the online Science News article “Ghost games’ spotlight the psychological effect fans have on referees.” A version of the article, “When fans are away, home teams lose their sway,” appears in the September 25, 2021 issue of Science News.

Want to make it a virtual lesson? Post the online Science News article to your virtual classroom. Discuss the article and questions with your class on your virtual platform.

I. Define scientific questions

1. What is a question and what is the purpose of asking one?

   A question is a request for information. Questions are asked in an attempt to better understand a topic, concept, opinion, thought or decision.

2. What makes a scientific question different from other types of questions? How is the answer to a scientific question determined?

   Scientific questions should be measurable and controllable, which means that an investigation using observation, scientific tools or computer simulations should be able to help answer the questions. Scientific answers are supported by empirical evidence gathered through a research, experimental or engineering process.

3. When are scientific questions asked during the scientific method?

   Scientific questions define the goal of an experiment. Questions must be asked at the beginning of the design process, and are also asked throughout the design process, including during the development of methods and procedures as well as data analysis.
4. Where can you get ideas for a scientific question?

*People can formulate scientific questions from observations of and curiosity about phenomena in the world around them. Questions also can arise from existing scientific studies, predictions based on scientific models or theories, and a desire to solve or find better solutions to problems.*

5. Why is it important to be able to ask scientific questions?

*The ability to ask well-defined, measurable questions makes it possible to explain phenomena of the natural world and design solutions to human problems.*

II. Identify testable questions

1. What was at least one scientific finding described in the article?

*With the stands mostly empty, the home team win rate decreased by 8.3 percentage points.*

2. What idea could have led researchers to ask their scientific question?

*Is the phenomenon of home team advantage real?*

3. What is one scientific research question that could have been asked by researchers to inform the study described in the article?

*How does the presence of fans impact the home team’s win and loss rates?*

4. Explain why the question you wrote qualifies as being scientific. Be specific.

*The question is measurable. The answer was found by an investigation with empirical, quantifiable evidence — specifically, a comparison of game outcomes from the season without fan attendance with game outcomes from the previous season with fan attendance.*

5. Were there additional questions that were asked? If so, what were they?

*The researchers asked howfan presence impacts the average number of foul calls referees give out to home teams and away teams.*

6. What makes the opportunity to do this study unique?
The COVID-19 pandemic prompted officials to prohibit fans from attending many sporting events around the world. That opened up an easy opportunity for scientists to study the potential impact crowds have on game outcomes.

III. Create your own scientific question

1. In what ways, other than those mentioned in the article you read, has the pandemic changed society?

Student answers will vary, but could include topics about limited air travel, limited in-person gatherings, changes in working situations and conditions, reduced capacity for medical care for ailments other than COVID-19, the effects of virtual schooling on students, etc.

2. How might some of the changes provide unique opportunities for research? Make a list of things that you could study. Consider the following questions to help you generate your list: Is there a way to build on the research reported in the Science News article? Is there a scientific model or theory that could be used to explore or predict something new based on the circumstance? Is there a problem that needs a better solution in the future?

Student answers will vary.

3. Break down your ideas into small, defined questions. Then determine which questions would be most interesting to investigate. Eliminate questions that cannot be answered by direct observation or experimentation.

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4. Pick one scientific question that you’d like to study. Define the variables and determine whether you can investigate the question within the scope of your school laboratory or other research facilities. Think about the time and equipment you would need to get started, and outline the steps of your experiment.

Student answers will vary.
Student Discussion Worksheet

**Directions:** Discuss and answer the first set of questions with a partner. Next, read an online *Science News* article assigned to you by your teacher and answer the second set of questions. Finally, use the last set of prompts to come up with a scientific research question.

**I. Define scientific questions**

1. What is a question and what is the purpose of asking one?

2. What makes a scientific question different from other types of questions? How is the answer to a scientific question determined?

3. When are scientific questions asked during the scientific method?

4. Where can you get ideas for a scientific question?

5. Why is it important to be able to ask scientific questions?

**II. Identify testable questions**

1. What was at least one scientific finding described in the article?

2. What idea could have led researchers to ask their scientific question?

3. What is one scientific research question that could have been asked by researchers to inform the study described in the article?
4. Explain why the question you wrote qualifies as being scientific. Be specific.

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