ScienceNews

EDUCATOR GUIDE

January 29, 2022
Mental Gymnastics

SOCIETY FOR SCIENCE

About this Guide

In this Guide, based on the online *Science News* article "[How mindfulness-based training can give elite athletes a mental edge](#)," students will learn about psychological tools that are helping elite athletes in competitions and everyday life, analyze data visualizations and discuss how they might apply the psychological tools to their own lives.
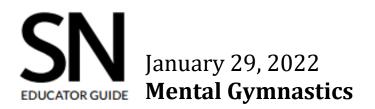
This Guide includes:

Article-based Comprehension Q&A — Students will answer questions about the online *Science News* article "[How mindfulness-based training can give elite athletes a mental edge](#)," which explores new research into psychological tools to improve mental health. A version of the article, "Mental gymnastics," appears in the January 29, 2022 issue of *Science News*.

> **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 uses of data visualizations, analyze visualizations from a *Science News* article, and think about how psychological tools used by elite athletes might benefit students' lives.

> **Student Discussion Worksheet** — These questions are formatted so it's easy to print them out as a worksheet.

Article-based Comprehension, Q&A

Directions for teachers: Ask students to read the online *Science News* article "How mindfulness-based training can give elite athletes a mental edge," which explores new research into psychological tools to improve mental health, and answer the following questions. Questions are broken up by article section. Ask students to answer the questions in the order they appear. A version of the article, "Mental gymnastics," appears in the January 29, 2022 issue of *Science News*.

1. During the 2021 Summer Olympics, why did U.S. gymnast Simone Biles withdraw from most of the events for which she qualified? How did people react to her decision?

Biles withdrew from the competition because of a mental block that put her at risk for making mistakes that could lead to severe injury or even death. Many people were shocked by her decision, and Biles faced a mix of criticism and praise.

2. Create a definition of "stigma" based on your understanding of the article. What effects does the stigma around mental health have on elite athletes?

Stigma is a set of negative, flawed beliefs that a society or group of people have about something. Stigma often causes shame. Stigma around mental health prevents athletes from talking about and seeking help for common problems such as anxiety, depression and eating disorders.

3. What psychological tools are scientists investigating that may improve athletes' mental health? How can athletes benefit from better mental health?

Scientists are investigating mindfulness training and acceptance and commitment therapy, or ACT. Research suggests that improving mental health can improve athletic performance and lead to a richer life outside of sports.

Team tests

4. What did mindfulness training teach the players on the women's lacrosse team at Marymount University in Virginia? How did the training appear to affect players' mental health?

Used over several seasons, mindfulness training combined with other activities such as yoga and throwing and catching exercises taught players how to let go of mistakes and focus on the present. Players reported a drop in anxiety.

5. Did the training appear to improve the team's overall performance? Make sure to cite evidence from the article in your answer.

The training seems to have improved the team's performance. Before training, the team had four wins and 15 losses. The season after training, the team won more games than it lost and qualified for a

championship game. The second season after training, the team won the championship.

6. Why do researchers think that mindfulness training did not improve the mental health of Miami Hurricanes football players? What did the training improve? Make sure to cite evidence from the article in your answer.

Mindfulness training probably didn't improve the players' mental health because of the exhausting physical stress from preseason football training. However, mindfulness training did help players maintain focus better than those who didn't have the training.

7. How are attention and mental health related, according to neuroscientist Amishi Jha?

Attention helps people regulate emotions and connect with others. Protecting the ability to pay attention can protect mental health, Jha says.

Learned discipline

8. Psychologist Tommy Minkler likens mindfulness training to push-ups for the brain. Explain the analogy based on your understanding of the article and state why Minkler's statement is considered an analogy.

Mindfulness training takes time and practice to see a benefit, like how you have to do push-ups again and again over time to build strength. Minkler's statement is an analogy because it compares two things that are alike in some way.

9. What is one limitation in interpreting the findings of mindfulness research?

Mindfulness researchers tend to overstate positive findings.

10. How might mindfulness training backfire for some athletes? What can be done for these athletes?

Some techniques of mindfulness training such as focused breathing can bring up memories of past trauma, causing athletes distress. For athletes who have such reactions, working with a clinical psychologist is important.

No judgments

11. What is the goal of ACT? How does it work?

ACT teaches athletes to separate their competitor identity from their personal one by acknowledging negative thoughts as independent from how talented they are. By accepting the negative thoughts rather
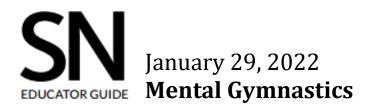
than trying to combat them, athletes can bring focus back to the present competition.

12. What have studies of athletes that get a combination of mindfulness training and ACT shown?

Athletes that combined mindfulness and ACT were less likely to be overcome by negative emotions and were better able to cope with change than players trained with traditional sports psychology tools such as relaxation, visualization and positive self-talk.

13. How do mindfulness training and ACT benefit student athletes off the field, according to some researchers?

Student athletes had improved focus on class assignments and improved communication with family and friends.

Student Comprehension Worksheet

Directions: Read the online *Science News* article "How mindfulness-based training can give elite athletes a mental edge," which explores new research into psychological tools to improve mental health, and answer the following questions. A version of the article, "Mental gymnastics," appears in the January 29, 2022 issue of *Science News.*

1. During the 2021 Summer Olympics, why did U.S. gymnast Simone Biles withdraw from most of the events for which she qualified? How did people react to her decision?

2. Create a definition of "stigma" based on your understanding of the article. What effects does the stigma around mental health have on elite athletes?

3. What psychological tools are scientists investigating that may improve athletes' mental health? How can athletes benefit from better mental health?

Team tests

4. What did mindfulness training teach the players on the women's lacrosse team at Marymount University in Virginia? How did the training appear to affect players' mental health?

5. Did the training appear to improve the team's overall performance? Make sure to cite evidence from the article in your answer.

6. Why do researchers think that mindfulness training did not improve the mental health of Miami Hurricanes football players? What did the training improve? Make sure to cite evidence from the article in your answer.

7. How are attention and mental health related, according to neuroscientist Amishi Jha?

Learned discipline

8. Psychologist Tommy Minkler likens mindfulness training to push-ups for the brain. Explain the analogy based on your understanding of the article and state why Minkler's statement is considered an analogy.

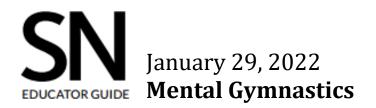9. What is one limitation in interpreting the findings of mindfulness research?

10. How might mindfulness training backfire for some athletes? What can be done for these athletes?

No judgments

11. What is the goal of ACT? How does it work?

12. What have studies of athletes that get a combination of mindfulness training and ACT shown?

13. How do mindfulness training and ACT benefit student athletes off the field, according to some researchers?

Cross-curricular Discussion, Q&A

Directions for teachers:
Ask students to read the online *Science News* article "[How mindfulness-based training can give elite athletes a mental edge](link)" and answer the first two sets of questions with a partner. Note that these questions can be used to analyze data visualizations in any *Science News* article. If you are using this with a different article, use the student worksheet titled "Grappling with graphs and other data visualizations." Once students have finished answering the first two sets of questions, lead a class discussion using the third set of questions. A version of the article, "Mental gymnastics," appears in the January 29, 2022 issue of *Science News*.

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

Why use data visualizations?
Discuss and answer the following questions with a partner.

1. How would you define a data visualization? Give examples of different types of data visualizations.

A data visualization is the graphic organization and representation of a set of data. Common types of visualizations are charts, graphs, maps and diagrams.

2. What is the purpose of a data visualization? Why are they helpful?

A data visualization allows people to quickly interpret patterns, trends and outliers in data. Especially with big data sets, visualizations allow an opportunity for people to quickly make informed decisions based on the data.

3. In what fields and careers are visualizations important? Give a couple examples.

Many career fields use data visualizations. For instance, STEM fields use visualizations to summarize research findings; professional sports use them to monitor player performance, game strategy and analysis; businesses use visualizations to summarize sales and market trends over time.

4. Aside from the type of data visualization, what features of a visualization can influence how the data is interpreted?

Colors, shapes, titles, legends and figure keys can influence how a visualization is interpreted.

Data at a glance
Answer the following set of questions for all the data visualizations in the *Science News* article.

1. What information is being portrayed by the data visualization? Define the type of visualization, the measured variables shown within it and the axes where applicable.

Student answers will vary. For "Prevalence of mental health issues in elite athletes," students could say that it is a table that shows the percent of elite athletes who report different mental disorders.

2. Pick out two data points from the visualization and state them along with their units. How does the visualization help you to compare the data points? Explain.

Student answers will vary. As an example, in the "Prevalence of mental health issues in elite athletes" table, 14.6 percent of elite athletes report that they face "generalized anxiety disorder." Between 4 percent and 68 percent of elite athletes report depressive symptoms. The table organizes the disorders and the percent of elite athletes affected, so you can easily compare the percentages.

3. State the general trend or takeaway from the visualization. How certain are you of this summarizing message? Explain your reasoning based on the number of outliers or error bars given, the fit of a trendline, the consensus of all the other data presented, etc.

Student answers will vary. As an example, students may say that the general takeaway from the "Prevalence of mental health issues in elite athletes" table is that mental health disorders in elite athletes are more common than people might think. However, the ranges given for disorders are so large that interpreting the overall message may be challenging.

4. Where do the data in the visualization come from? Does the source look credible? How can you tell?

Student answers will vary. For example, the data in the "Prevalence of mental health issues in elite athletes" table appears to come from a scientific study in a journal focused on sports medicine, which probably is a reliable source. To investigate further, and to see, for example, if the study is peer-reviewed, students could find the study online by clicking the link in the citations at the bottom of the online Science News *article.*

5. What other questions do you have about the visualization? In your opinion, did the visualization present data in a clear, effective way?

Student answers will vary. For the "Prevalence of mental health issues in elite athletes" table, students might say they want to know that percent of the general population is affected? Why are there such large ranges of percentages for some disorders and more precise percentages for others? The table is clear, but the data within raise a lot of additional questions.

Mental health toolbox

Read the following questions individually and be prepared to discuss them with your class.

1. List a couple examples of psychological tools given in the article, then create a definition of a psychological tool based on your understanding of the article.
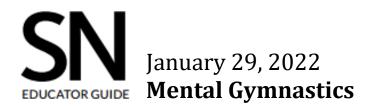
Mindfulness meditations, acceptance and commitment therapy, relaxation exercises, visualization and positive self-talk are psychological tools mentioned in the Science News *article. Psychological tools are ways people can mediate their emotions and feelings to maintain or improve mental health.*

2. In what areas other than sports could the psychological tools and practices described in the article be useful. Explain why you think they might help in these areas.

Student answers will vary.

3. How could you apply the psychological tools and practices that have helped elite athletes to your own life?

Student answers will vary.

Student Discussion Worksheet

Directions: Read the online *Science News* article "How mindfulness-based training can give elite athletes a mental edge" and answer the first two sets of questions with a partner. Your teacher will lead a class discussion using the third set of questions. Make sure to read the questions and be prepared to share answers with your class. A version of the article, "Mental gymnastics," appears in the January 29, 2022 issue of *Science News*.

Why use data visualizations?
Discuss and answer the following questions with a partner.

1. How would you define a data visualization? Give examples of different types of data visualizations.

2. What is the purpose of a data visualization? Why are they helpful?

3. In what fields and careers are visualizations important? Give a couple examples.

4. Aside from the type of data visualization, what features of a visualization influence how the data is interpreted?

Data at a glance
Answer the following set of questions for all the data visualizations in the *Science News* article.

1. What information is being portrayed by the data visualization? Define the type of visualization, the measured variables shown within it and the axes where applicable.

2. Pick out two data points from the visualization and state them along with their units. How does the visualization help you to compare the data points? Explain.

3. State the general trend or takeaway from the visualization. How certain are you of this summarizing message? Explain your reasoning based on the number of outliers or error bars given, the fit of a trendline, the consensus of all the other data presented, etc.

4. Where do the data in the visualization come from? Does the source look credible? How can you tell?

5. What other questions do you have about the visualization? In your opinion, did the visualization present data in a clear, effective way?

Mental health toolbox
1. List a couple examples of psychological tools given in the article, then create a definition of a psychological tool based on your understanding of the article.

2. In what areas other than sports could the psychological tools and practices described in the article be useful. Explain why you think they might help in these areas.

3. How could you apply the psychological tools and practices that have helped elite athletes to your own life?