All-Star Virtual Field Trip
Educator Companion Guide

Targeted Grade Level: 6-9

Overview

The NBA All-Star Game is a basketball exhibition game hosted every February by the NBA, matching a mix of the league's star players, who are drafted by the two players with the most votes from fans. Each team consists of 12 players, making it 24 players in total.

The 2019 NBA All-Star game will take place in Charlotte, North Carolina. What fans might not notice as they watch the events of All-Star Weekend is just how much collaboration, communication, creativity, and critical thinking –- all related to STEM –- are behind every moment of All-Star Weekend or any NBA basketball game.

Discovery Education and the NBA are hosting a very special Virtual Field Trip to showcase the STEM skills that are vital to the NBA and NBA-related careers. This 30-minute program will introduce students and educators to NBA-related career pathways and demonstrate how STEM is critical to their work.

The **pre-viewing activity** in this companion guide will introduce students to the natural connections between STEM and basketball as they explore technologies that have changed the game. The **post-viewing activities** will give students an opportunity to research an NBA-related STEM career and to simulate two of the careers they will learn about during the viewing. Educators may choose to complete one or all these activities before, during, or after the Virtual Field Trip.

Objectives

Students will:

- identify and research NBA-related STEM careers and investigate how they align with their skills, interests, and experiences.
- describe how STEM professionals working for the NBA identify problems, create solutions, think critically, communicate effectively as part of a team, and apply new technologies and skills.
- explain the role technology plays in solving real-world problems by simulating how NBA professionals work to innovate and enhance the game of basketball.
- use a social media platform to engage and persuade an audience.
- apply data-driven decision-making to identify the NBA All-Star MVP.

Materials

1. Internet Access
2. Some activities utilize resources and tools that are available in Discovery Education services. Simply log into Discovery Education with your user name and password to find more ways to explore. Not a current Discovery Education user? No problem. Start a free trial at www.DiscoveryEducation.com/trials
3. Copies for each student of the following:
    - o **Technology Timeline** handout
    - o **Careers in the NBA** capture sheet
    - o **Career Profile Research** handout
    - o **NBA All-Star Game MVP** *Prediction* handout
    - o **Engineering Design Process** diagram
    - o **Engineering Design Journal** handout
4. Four signs
5. Sticky notes
6. Highlighters (yellow, pink, and green)
7. Timer

Pre-Viewing Activity | Game Changers

- Hang four signs around the room, each with one of the following numbers on it: 6, 12, 24, or 48. Explain that one of these numbers represents the number of seconds allowed by NBA teams to take a shot once they get possession of the ball during a game. Invite students to physically move to the correct number.

- Reveal the correct answer (24), and ask students: What do you know about the NBA shot clock, and why do you think it was introduced to the game of basketball? How did the shot clock innovate and enhance the game of basketball? Watch the "NBA: Shot Clock" video (34 sec. / available in Discovery Education services) and read this entry from the NBA Encyclopedia. Discuss as a class how the 24-second shot clock impacted the sport. Challenge students to brainstorm other technologies that have impacted basketball.

- Invite students to form teams of five. Distribute the **Technology Timeline** activity sheet and five sticky notes to each team. Invite each team member to select one of the five technological advancements on the handout to represent. Direct them to write the name of their chosen technological advancement on a sticky note. Explain that all of the listed technological advancements have changed basketball in the last several decades.

- Challenge teams to line themselves up in the correct chronological order of these advancements (earliest to latest), holding up their sticky notes as part of a physical timeline. Set a 24-second "shot clock" timer and see how many teams get themselves in the correct order by the time it buzzes. Review the correct chronological order with the class, direct students to record the order on their handouts, and brainstorm how each technological advancement has revolutionized the game.

- Invite student groups to match those technologies with the STEM careers that developed them or that use them in the course of their work. Review the correct pairings as a class using this key:

- Wrap up the activity by having students brainstorm other technological advancements that have revolutionized basketball and the STEM careers may have contributed to the development of each. Suggested ideas are below. Invite students to draw conclusions about the important role of STEM careers in improving all aspects of sports.

Technologies

- basketball shoes
- 3-D motion sensors
- smart basketballs
- pressure sensors in sneakers
- Player Position Tracking (PPT)
- smart mouth guards
- referee whistles that automatically stop the game clock
- virtual reality head-sets and 360 cameras

Careers

- software developers
- app developers
- trainers
- team doctors
- coaches
- recruiters
- hardware engineers
- marketing professionals

Viewing Activity | Capture the Action

1. Introduce the Virtual Field Trip, which will allow students to explore in greater detail some of the careers they just learned about. Distribute the **Careers in the NBA** capture sheet.

2. Direct students to watch the **All-Star Virtual Field Trip**. (If time permits, students can also watch the Careers that Count: A Virtual Field Trip with the NBA as part of their research. While they watch, direct them to list two background experiences or training opportunities that each professional highlighted as influential or helpful in his or her current career.

3. Challenge students to consider how their personal backgrounds and the training opportunities available to them match up with the careers featured in the video, and direct students to answer the other questions on the capture sheet.

Post-Viewing Activity 1 | Career Panel

1. Ask students to share questions they would like to have asked one of the STEM professionals they "met" during the Virtual Field Trip. Explain that, in this activity, they will both ask and answer questions about NBA STEM careers.

2. Distribute the **Career Profile Research** sheet and tell students that they will investigate an NBA-related STEM career of interest and use their research to participate in a mock NBA career panel. Note: Career panels are opportunities for students to interact with professionals in a wide variety of career areas to learn about what it takes to prepare for a specific career and what it takes to be successful in the world of work in general.

3. Invite students to pick one of the two careers they chose on their **Careers in the NBA** capture sheet (Question 3), or one of the additional STEM careers from the list they brainstormed during the **Game Changers** activity to research online.

4. Direct students to search on the internet, using sites such as the Bureau of Labor Statistics, NBA.com, Dice.com, or other online job search engines. Challenge students to search for a brief description of the career (including the types of problems this professional works to solve), training and skills required, related careers, current job openings, and current and future courses and training they would need to pursue a job in this field. Note: Make sure that students research a variety of careers to ensure good representation on the panel.

5. Ask for volunteers to represent all researched careers on a panel discussion to be conducted with the rest of the class as the audience. Give student volunteers time to prepare a 60-second opening statement about their careers, using their research as a resource. Students not serving as panelists should use this time to draft two or three questions for the panel.

6. Act as the moderator as student panelists give their opening statements and as the panel takes questions from the audience.

7. To wrap up the activity, challenge students to complete an exit ticket answering the following questions:

   • After completing your research and participating in a panel discussion, which STEM career related to basketball most interests you and why?

   • Identify one high school or college course you could take that would help you prepare for a career in this field.

Post-Viewing Activity 2
Group Podcast and School-Wide Twitter Poll

1. Ask students to share what they learned in the Virtual Field Trip about the role of data to improve player performance and to engage NBA fans more deeply in the game.

2. Inform students that, in this activity, they will assume the role of team members working for Digital Content Strategy and Analytics for the NBA. Their team has been challenged to help identify the Most Valuable Player (MVP) for the All-Star Game. Ask students why they think the NBA chooses an MVP for the All-Star Game and what type of data might be used to choose this player. Introduce data-driven decision making: making decisions that are backed up by hard data rather than making decisions that are intuitive or based on observation alone.

3. Distribute the **NBA All-Star Game MVP Prediction** handout. (Note: Once All-Star teams are selected, you can find the five players in the starting line-ups for the Eastern and Western Conference Teams at www.nba.com/allstar.)

4. Introduce students to the Discovery Education NBA Analysis Tool (available in Discovery Education services) an interactive, real-time database of NBA player data from the current and past NBA seasons. You can familiarize yourself with the tool by viewing the Video Tutorial found by clicking the "?" icon at the top right of the tool dashboard. Tell students that they will use the data set from the regular season to predict who *might* be the All-Star Game MVP based upon past performance. To simplify calculations, students will only consider the five starters for each team. They should spend a few minutes looking at all of the data columns in the tool to discover what's available.

5. Ask the students to choose and calculate three statistics from the 2018-2019 regular season data to-date that they think will help predict the player who will be named the All-Star Game MVP. For example, if students think points scored per minutes played will help predict the All-Star Game MVP, they should calculate that statistic for each of the 10 starting players (five on the Western Conference Team and five on the Eastern Conference Team) and record that information on the handout.

6. Using data-driven decision-making, challenge students to predict the All-Star Game MVP based upon their calculations.

7. As an extension activity, instruct the groups to imagine they are creating a social media campaign for the NBA based upon their data analysis. Each group should produce a short podcast using a free platform (like Audacity or Synth) and launch a Twitter poll inviting the student body to listen to the podcasts and vote on their choice for "Most Likely All-Star Game MVP." For additional background on how to teach students to create podcasts, view these resources from National Public Radio.

Post-VFT Activity 3
Engineering New Tech to Revolutionize Basketball

1. Instruct students to close their eyes and imagine that they are engineers working with the NBA to solve a challenge related to basketball. Ask: *How do you identify challenges? How would you go about solving a particular challenge? How would you know if your solution helped resolve the challenge effectively?*

2. Inform students that they will assume the role of app developers, engineers, or computer scientists to conceptualize and defend a new and unique technology or application to solve a challenge or to help to revolutionize basketball.

3. To learn more about how real STEM professionals seek solutions, watch an interview with Hao Meng, Director of Basketball Strategy for the NBA, (4:07 min. / available in Discovery Education services). Meng and his team built a computer application that significantly reduced the amount of time spent on creating the massive 1,230-game NBA schedule.

4. Distribute the **Engineering Design Process** diagram and **Engineering Design Journal** handout, and instruct students to add these resources to their notebooks or formal engineering journals if your class uses these.

5. Ask students to recall some of the technologies they brainstormed during the *Game Changers* activity, such as advancements in protective gear, wearable mics/cameras/sensors, new applications and hardware, etc. Tell them that they will be getting into groups to define a challenge related to basketball and to design a possible solution.

6. Guide students to form collaborative teams and instruct them to follow the engineering design cycle (process) on the **Engineering Design Process** diagram to record their work and report their design recommendations in a journal. Note: Students will need internet access for the research phase of the process (Step 2).

7. As an extension or wrap-up for this activity, invite student groups to present their designs to the class, reporting any difficulties they encountered during the process and how they overcame those challenges. Allow students to pose questions to the presenters. Give the student groups an opportunity to reflect on their presentations and complete an exit ticket describing possible elements of their design that they might want to adjust or retool based on their classmates' questions and feedback.

Explore More NBA Activities & Resources

Find more ways to explore STEM and the NBA. Simply log into Discovery Education with your user name and password. Not a current Discovery Education user? No problem. Start a free trial at www.DiscoveryEducation.com/trials

Content Collection
Once you're logged into Discovery Education, type NBA Content Collection in search to access lesson starters by grade band, content, videos, and more.

NBA Analysis Tool
Using the interactive NBA Analysis Tool, students can gather and analyze NBA and WNBA statistical categories, follow a favorite player or team, and predict player performance throughout the season. Students quickly see that math is essential in basketball, while engaging in problems worth solving and learning about diverse careers in sports.

National Standards

The activities in this companion guide have been designed to correspond with the following national standards:

Science	**Next Generation Science Standards (NGSS)** ETS1.B: Developing Possible Solutions There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
Technology Education	**Standards for Technological Literacy (STL) from the International Technology and Engineering Educators Association (ITEEA)** Standard 2: Core Concepts of Technology W: Systems thinking applies logic and creativity with appropriate compromises in complex real-life problems. BB: Optimization is an ongoing process or methodology of designing or making a product and is dependent on criteria and constraints.
Mathematical Practice	**Common Core State Standards for Mathematics (CCSS.Math)** SIC-3. Making Inferences and Justifying Conclusion Make inferences and justify conclusions from sample surveys, experiments, and observational studies S-MD-7. Using Probability to Make Decisions Analyze decisions and strategies using probability concepts
English Language Arts	**Common Core State Standards for English Language Arts & Literacy (CCSS.ELA-Literacy)** CCSS.ELA-LITERACY.CCRA.R.7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. CCSS.ELA-LITERACY.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. CCSS.ELA-LITERACY.CCRA.SL.5 Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Name_____   Date_____

Game Plan for the Future
Technology Timeline

Review the technological advancements below and place them on the timeline in the correct chronological order. Then, discuss whether each technology is used by NBA Referees, Digital Content Strategy and Analytics Managers, Directors of Arena Operations and Events or players.

Important Innovations in the NBA

VHS Tape Review and Mini-TVs
VHS (video home systems) is a video cassette recording technology that the league required referees to use after each game to review their performances.

AutoCAD
This commercial computer-aided design and drafting software application is used by event planners at arenas to plan effective seating layouts.

Instant Replay
This technology is a video reproduction of something that recently occurred which was both shot and broadcast live. It is used to review last-second shots, last-second fouls, shot clock violations, out-of-bounds plays, and certain shots.

Second Spectrum
This video-tracking technology is used by the NBA to collect 3D spatial data including ball, player, and referee locations, movements, and other dynamic statistical and visual features.

24-Second Shot Clock
This technology is used to speed up the pace of game play and encourage teams to take more shots.

1954-1955

1986

2001

2002-2003

2017-2018

Name_____   Date_____

Careers in the NBA

Complete the information in the table during or after watching the Virtual Field Trip.

List two background experiences or training opportunities that each professional highlighted as influential.		
Referee Development and Training	1.	2.
Digital Content Strategy and Analytics	1.	2.
Arena Operations and Events	1.	2.
Player	1.	2.

1. Which background experiences of yours mirror those that you learned about during the Virtual Field Trip?

_____

_____

_____

2. Which courses or training opportunities would you be interested in exploring further?

_____

_____

3. List **two** careers from the Virtual Field Trip that most interest you based on your experiences, skills, and interests.

_____

_____

Name _____   Date _____

Career Profile Research

Directions: *Conduct online research to explore a basketball-related STEM career further.*

CAREER NAME _____

Brief description (include challenges this career solves)	
Training and skills required	
Related careers	
How this career matches my interests, skills, and strengths	
Current classes I am taking that could help prepare me for this career	
Education or training opportunities I would need in the future to pursue this career	
Projected job openings, if available	
I would/would not be interested in this career because …	

Name _____   Date _____

NBA All-Star Game MVP Prediction

Using the Discovery Education NBA Analysis Tool, (available in Discovery Education services) choose and analyze three statistics from the 2018-2019 regular season data to-date that you think will help predict the player who likely will be named the All-Star Game Most Valuable Player (MVP). For example, if you think points scored per minutes played will help project the All-Star Game MVP, calculate that statistic for each of the 10 starting players (five each on the Western Conference and Eastern Conference teams) and record that information on the handout. Using data-driven decision-making, predict the All-Star Game MVP and be prepared to defend your choice using data.

Describe each statistic and how you will calculate it:

1. _____

   _____

2. _____

   _____

3. _____

   _____

Prediction for All-Star Game MVP

Eastern Conference Team | Starting Line-up

Player Name	Statistic 1	Rank on Stat 1 (out of 10)	Statistic 2	Rank on Stat 2 (out of 10)	Statistic 3	Rank on Stat 3 (out of 10)
1.						
2.						
3.						
4.						
5.						

Western Conference Team | Starting Line-up

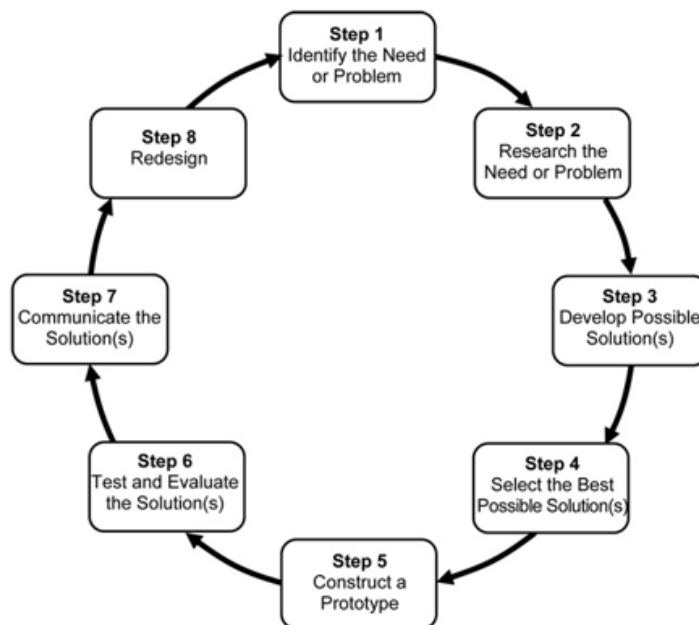| Player Name	Statistic 1	Rank on Stat 1 (out of 10)	Statistic 2	Rank on Stat 2 (out of 10)	Statistic 3	Rank on Stat 3 (out of 10)
1.						
2.						
3.						
4.						
5.						

Engineering Design Journal

The engineering design process involves a series of steps that leads to the development of new products or systems. In this design challenge, you will complete each step and document your work as you propose a solution.

Guiding Questions for Steps 1-4

1. What is a challenge or unfulfilled need that you believe players, coaches, NBA professionals, referees, or fans face related to basketball?

2. What are some possible solutions that could solve this challenge?

3. Who could benefit from these solutions?

4. After brainstorming with your group, describe the design solution you have selected. How will this solution impact the game of basketball?

8 Step Engineering Design Process

Source: **https://tinyurl.com/y9aemlxl**

Step 1
Identify the Need or Problem

Step 2
Research the Need or Problem

Step 3
Develop Possible Solution(s)

Step 4
Select the Best Possible Solution(s)

Step 5
Construct a Prototype

Step 6
Test and Evaluate the Solution(s)

Step 7
Communicate the Solution(s)

Step 8
Redesign

Step 5: Construct a Prototype

Use the grid below to sketch your idea using a scale drawing (one in which all the dimensions are reduced or enlarged proportionally). Write the scale used and include units of measurement. Include a short explanation of the design elements that should be incorporated into your new basketball tech. Include information from your internet research to support your recommendation.

Step 6-8:

- Test and Evaluate the Solution

- Communicate the Solution

- Redesign/Reflection