Sports Philanthropy Webinar

Engaging Students with STEM

Join Jeff Golner, STEM Sports, to learn how your organization can offer five free STEM lessons involving basketball, football, soccer and volleyball, allowing students to continue their education at home.

April 6, 2020

11 ET / 10 CT / 9 MT / 8 PT AM

SPN is hosting special free webinars every M, W, F to provide insight and growth opportunities.


Follow us at:

STEMSportsUSA
About STEM Sports®

STEM Sports® provides turnkey K-8 supplemental curriculum that uses sports as the real-life application to drive STEM-based learning in classrooms, after-school programs and camps.
About STEM Sports®

• Began in 2016 after a successful launch of STEM BMX for USA BMX
• STEM Volleyball and STEM Basketball followed
• STEM Soccer, STEM Football, and STEM Multi-Sport launched in 2017
• In August 2018, STEM Sports® received the service mark/trademark/supplemental register from the United States Patent and Trademark Office
• To begin 2019, STEM Sports® and Skyhawks Sports Academy, LLC began an exclusive licensing agreement whereby Skyhawks’ STEM Sports® camps and programs are offered
• In November 2019, STEM Sports® went international by partnering with the not-for-profit entity TIBU in Casablanca, Morocco whereby TIBU became an authorized reseller of STEM Sports® curriculum
• STEM Sports® curriculum is in schools, after-schools or camp programs in 47 U.S. states
• As of January 2020, STEM Sports® curriculum is being piloted in Japan, Australia, Egypt, Saudi Arabia and other countries are to follow
• STEM Golf, STEM Hockey, STEM Lacrosse, STEM Tennis, as well as STEM Baseball and STEM Softball along with STEM Multi-Sport for K-2, will be introduced in 2020
Each STEM Sports® teacher’s manual contains eight (8) robust supplemental curriculum lessons or modules that provide a minimum of 16 hours learning time.

Within each module, the time needed is clearly indicated.
Each curriculum has eight lessons aligned with either the Next Generation Science Standards (NGSS) and/or Common Core State Standards (CCSS) and/or National Standards for K-12 Physical Education.
STEM Sports® turnkey kits come equipped with all of the relevant sports equipment along with the necessary science supplies and teacher manual.

Teacher manuals are available to purchase alone and/or as an individual product.

Kits with just the teacher manual and science supplies and without sports equipment are now available as well.
Students will develop 21st-century skills such as critical thinking, collaboration, creative problem-solving, and leadership.

STEM Sports® curriculum survey results were accumulated from January 25, 2019 through December 23, 2019 and are comprised from 37 individual teachers/administers across the United States. For more survey results, click HERE.

OVERALL EFFECTIVENESS
How effective was the curriculum in encouraging students to use problem-solving skills?

<table>
<thead>
<tr>
<th>Extremely Effective</th>
<th>Very Effective</th>
<th>Moderately Effective</th>
<th>Slightly Effective</th>
<th>Not Effective at All</th>
</tr>
</thead>
<tbody>
<tr>
<td>46%</td>
<td>35%</td>
<td>14%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

APPROVAL RATING
The learning activities effectively further developed my students' ability to think critically about a topic.

<table>
<thead>
<tr>
<th>Extremely Agree</th>
<th>Moderately Agree</th>
<th>Slightly Agree</th>
<th>Neither Agree Not Disagree</th>
<th>Slightly Disagree</th>
<th>Moderately Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>61%</td>
<td>50%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

SATISFACTION LEVEL
How satisfied were you with the integration of 21st century skills within the learning activities?

<table>
<thead>
<tr>
<th>Extremely Satisfied</th>
<th>Moderately Satisfied</th>
<th>Slightly Satisfied</th>
<th>Neither Satisfied Not Dissatisfied</th>
<th>Slightly Dissatisfied</th>
<th>Moderately Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>57%</td>
<td>48%</td>
<td>5%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
</tr>
</tbody>
</table>

SATISFACTION LEVEL
Overall, how satisfied or dissatisfied were you with this STEM Sports curriculum/resource kit?

<table>
<thead>
<tr>
<th>Extremely Satisfied</th>
<th>Moderately Satisfied</th>
<th>Slightly Satisfied</th>
<th>Neither Satisfied Not Dissatisfied</th>
<th>Slightly Dissatisfied</th>
<th>Moderately Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>46%</td>
<td>43%</td>
<td>3%</td>
<td>5%</td>
<td>0%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Each teacher manual has 3rd to 5th grade lessons and lessons for 6th to 8th grade students.

“Capstone” Project (for 6th to 8th grade students) to commensurate student’s knowledge of each curriculum.

A Multi-Sport for K-2 students will launch in 2020 Q1.
Who teaches the curriculum?

Using the gold standard for science curriculum, the 5E instructional model is used in every module: Engage, Explore, Explain, Elaborate and Evaluate. STEM Sports® even added a sixth sequence: Extend.

This sequence of lesson methodology abides by science and STEM teacher’s instruction procedures which also creates great ease for PE teachers, sports coaches, and volunteers. Even students for whom the curriculum is designed for can lead the modules for their fellow students.

After all, STEM skills are all about Leadership, Problem Solving, Critical Thinking and Collaboration.
At STEM Sports®, we realize the importance and purpose of STEM academia: to help young students obtain important science, technology, engineering and math skills so that when they join the workforce, they are ready and prepared. Moreover, by offering these important STEM skills, students can also see career paths at an earlier age so that their education is geared for their long term success.

In each module, a list of STEM jobs within or touching the sports industry are offered. This enables teachers and curriculum administrators the opportunity to have robust classroom discussions about jobs that some students have yet to realize.
Each curriculum and every module has a corresponding student assessment. As part of the sequence of the lesson, students are to take the assessment before and after the lesson to better evaluate their comprehension level. Teachers/administers will receive instant results once the digital assessment is completed.
Ready-to-use worksheets are applicable to almost every lesson of every module. These worksheets are provided within the teacher manual and are designed for open-ended responses as well as for rigorous data collection. Furthermore, they assist in evaluating the student’s comprehension level of the standardized lessons.
The Engineering Design Process (EDP) is a key element of any STEM curriculum and is woven into each STEM Sports® supplemental curriculum.

Supplies Provided
- Workbooks, Soccer Balls, String, Tape, Balls, and Test Pops
- Please email info@STEMsports.com to access Worksheet Keys.

Materials Needed
- Pencils

Sequence of Lesson
Have your students take this lesson’s assessment prior to engaging by visiting https://stemsports.com/supplements
Please email info@STEMsports.com to access Assessment Keys.

Engage: Play the first video of first video under Goal-Line Technology at www.STEMsports.com by clicking "Sources," then "STEM Soccer." Ask students if a goal would be given here or not. Have students discuss with their groups. Ask them if they think it is fair to use technology to determine if it was a goal. Why or why not? Show them the rest of the video.

Explore: Play the second video under Goal-Line Technology at www.STEMsports.com by clicking "Sources," then "STEM Soccer." Ask students to draw a diagram of the current technology at the World Cup.

Explain: Tell students that technology can be designed using the Engineering Design Process. Discuss Engineering Design Process steps.

Explain that sometimes we need to engineer a simple product for different uses. For example, we may not use the system developed for the World Cup in a youth community league, but it still might be fair if the youth league had a device to determine if the entire ball crosses the line. Their problem is that the current technology is too expensive.

Elaborate: Students need to design a low-tech version of goal-line technology. Students will brainstorm, prototype, and test the prototype. Use the engineering design sheet to help guide them through the process.

Evaluation: Students should present their designs to the class with evidence to support that it is successful.

Have your students retake this lesson’s assessment to effectively evaluate their comprehension by visiting https://stemsports.com/supplements
Please email info@STEMsports.com to access Assessment Keys.

Extend: If you have other materials available, allow students to have an open design challenge. Students need to use data to redesign and justify their design changes in writing.

STEM Jobs in Sports
- Computer Application Coders of pga
- Videographer
- Patent Agent
- Computer Engineer
- Stadiums/Rena: Quality Control Coordinator

Fun Facts
Perhaps one of the most famous goal-line Related incidents came in 2010 in the knockout stages of the FIFA World Cup with Germany and England. Just before halftime, Frank Lampard of England shot the ball and it hit the underside of the crossbar, resulting in the ball fully crossing the goal line but bouncing back into the field of play due to backspin. Whether the referee nor his assistant could award the goal. England went on to lose to Germany in that game 4-1.
The mental health of both teachers and students alike should not be overlooked during any aspect of the education process. STEM Sports® recognizes this and establishes that mindfulness matters when tackling our curriculum. The need and importance of the double play of STEM & Sports is established at the beginning of each curriculum.
STEM Sports® Curriculum Details

For slides 16 through 40, review the Tables of Contents for each curriculum, based on grade differentiation, along with Supplies highlights.
<table>
<thead>
<tr>
<th>Module 1.1</th>
<th>The Measurements of Basketball</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Students will measure the area and perimeter of a polygon by using a square tile and a tape measure. Students will calculate the perimeter and area of a polygon by using a formula and dimension (either measured or given).</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Math: Area and Perimeter</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>(1) 60-minute session</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 2.1</th>
<th>Forces in Basketball</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Students will conduct a controlled experiment to determine the change in motion by measuring the number of bounces and the height of the first bounce. Students will predict how gravity/motion will affect/change the ball if it is dropped at a higher or lower height.</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Science: Motion and Gravity</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>(2) 45-minute sessions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 3.1</th>
<th>Understanding Basketball</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Students will explain why balls behave differently by using observations about the solids and gases that make up the balls. Students will make observations about texture, ability to stretch, and state of matter of materials by recording information in a data table. Students will explain there is air inside the ball by comparing an empty ball and a full ball.</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Science: States of Matter, Observations</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>(2) 45-minute sessions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 4.1</th>
<th>Motion and Basketballs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Students will round whole numbers from the tenth place. Students will divide two whole numbers to determine the speed of a basketball. Students will explain speed as a division problem between distance and time.</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Science: Measuring Speed Math: Division and Real World Problems</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>(2) 45-minute sessions</td>
</tr>
</tbody>
</table>
## Module 5.1
**Engineering Design Challenge**

**Objective**
Students will design a device that increases the motion of an object by conducting a controlled test. Students will conduct a controlled test on their design by taking measurements and recording observations.

**Concept**
Motion and Engineering for Accuracy

**Time**
(2) 45-minute sessions

## Module 6.1
**Calculating Calories**

**Objective**
Students will calculate calories burned during gameplay by using multiplication and division. Students will predict the calories they will burn by doubling numbers.

**Concept**
Math: Multiplication and Division

**Time**
(1) 60-minute session

## Module 7.2
**Shot Tracking**

**Objective**
Students will compare fractions based on their free throw accuracy by using the greater than and less than symbols.

**Concept**
Math: Fractions

**Time**
(1) 60-minute session

## Module 8.1
**Advancements in Shoe Technology**

**Objective**
Students will make detailed observations by using their senses and measurements to make inferences about changes in technology.

**Concept**
Science: Observation

**Time**
(2) 45-minute sessions
**Module 1.1**  
**Basketball Measurements**  
**Objective**  
Students will use actual data to determine the scale sizes of a basketball court by using proportional relationships.  
**Concept**  
Math: Propositions  
**Time**  
(2) 50-minute blocks

**Module 2.1**  
**Science of Basketball**  
**Objective**  
Students will compare the forces acting and reacting on a basketball by using data from a controlled experiment. Students will explain how Newton's Third Law is demonstrated in dribbling a basketball.  
**Concept**  
Science: Physics  
**Time**  
(3) 50-minute blocks

**Module 3.1**  
**Understanding Basketball**  
**Objective**  
Students will describe how temperature changes the properties of the basketball by drawing a diagram of the molecular motion of the solid ball material.  
**Concept**  
Science: Molecules and Heat  
**Time**  
(2) 50-minute blocks

**Module 4.1**  
**Velocity and Acceleration**  
**Objective**  
Students will calculate the force used on a basketball in different pass types by using Newton’s Second Law. Students will describe the materials of a basketball by using the physical and chemical properties.  
**Concept**  
Science: Physics and Chemistry  
**Time**  
(2) 50-minute blocks
Module 5.1  
Engineering Design Challenge  

Objective  
Students will design and build a mechanical shooting device (aka catapult) by using the Engineering Design Process. Students will test and redesign their prototype by using Newton’s Second Law to determine the change in force.  

Concept  
Engineering and Science: Physics  

Time  
(3) 50-minute blocks  

Module 6.1  
Calculating Calories  

Objective  
Students will explain how food is converted to energy (kcal) through cellular respiration. Students will develop an equation for calories burned during activity by using letters to represent variable for the equation.  

Concept  
Science and Math: Biology and Equations  

Time  
(1) 50-minute block  

Module 7.2  
Shot Tracking with Technology  

Objective  
Students will use data collected to make a claim using evidence from technology by interpreting graphs.  

Concept  
Science and Math: Process of Science, Statistics  

Time  
(2) 50-minute blocks  

Module 8.1  
Advancements in Shoe Technology  

Objective  
Students will use qualitative data to evaluate and improve shoe technology by using the Engineering Design Process.  

Concept  
Engineering  

Time  
(2) 50-minute blocks
STEM Basketball

• Multiples of 18 different products in the kit
• Long shelf-lives
• Features: 10 basketballs and five hair dryers
How to receive STEM Sports® Curriculum

Visit

www.STEMSports.com/Samples

Fill out a brief form and request the lesson you desire.

You’ll also receive a free, non-sports specific lesson called Playing with Precision.