



Welcome to Playing with Precision

Module
10.0

STEM Sports® provides turnkey K-8 supplemental curriculum. We deliver standards-aligned lessons using Basketball, Football, Soccer, Volleyball and BMX as the strategic vehicles to drive STEM-based learning in classrooms, after-school programs, and camps.

We are pleased to present this sample lesson - Playing with Precision. We encourage you to activate this lesson with your students to get a better picture of how STEM Sports® uses sports as the catalyst to bring STEM learning to your classroom!

All of our Supplemental Curriculum lessons present a rigorous, hands-on approach to exploratory learning, highlighted by the following:

- Content for a minimum of 16 hours of instruction.
- Each curriculum has eight lessons aligned with the Next Generation Science Standards (NGSS) and/or Common Core State Standards (CCSS).
- Turnkey kits come equipped with all of the relevant sports equipment along with the necessary science supplies.
- Students will develop 21st-century skills such as critical thinking, collaboration, creative problem-solving, and leadership.
- Differentiation: grade band assimilation for 3rd to 5th and 6th to 8th.
 - “Capstone” Project (6th to 8th) to commensurate student’s knowledge of each curriculum.
- Well designed and scalable for teachers, administrators, or volunteers.
- Ready-to-use worksheets that align with each lesson and standards.
- Mindfulness Matters: important messaging to assist with the uniqueness of blending STEM with sports.
- Each module has a list of STEM-based, sports-related jobs pertinent to the lesson concept.
- Assessments in each lesson to effectively evaluate students.

Please visit www.STEMSports.com for additional information and to learn about the other STEM Sports® curriculum that we offer.

We sincerely hope you and your students enjoy this STEM Sports® lesson!

DISCLOSURE: This curriculum, including any/all portions of this kit/equipment are intended for educational purposes only. The sport of basketball involves risk of injury, loss and damage. By choosing to partake in this program, all teachers, students, and participants assume full responsibility for such risks. This curriculum makes no representation or warranty, expressed or implied, including but not limited to any warranty of merchantability or fitness for a particular purpose. There are risks associated with participation in any athletic activity, and the student/teacher/participant is responsible for any potential risks associated with these activities. STEM Sports® shall not incur any liability for any damages, including but not limited to, direct, indirect, special or consequential damages arising out of, resulting from, or in any way connected to the use of this curriculum, whether or not based upon warranty, contract, or otherwise, whether or not injury was sustained by persons or property, and whether or not loss was sustained from, or rose out of, the implementation of this curriculum. The curriculum contained within this document is the property of STEM Sports®, and may not be reproduced or otherwise distributed for use without the written consent of STEM Sports®.



Mindfulness Matters

Mindfulness may not be the first thing that comes to mind when one thinks about STEM Sports®. However, mindfulness is essential to fully understanding the design and benefits of the STEM Sports® curricula by way of the following:

- Approximately 85% of STEM jobs anticipated for the year 2030 have yet to be invented.
- Moreover, within the next 10 years or so, 80% of all jobs will be STEM related.



The STEM Sports® curricula distinctly blends STEM content areas through hands-on/active play and sports. Active play provides a mechanism to teach STEM concepts; therefore, learning is integrated, engaging and meaningful, as participants are exposed to STEM applications through real world experiences.

Teachers of the curricula should be mindful of the fact STEM Sports® curricula are:

- Collaborative in nature, ensuring peer-to-peer learning opportunities
- Inquiry-based, allowing learners to discover information for themselves
- Designed for problem-solving, an essential lifelong skill
- Hands-on, engaging all types of learners
- Student-led, encouraging ownership of learning
- Active, promoting physical activity and wellbeing

Participants of the curricula should be mindful of the fact STEM Sports® curricula are:

- Introductory to STEM concepts: facilitates comfort with STEM content areas
- Blends play and sport: an environment that is engaging, fun, and applicable to life outside the classroom
- Designed for all: ensuring success for all participants – you don't have to be athletic or excel at science to accomplish curricula tasks
- Applicable to the real world: learning is meaningful for all participants

In sum, stakeholders should be mindful of all the STEM Sports® curricula have to offer. The unique design of the STEM Sports® curricula is essential to maximize learning and the understanding of STEM concepts in sports and life applications.

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Playing with Precision

Concept

Energy Transfer

Objective

Students will be able to design a chain reaction system that transfers energy from the ball in three ways by using the Engineering Design Process.



Standards

Next Generation Science Standards (NGSS) Connections

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Materials Needed

Paper, Cups and Pencils

Sequence of Lesson

Engage: Have students use small paper balls and a cup to try to make a “basket” with one bounce. Ask students to describe what is happening to the energy in the ball when it bounces. Share out with the partners or groups using instructional strategies.

Explore: Line up buckets and line up students ten feet from the baskets. Have students try to make the ball in the basket by creating a chain reaction using rolls, bounces, a second ball or other common classroom objects (chair, ramp, etc). Students can angle the basket in different directions, but it must stay ten feet away (Give students about 5-10 minutes.).

Explain: The instructor should explain how energy can be transferred from one object to another (i.e. Electric to motion (cars), heat to motion (wind), potential to kinetic). Explain to students the difference between kinetic and potential energy, as well as how mass to the height of the object can influence its energy.

Elaborate: Have students brainstorm several ways to complete a chain reaction with the materials provided. They should each draw out three diagrams with labels. In groups, they should evaluate the designs and select two designs to build and test. Allow students time to construct and test two designs as a group.

Evaluate: Students should use their most successful* design. Have students draw and label where the energy transfers are taking place, and if more or less energy is transferred.

Extend: Have students go back and redesign their most successful design. Students should justify their design changes in writing.



STEM Jobs in Sports

- Arena Mechanical Engineer
- Materials Scientist
- Kinesiotherapist
- Stadium Architect
- Exercise Physiologist

Name: _____

Playing with Precision

GRADES 3-5

Elaborate: Brainstorm and Draw Three Diagrams with Labels

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Evaluate: Select Two Designs & Test

	Shot 1	Shot 2	Shot 3	Shot 4	Shot 5
Design 1					
Design 2					

MADE SHOTS = O
MISSED SHOTS = X

Name: _____

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GRADES 3-5

Evaluate: Draw and Label Energy Transfers