Welcome to

Module 10.0

Playing with Precision

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®.

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Mindfulness Matters

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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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training for your school/organization, visit www.RayeEducationalServices.com or call 602-510-0298.

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Module 10.0

GRADES 6-8

Playing with Precision

Concept

Accuracy and Precision

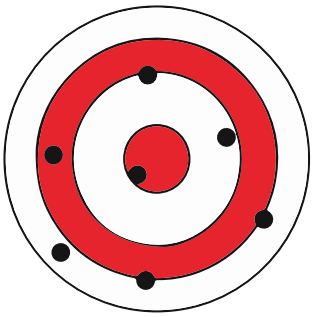
Objective

Students will measure accuracy and precision by determining percent success and percent error. Students will explain how the amount of force put on the ball will influence the distance traveled by completing a force diagram.

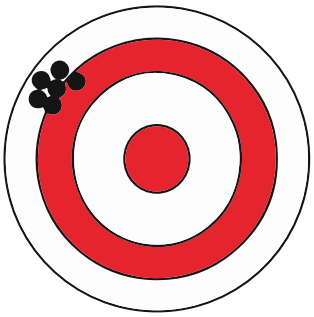
Standards

Next Generation Science Standards (NGSS) Connections

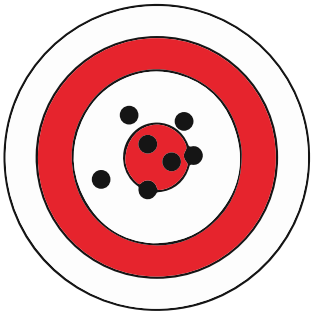
MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
Understanding about the Nature of Science: Scientific Knowledge is Based on Empirical Evidence.



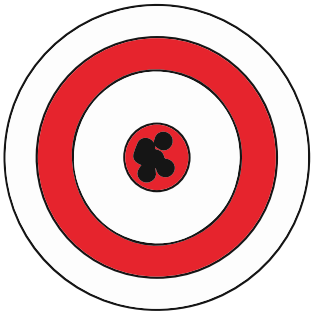
Low accuracy
Low precision



Low accuracy
High precision



High accuracy
Low precision



High accuracy
High precision

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Materials Needed

Paper, Cups and Pencils

Sequence of Lesson

Engage: In the classroom, have students use small paper balls and a cup to try to make a "basket". Ask students to describe how they would measure their success. Share out with the class using instructional strategies.

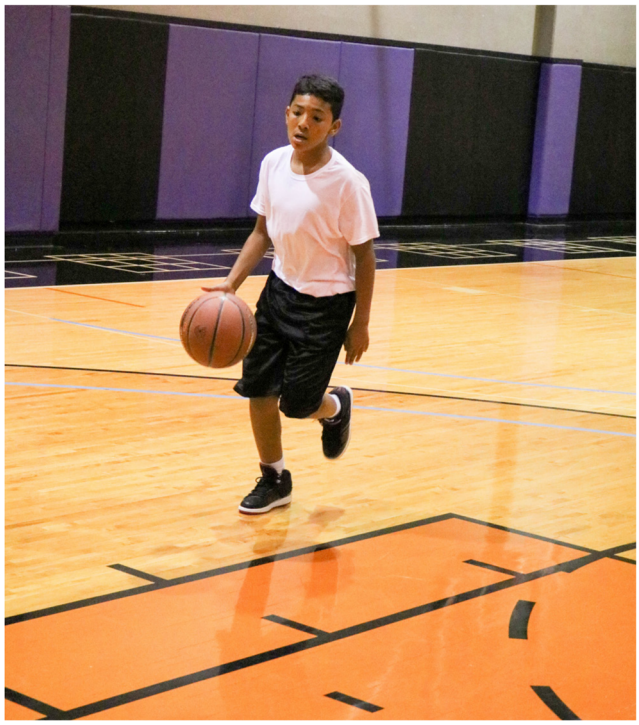
Explore: Line up buckets and line up students ten feet from the baskets. Have students try to make as many baskets as possible in a 2 minute time frame. Students should record data in the provided data table.

Explain: The instructor should explain the differences and similarities between precision and accuracy. Discuss statistical measures of accuracy (percent error or percent success) and precision (range).

Elaborate: Have students brainstorm ways to measure range during the experiment. Alternatively, provide them with the following instructions: Have a second student stand at the bucket end of the set up and mark with chalk where the ball hits each time it misses. Then students will measure each miss distance and find the average miss difference (include shots made with a value of 0) or they can find a simple range. Then have students perform the experiment again; collect data on 20 shots. They should also calculate percent success by dividing the number of made shots by the total number of shots and multiply by 100. Repeat 3 - 5 times.

Evaluate: Students should create a Venn diagram that outlines the differences between accuracy and precision.

Extend: Repeat the experiment a third time. This time students should vary the force (strength) acting on the ball every time (independent variable) and then calculate percent success and range/average miss distance for each varying force tested. Repeat each force 3 - 5 times. Force suggestions (easy toss, normal toss, hard toss).



STEM Jobs in Sports

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

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Module 10.0

Name: _____

Playing with Precision

GRADES 6-8

Explore: Number of Shots Made In 2 Minutes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Partner 1																					
Partner 2																					

MADE SHOTS = O
MISSED SHOTS = X

Elaborate: Calculate "Success" Percentage

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Partner 1																					
Partner 2																					

MADE SHOTS = O
MISSED SHOTS = X

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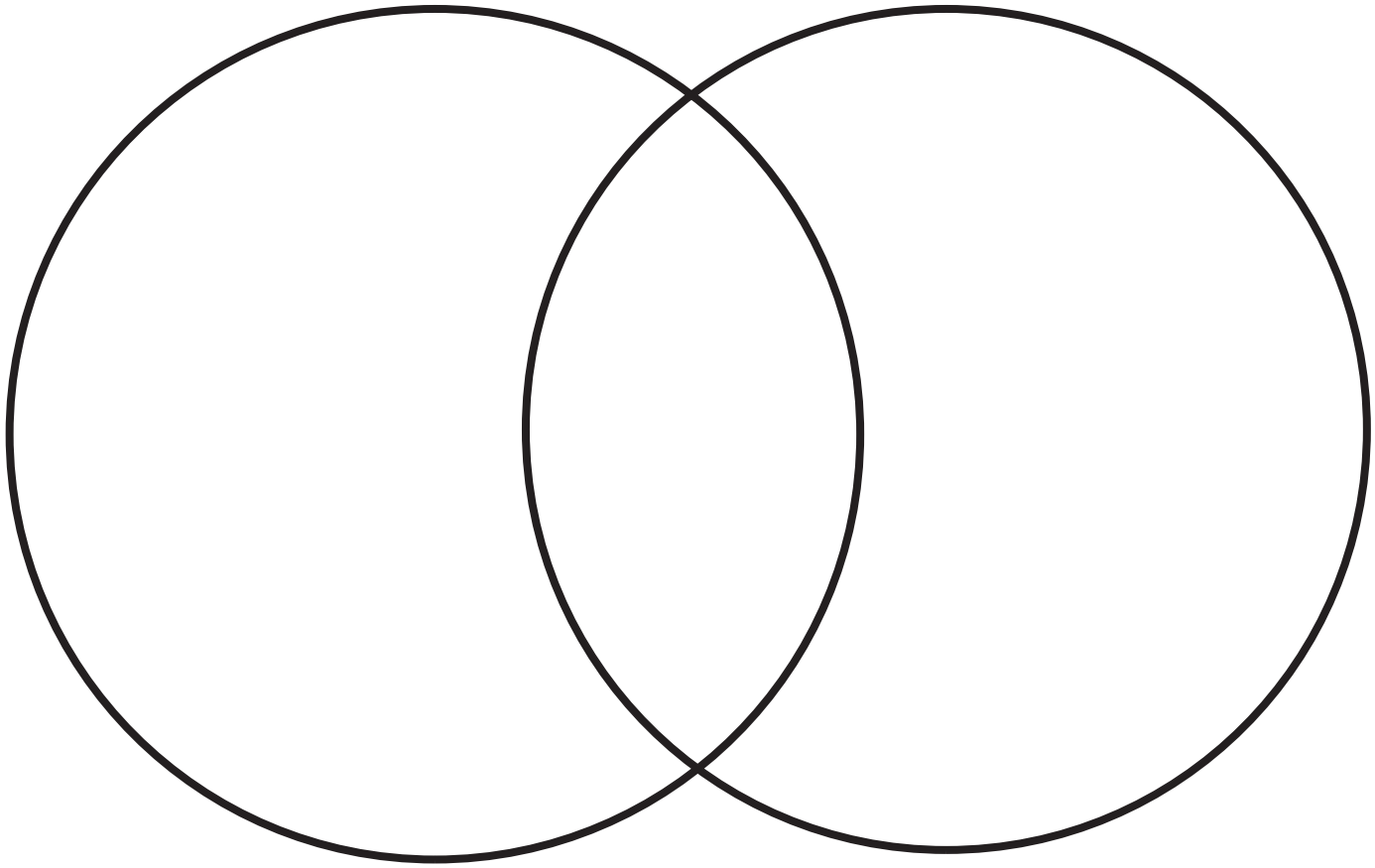
Name: _____

Playing with Precision

GRADES 6-8

Evaluate: Accuracy and Precision



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