VOLUME
1

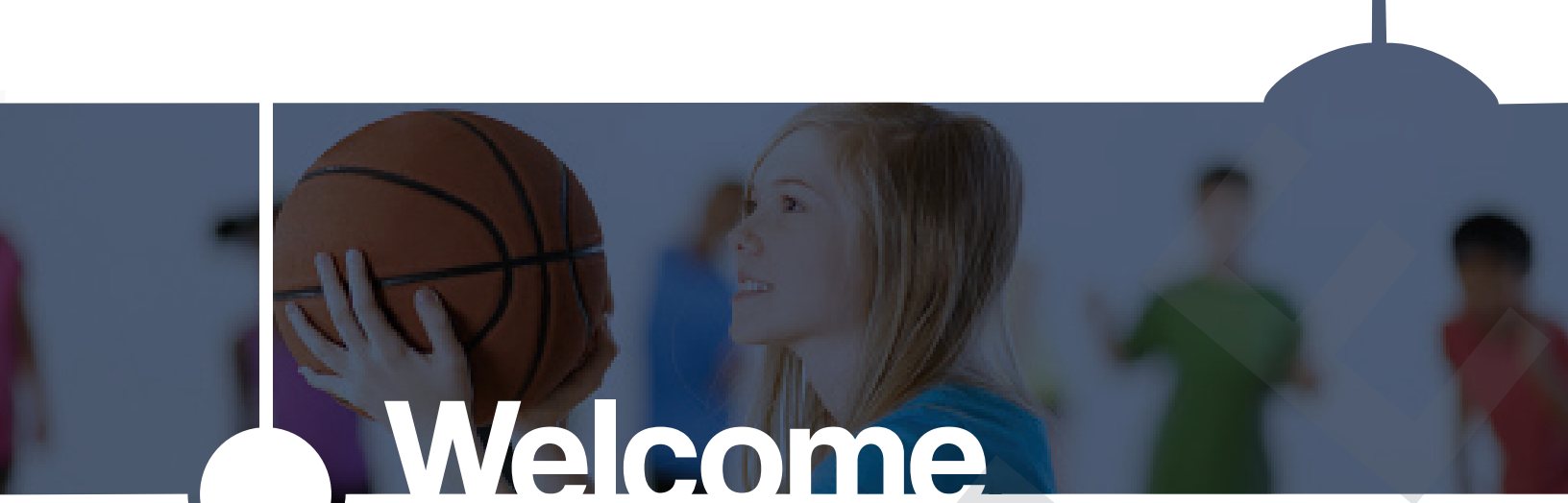
STEM sports®

science • technology
engineering • math • sports

STEM MULTI-SPORT

SUPPLEMENTAL CURRICULUM

KINDERGARTEN THROUGH GRADE 2



Welcome

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

We are pleased to present Volume 1 of STEM K - 2 Multi-Sport, highlighted by the following:

- Content for a minimum of 16 hours of instruction that includes some healthy, physical activity.
- Turnkey kits come equipped with all of the relevant sports equipment along with the necessary science supplies.
- The curriculum has eight lessons aligned with the Next Generation Science Standards (NGSS) and/or Common Core State Standards (CCSS) and/or National Standards for K-12 Physical Education.
- Through our 5E lesson plans, students will develop 21st-century skills such as critical thinking, collaboration, creative problem-solving, and leadership.
- Ready-to-use worksheets that align with each lesson and standards.
- Each module has a list of STEM-based, sports-related jobs pertinent to the lesson concept.
- Engineering Design Process (EDP) and the Scientific Method woven into lessons.
- Mindfulness Matters: important messaging to assist with the uniqueness of blending STEM with sports.
- STEM Sports® glossary to support instructors and students as they come across key vocabulary in each module.
- Well designed and scalable for teachers, administrators, or volunteers.

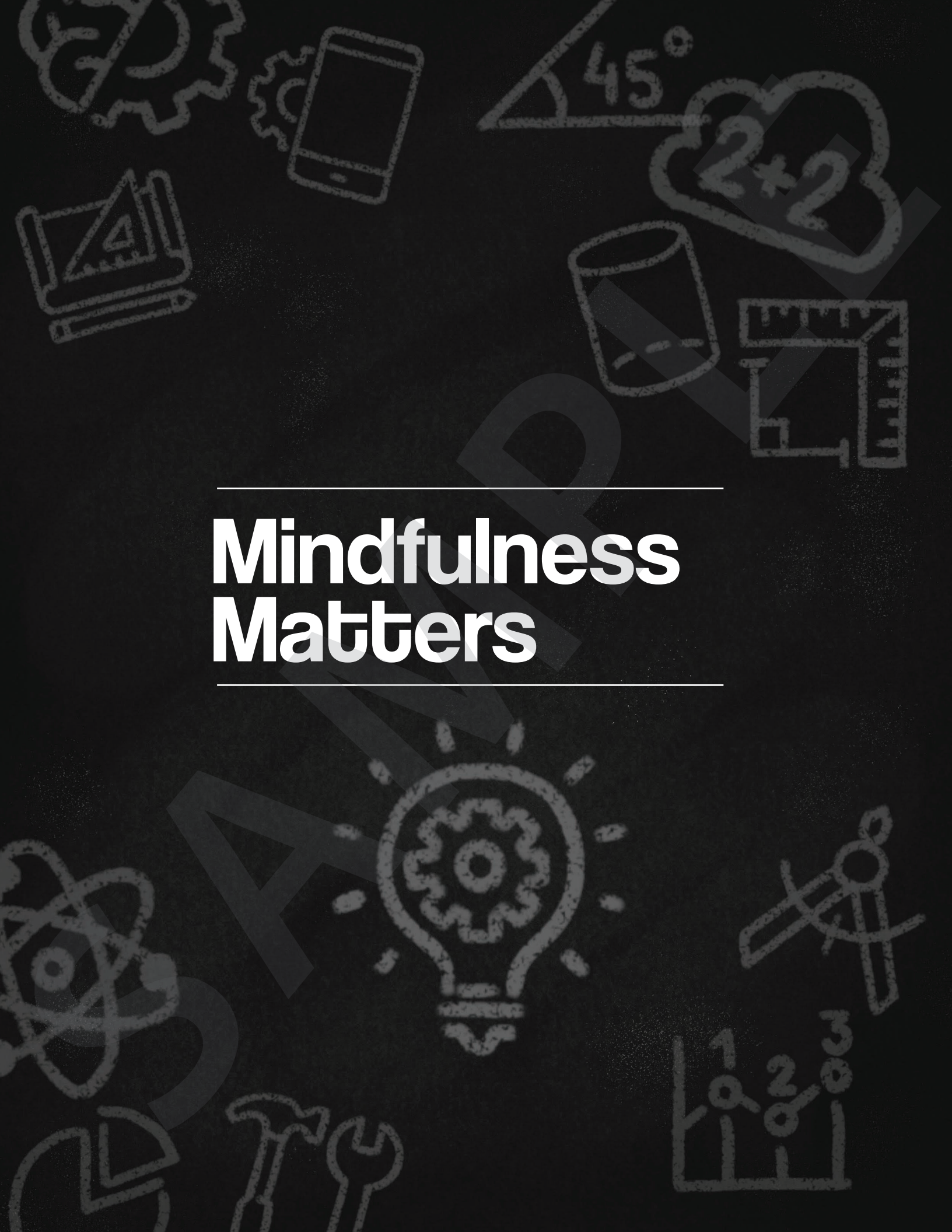
Please visit www.STEMSports.com for additional information and to learn about the other STEM Sports® curriculum that we offer.

We sincerely hope you and your students enjoy this STEM Sports® supplemental curriculum.

Please complete our Teacher's Survey at www.stemsports.com/teacher-survey.
We appreciate your feedback.

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 one thinks about regarding 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:

- Introduction to STEM concepts, facilitating comfort with STEM content areas
- Blending play and sport in an environment that is engaging, fun, and applicable to life outside the classroom
- Designed for all ensuring success for all participants – students do not have to be athletic or excel at science to accomplish curricula tasks
- Applicable to the real world where 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.

Contents

Grades K-2

Supplies Checklist

- ☐ **Six (6)** 25.5" youth outdoor basketballs
- ☐ **Six (6)** pee-wee footballs
- ☐ **Six (6)** foam footballs
- ☐ **Six (6)** size 3 soccer balls
- ☐ **Six (6)** 6" playground balls
- ☐ **Three (3)** ball bags
- ☐ **One (1)** ball pump
- ☐ **One (1)** set of inflation needles
- ☐ **Twenty-Four (24)** disc cones
- ☐ **Six (6)** digital stopwatches
- ☐ **Six (6)** 25' tape measures
- ☐ **One (1)** weight scale
- ☐ **Five (5)** cut ball swatches – indoor
- ☐ **Five (5)** cut ball swatches – outdoor
- ☐ **Five (5)** calipers
- ☐ **One (1)** package of 100 latex balloons
- ☐ **Four (4)** mini-stikka!
- ☐ **Three (3)** flagstick!
- ☐ **Two (2)** t-mat!
- ☐ **Eight (8)** ballz!
- ☐ **Three (3)** clubs - puttr! (1), hitta! (1) hitta! (LH) (1)
- ☐ **One (1)** K – 2 Multi-Sport Curriculum Manual

Materials Needed

- ☐ Pencils
- ☐ Paper Towel Rolls
- ☐ Empty Cereal Boxes
- ☐ Multiple Solid Objects: Wooden Block, Bouncy Ball and Plastic Ball
- ☐ Multiple Sports Balls: Tennis, Golf, Baseball and Ping Pong
- ☐ Pieces of Cardboard

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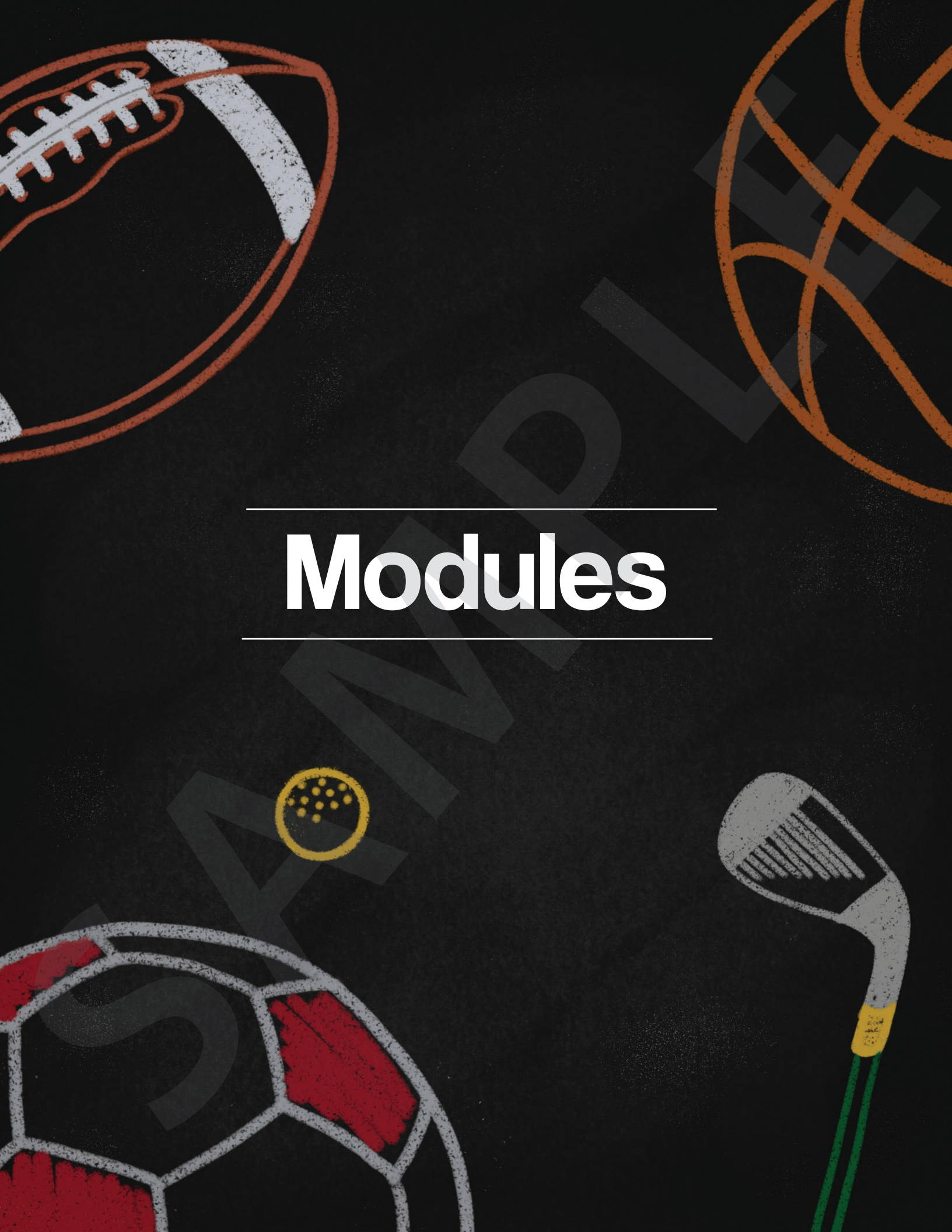
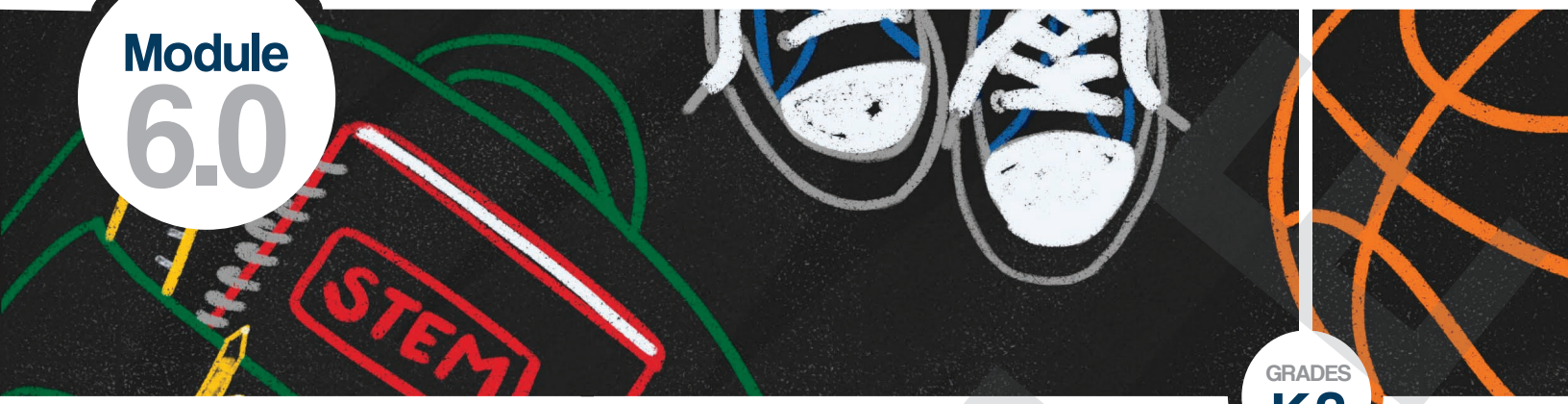

Modules



Module 6.0

GRADES K-2

Design a Shoe

Concept
Engineering Design Process
Science: Observations
Use of Technology

Objective
Students will study the advancements in shoe design from the first basketball shoe to today's shoes. Students will make detailed observations by using their senses and measurements to make inferences about changes in technology. Students will design their shoes using the Engineering Design Process.

Time
(2) 30-minute Sessions

Standards

Next Generation Science Standards

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K - 2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

2-PS1-2: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

National Standards for K - 12 Physical Education

Standard 2: The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.

Standard 4: The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Background:

Athletic shoes may look similar in many ways, yet their purpose and function differ. For example, a running shoe is

specifically designed to protect your feet from different types of weather while being light weight and comfortable. Whereas a basketball shoe is designed to support (high-tops) both a player's foot and lower ankle from injury. Non-sports shoes, such as "dress-casual", have a more professional look, however, have the comfort and performance of an athletic shoe. What about shoes with cleats or spikes? These shoes function well across several different sports, such as: baseball, football, track & field and golf.

In general, shoes may look and feel the same in many ways but are constructed with several small differences.

Supplies Provided

Worksheets

Please email Info@STEMSports.com to access Worksheet Keys.

Materials Needed

Pencils and Sample Shoes (cleats, dress shoes, basketball shoes, tap shoes)

Sequence of Lesson

Engage: Have students discuss with a partner: Describe your favorite pair of shoes. Would it be hard to play outside or play sports without shoes on? Why or why not?

Explore: Have students study the five (5) different pictures (worksheet) of shoes and discuss. How have shoes changed over time (technology vs. innovation)? What is new? What is the same?

Explain: Tell students about the similarities and differences between observations and inferences. Explain to students how detailed observations can provide good scientific data to make inferences.

Elaborate: Ask students: What are shoes made of? Why is there rubber on the bottom of the shoes? How do laces help? Why are "slip-on" shoes not used to play basketball? What kind of materials/ fabric is on the inside vs. outside of the shoe? How did the invention of the "high-top" help prevent injuries?

Evaluate: Ask parents to send students with an extra pair of shoes for the lesson OR have students remove one shoe. Using the student's shoes, have them make observations on the worksheet (students in lower grades can verbalize).

Extend: Students can draw, measure, and use their four senses (no tasting!) to generate additional inferences of his/her shoes.

Teacher note: Advance students can design a better shoe on the backside of the worksheet or a separate piece of paper based on what they learned about shoe technology. Students can write an explanation on why shoes count as "technology".

STEM Jobs in Sports

- Shoe Designer
- Orthopedic Doctor
- Strength and Conditioning Coach
- Equipment Manufacturer
- Supply Chain Manager

Fun Facts

Converse previously made rain boots: The company started in 1908 as a rubber shoe company that produced galoshes.

Name: _____

Design a Shoe

GRADES K-2

Have students observe the below shoes images.

How have shoes changed over time (technology vs. innovation)? What is new? What is the same?

Teacher note: Younger students may verbalize their responses.

Shoe	Observations with numbers	Observations with words	Inference about why there was a design change
			
			
			
			
			

Name: _____

Design a Shoe

GRADES K-2

Design your shoe in the box below:

Name: _____

Design a Shoe

GRADES K-2

Describe your shoe:

Shoe	Material	Reason
Sole		
Covering		
Laces		
Height		

Module 6.0

Name: _____

Design a Shoe

GRADES K-2

Shoe Name: _____

What are your shoes designed for (sport, dressing up, causal, etc.)?

If you were to sell your pair of shoes, what would the cost be and why?

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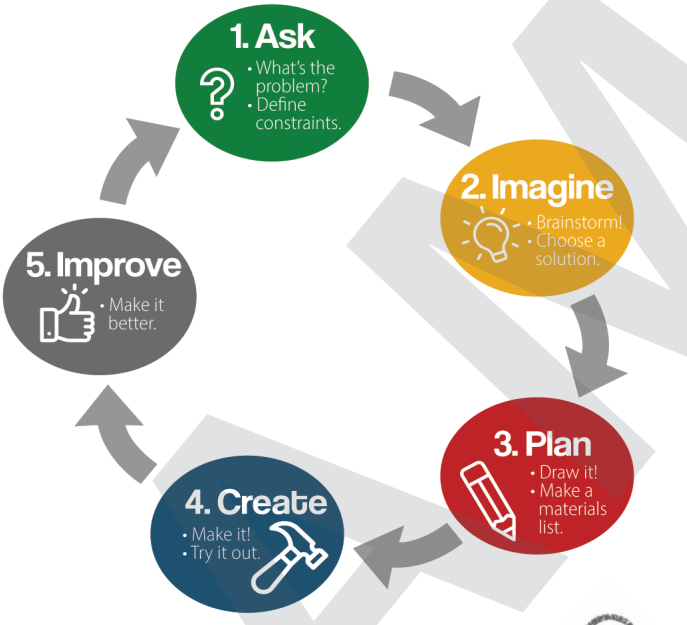
K-2 STEM Sports® Glossary

Chipping or Chip Shot is a golf stroke played close to the green that pops the ball briefly into the air, then rolls toward the hole.

Conclusion means to finish or conclude with an explanation, judgment, or opinion through interpretation.

The **Engineering Design Process (EDP)** is an organized series of steps that engineers use to develop functional products or processes.



An **Experiment** is a test or investigation to find something out.

A **Force** is a push or a pull and measured in units called "newtons".

A **Hole-in-One** is when a player hits the ball from the tee box (tee shot) into the hole in one shot.

A **Hypothesis** is a proposal with the objective to explain certain observations or events.

Innovation is the creation of something new or a modification to an existing product in an attempt to improve it.

Mass is a fundamental property of matter that is a numerical measure of the inertia (inactive) of an object or the amount of matter an object contains.

A **Penalty Kick** is a free shot at the goal defended only by the goalkeeper, given to an offensive player for specific defensive violations.

Probability is the likelihood an event will occur, often demonstrated with a numeric value/statistic.

Properties are what a material or substance is like or how it performs. It can describe any piece of the material. For example, a golf ball is small and hard.

Putting or **Putt** is a golf stroke made on a green to cause the ball to roll into or near the hole.

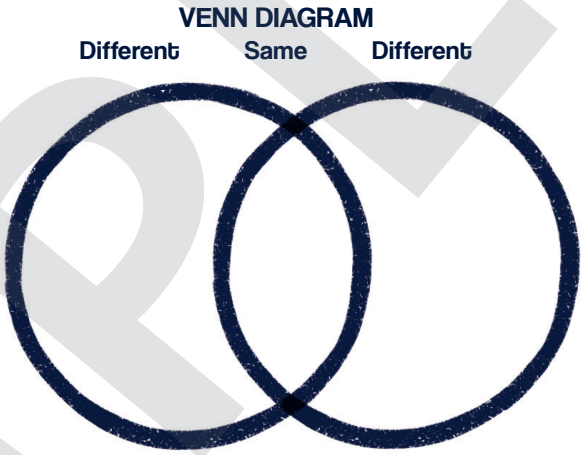
The **Putting Green** is the part of the course/hole designed for putting. It should be kept clean at all times for consistent play.

STEM Sports® Glossary Continued

Scientific Method

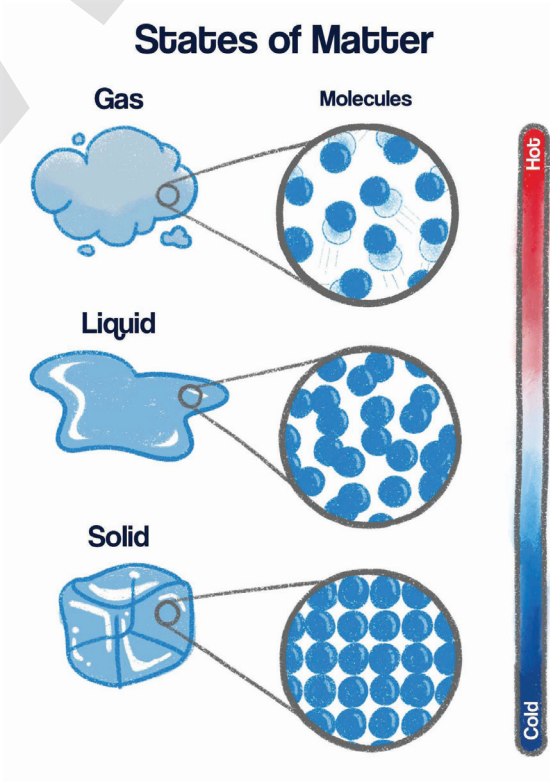
The **Scientific Method** is a scientific process that involves investigation and discovery through a variety of techniques: observation, description, measurement, experimentation, formulation (or modeling), testing and adapting the hypotheses.

A **Venn Diagram** is a diagram that logically demonstrates relationships of similarities and differences of a given entity or entities.



States of Matter

- A **Solid** is a set of atoms or molecules held together (within a constant state) so they maintain a distinct shape and size.
- A **Liquid** is a state of matter defined by its condensed make-up and ability to flow.
- **Gas** is a state of matter defined by its moveable or non-condensed state and/or ability to flow.



Technology is a branch of knowledge that deals with the creation and use of technical means related to life, society, and the environment.

Notes

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