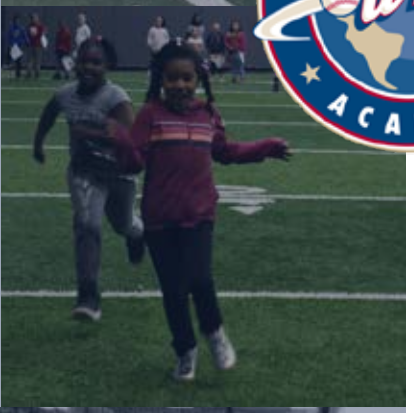
STEM EDUCATION



The Bigger Vision

"Everywhere we go in this world we see the need for young leaders to emerge who care about the needs of others."

– Caleb Kimmel, CEO of World Baseball Academy

OUR MISSION

The mission of World Baseball Academy is to use the platform of baseball to exemplify excellence and leadership beyond the game.

OUR VISION

The vision of World Baseball Academy is to develop leaders who positively impact our world.

WHY STEM?

World Baseball Academy STEM initiative is an innovative way to connect with ALL kids through the science, technology, engineering, and mathematics of the game of baseball. Our fun, hands on "learning by doing" curriculum allows staff and volunteers to build relationships with young people while helping them become of aware of future career paths and WBA core character traits.

Science, Technology, Engineering and Math are integral to baseball. Applications of geometry, aerodynamics, balance, gravity, velocity, transfer of energy, and math measure every movement of every player, creating endless statistical models that track progress and determine the elite. Baseball players excel when they understand what the numbers reveal and how the laws of physics apply to skill development and game strategy. STEM subjects therefore come easily to WBA's baseball instructors, but that is not why World Baseball Academy includes STEM education in its programs. WBA uses STEM to ignite a desire for knowledge, a core character leadership trait.

STEM EDUCATION PARTNERS

FWCS
WE ARE YOUR SCHOOLS

DoD STARBASE
A Department of Defense Youth Program

BOYS & GIRLS CLUBS
OF FORT WAYNE

EACS
EAST ALLEN COUNTY SCHOOLS

WBA
INTERNSHIP
PROGRAM

Developing Future Leaders

Great STEM education inspires exploration and discovery and increases awareness of career opportunities that align with a young person's passion. Making STEM subjects relevant to average boys and girls is a vital need, according to the National Science Foundation and National Education Association. Both value informal STEM learning's critical role in opening minds to STEM subjects and opportunities, with NEA stating, "Research stresses the importance of this hands-on learning as an important way to spark interest in critical and fast-growing STEM fields. But little about science instruction in today's classrooms matches that ideal."

Across the country, teaching science through sports hits a home run for impact. At Columbus, Ohio's Center of Science and Industry, the professional Blue Jackets hockey team is an "Official Science Sponsor." Hockey is the focus in one of a series of COSI's Science of Sports videos. San Francisco's Exploratorium, a public learning laboratory, hosts a Science of Baseball web page devoted to baseball and STEM topics. The national Cal Ripken, Sr. Foundation sees STEM education as an opportunity to apply lessons from sports—teamwork, respect, communication, and resilience—to the classroom, and has developed curriculum for interactive afterschool STEM lessons.

WBA envisions adding this kind of value to the STEM educational experience of boys and girls in greater Fort Wayne when they visit the WBA Baseball STEM Lab, or experience WBA STEM hands-on learning with the HitTraxTM simulator at their school.

Our StarBase partners are excited about this possibility, as instructor Victoria Wilson explains: "Starbase values innovative, hands-on activities to expose at-risk youth to STEM topics. The HitTraxTM system would be a new and exciting way to do just that, especially as presented with WBA's proven ability to make baseball a fun learning experience."

WBA invites others in the community to team with us to target the sweet spot for optimal energy transfer. In other words, together we can hit one out of the park for STEM education in Fort Wayne.

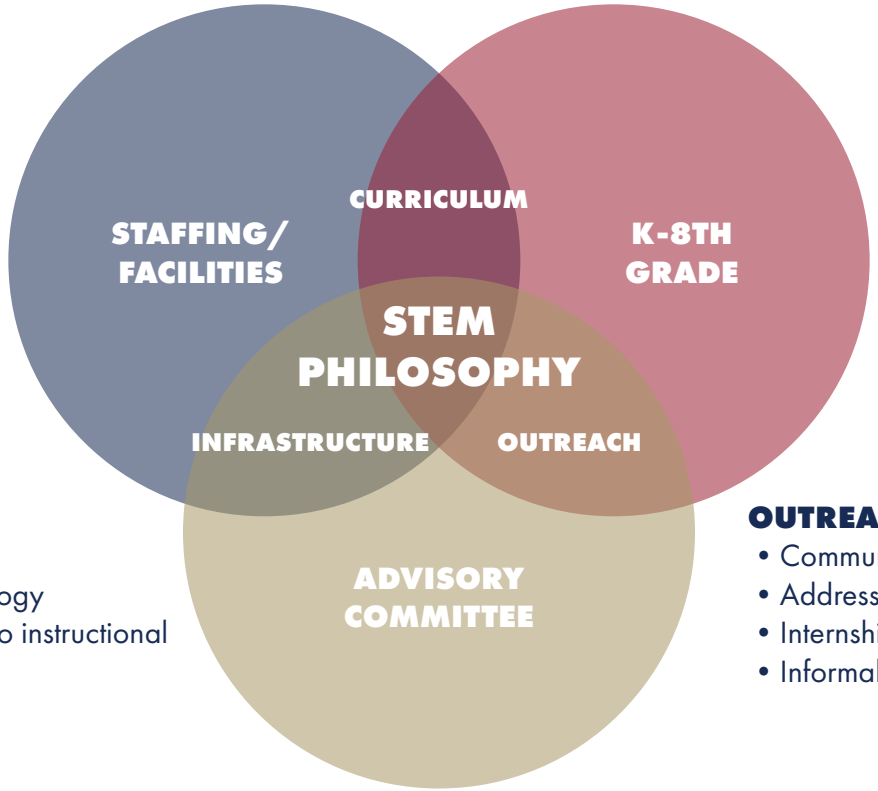
Conducting informal STEM education, particularly in Title 1 schools, is also a recruitment tool for WBA's On Deck initiative. On Deck programs, including summer camps and year 'round mentoring, are offered at no charge to at-risk boys and girls thanks to the generosity of donors. WBA's STEM presentations help spread the word about On Deck opportunities.

STEM Program-Development Model

CURRICULUM
- Fun/interactive/hands-on learning
- Standards integration
- Project/problem-based
- 21st Century skills and WBA core character traits
- Formulate-implement-evaluate process

STAFFING/FACILITIES
- Qualified teachers and coaches
- Equipment and resources necessary
- First class field trip destination
- Demonstrate replicability and scalability

K-8th GRADE
- Pipeline of K-8th Grade
- Collaborative projects
- Create high-impact collaborations



INFRASTRUCTURE
- State of the art equipment
- Portable baseball technology
- Embedded technology into instructional programs
- Industry standard

OUTREACH
- Community education
- Address needs of underserved groups
- Internships
- Informal STEM program

ADVISORY COMMITTEE
- Education
- Business
- Science
- Technology
- Engineering
- Mathematics/Finance

STEM Programs

FIELD TRIPS

CLASSROOM SESSIONS

GRADUATION SPEECHES

SUMMER CAMP

STEM Curriculum

World Baseball Academy STEM Program - *Curriculum Grid*

CURRICULUM TOPICS	Kindergarten						1st Grade						2nd Grade						3rd Grade						4th Grade						5th Grade					
	Number Operations & Algebraic Thinking	Measurement & Data	Geometry	Addition	Subtraction	Data Analysis	Number Operations & Algebraic Thinking	Measurement & Data	Geometry	Number Sense	Data Analysis	Engineering	Number Operations & Algebraic Thinking	Measurement & Data	Geometry	Number Sense	Data Analysis	Engineering	Number Operations & Algebraic Thinking	Measurement & Data	Geometry	Number Sense	Data Analysis	Engineering	Number Operations & Algebraic Thinking	Measurement & Data	Geometry	Number Sense	Data Analysis	Engineering	Number Operations & Algebraic Thinking	Measurement & Data	Geometry	Number Sense	Data Analysis	Engineering
BASE RUNNING		X			X	X		X		X	X	X		X		X	X	X		X		X	X	X	X	X	X			X		X	X	X
BASEBALL CARD STATISTICS						X	X			X	X	X	X			X	X	X	X			X	X	X	X	X		X	X		X			X	X	X
BUILD A MINIATURE FIELD	X		X			X			X		X	X			X		X	X			X		X	X		X	X	X			X			X	X
PAPER BASEBALL THROW		X	X		X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X		X			X	X		X	X	X	X
AERODYNAMICS		X	X			X		X		X	X	X		X			X	X		X			X	X		X			X	X		X		X	X
REACTION TIME		X				X		X			X	X		X			X	X		X			X	X		X			X			X		X	X
LAUNCH ANGLE		X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BAT SPEED		X				X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X		X			X		X	X		X	X	X
MLB TICKET PRICES				X	X	X				X	X	X				X	X	X				X	X	X	X	X		X	X					X	X	X
STRIKEZONE				X	X	X	X			X	X	X	X			X	X	X	X			X	X	X	X	X		X	X	X	X			X	X	X

Example Lessons- Field Trip Session

WELCOME!

World Baseball Academy is excited to have you participating in a STEM Field Trip.
-Education and Fun, All Rolled Into One!-

A unique educational experience that gets students **EXCITED** about learning!
Students will learn how the concept of **SCIENCE, TECHNOLOGY, ENGINEERING** and **MATH** can be found in everyday experiences, even FUN experiences like sports!

Our professional WBA Staff will engage the students on how STEM principles are a critical component of basic athletic activities. These customized lesson plans focus on hands on activities that are both educational and fun! Lessons are based on teacher's needs to **DIRECTLY RELATE** back to classroom learning making this program unique. In addition, WBA also includes leadership and career path topics to help kids understand that they matter!

OBJECTIVE:

Our objective is to work as a team using baseball and STEM to make a hypothesis, collect data, and to use the data to draw conclusions to our hypothesis.

STANDARDS:

- **K-2 E.1:** Pose questions, make observations, and obtain information about a situation people want to change. Use his data to define a simple problem.
- **2.CA.1:** Add and subtract fluently within 100.
- **2.CA.4:** Add and subtract within 1000, using models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; describe the strategy and explain the reasoning used. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones, and that sometimes it is necessary to compose or decompose tens or hundreds.
- **2.M.1:** Describe the relationships among inch, foot, and yard. Describe the relationship between centimeter and meter.
- **2.CA.3:** Solve real-world problems involving addition and subtraction within 100 in situations involving lengths that are given in the same units (e.g., by using drawings, such as drawings of rulers, and equations with a symbol for the unknown number to represent the problem).

IMPORTANT TERMS:

- **Distance:** How far something is between two objects.
- **STEM:** STEM is an acronym that stands for science, technology, engineering, and math.
- **Hypothesis:** An educated guess you make, before you start a science experiment.
- **Speed:** The rate at which someone or something is able to move or operate.
- **Force:** Strength or energy as an attribute of physical action or movement.
- **Motion:** The action or process of moving or being moved.
- **Rotation:** The action of rotating around an axis or center.
- **Accuracy:** Measurement on how close something is to the true value or true target.
- **MPH:** Miles per Hour.
- **Hundredth:** There are 100 hundredths in one full second of measurement.

HOSTED BY:

World Baseball Academy, Inc is a 501c3 nonprofit entity whose vision is to develop leaders who positively impact our world. Our STEM program is designed to be a fun, engaging learning environment that highlights the importance of leadership and career path opportunities for young people.

BASEBALL STUDENT THROW

PART 1: Analyze & Predict

STEP #1: **Compare.** The first thing you need to compare is the two distances from which the group will be throwing a baseball. Distance A will be 20 ft from the target on the net. Distance B will be 40 ft from the net.

STEP #2: **Predict.** Make a prediction on how many thrown baseballs from the entire group will go into the net from each distance.

Prediction #1: The group will throw _____ baseballs into the net at 20 feet away.

Prediction #2: The group will throw _____ baseballs into the net at 40 feet away.

HYPOTHESIS:

What distance do you think will have the highest score? **Why?** _____

PART 2: Test & Solve

STEP #3: **Test.** In groups of 5, we will have you throw your ball and try to get it into the net from each distance. Count the number of balls that land in the net from the entire group at each distance.

Actual #1: _____ balls in the net at 20 feet away.

Actual #2: _____ balls in the net at 40 feet away.

In Major League Baseball, the pitcher stands at a distance of 60 feet 6 inches from home plate!

STEP #4: **Solve.** How many **more** balls landed in the net at 20 feet compared to 40 ft.

Answer: _____

STEP #5: **Conclusion.** Does the distance of the target matter in baseball? What did you learn?

_____

_____

_____

Example Lessons- Field Trip Session

BASEBALL STUDENT RUN

PART 1: Analyze & Predict

STEP #1: **Compare.** The first thing you need to look at is the distance of the two bases on the ground. The closest base is at 60 feet. The furthest base is at 90 feet.

STEP #2: **Predict.** Make a prediction on how many seconds it will take you to run to each base.

Prediction #1: It will take me _____ second(s) to run to the base that is 60 feet away.

Prediction #2: It will take me _____ second(s) to run to the base that is 90 feet away.

HYPOTHESIS:

What distance do you think will have the faster time? **Why?** _____

_____

PART 2: Test & Solve

STEP #3: **Test.** Now you will take turns running to each base one at a time. Record your time!

Actual #1: _____ seconds to 60 ft base.

Actual #2: _____ seconds to 90 ft base.

STEP #4: **Solve.** How many **more** seconds did it take for you to run to the base at 90 feet compared to the base at 60 feet?

Answer: _____

STEP #5: **Conclusion.** Does the distance of the base matter to you as a runner? What did you learn?

_____

_____

_____

BASEBALL STUDENT BAT SWING

PART 1: Fun & Safety

STEP #1: **Be Safe.** This is going to be a really fun experiment but safety is important. The simple rule is do not pick up a bat or swing a bat until an adult instructs you to do so.

PART 2: Analyze & Predict

STEP #2: **Predict.** In this experiment, we will test how fast you can swing a bat. The first bat is a wiffle ball bat and other bat is a metal bat. Can you predict how fast you will swing each bat? We will measure the speed of your swing from initial stance to follow through in hundredths of a second.

Prediction #1: I will swing the **wiffle ball bat** in _____ hundredths of a second.

Prediction #2: I will swing the **metal bat** in _____ hundredths of a second.

HYPOTHESIS:

Which bat do you think will swing faster? _____ **Why?** _____

_____

PART 3: Test & Solve

STEP #3: **Test.** Now we will test how fast you can swing each bat.

Actual #1: _____ hundredths of a second with the wiffle ball bat (record fastest time)

Actual #2: _____ hundredths of a second with the metal bat (record fastest time)

STEP #4: **Solve.** How much faster did you swing the wiffle ball bat compared to the metal bat?

Answer: _____

STEP #5: **Conclusion.** Does the weight of the bat matter in how fast you can swing? Why?

_____

_____

_____

WBA Baseball Lab

COMING SOON

WBA Baseball Lab Features:

- Two batting cages
- Hit Trax Technology
- Rapsodo Technology
- Interactive video monitors
- Batting tees
- Pitching machine
- Pitching mound
- Touch screen teaching monitors
- Bright Sign video monitors

HitTrax®

STEM- Key Personnel

CALEB KIMMEL
Chief Executive Officer (CEO)-WBA
Advisory Board for School of Business:
Indiana Tech

AUSTEN RIGELMAN
STEM Director-WBA
Master's Degree in Education

SUPPORT STAFF

Tim Petersen- WBA On Deck Director

Melinda Petersen- WBA On Deck Administrator

Andy McManama- WBA Director of Operations

Linda Buskirk- WBA Development Officer

Josette Grames- WBA Visual Communications

WBA STEM COMMITTEE

Jeff Nowak- Ph.D. Professor of STEAM Education at PFW University

Justin Libey- VP at Old National Bank

Craig Dyer- Professor of Sports Management at Indiana Tech

Sarah Neace- Interim Executive Director at Vincent Village

Kimberly Fifer- Assistant Superintendent at Greater Clark County Schools

Mike Nutter- President of Fort Wayne TinCaps

David Kolpien- Investment Analyst at Raymond James

Justin Waterson- Director of Project Management at Aptera

STEM EDUCATION

STEM EDUCATION

WORLD BASEBALL ACADEMY

SCIENCE • TECHNOLOGY • ENGINEERING • MATHEMATICS