SPORT SCIENCE K-20

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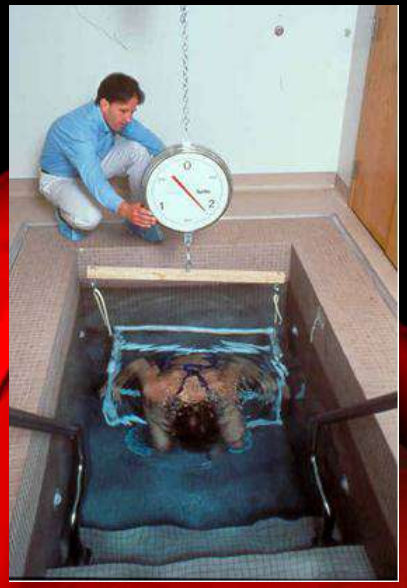
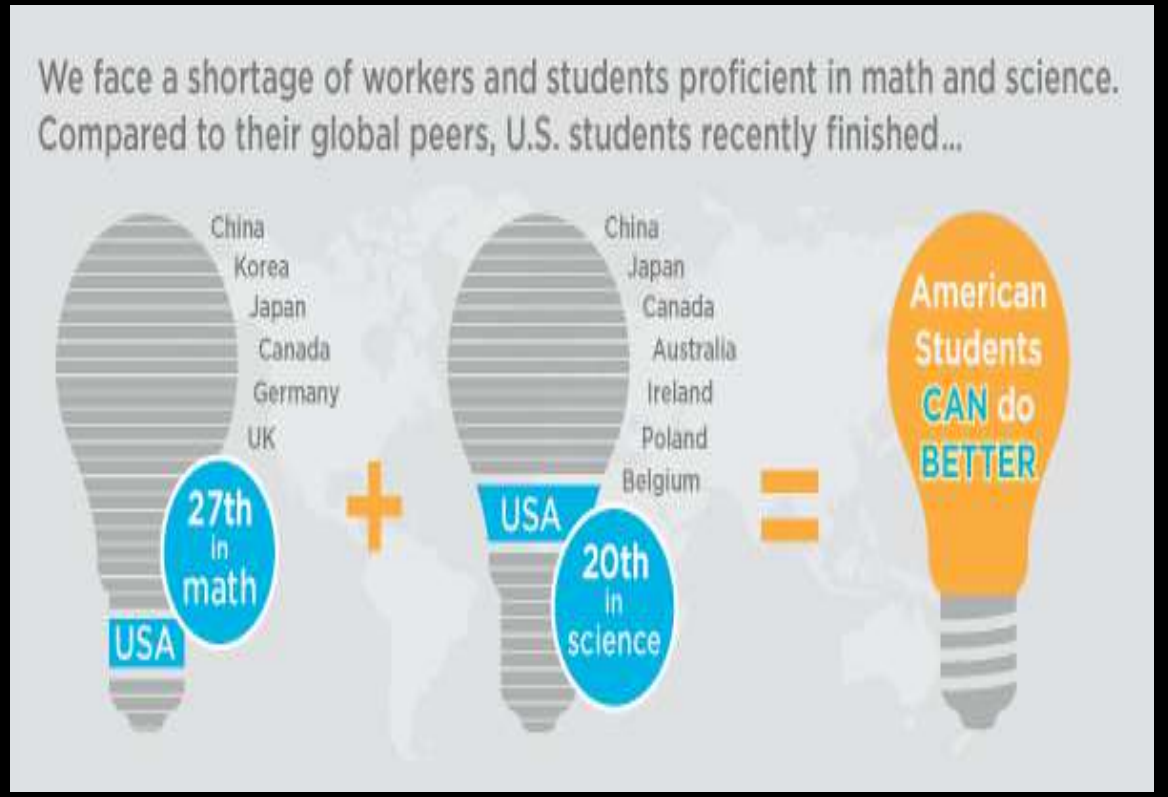


COMPONENTS OF PROGRAM

1. "Partnership" schools
   - *STEAM* activities HPE & "science" courses
   - coaches, students, athletes, parents
2. STEAM workshops at Rowan
3. Sport Science K-20 Website
   - Sport Science videos
   - HPE STEAM resources
4. STEAM Academy
5. Expose youth to Exercise Science Careers

MOTIVATION FOR SPORT SCIENCE K-20

- Objectives
  1. ↑ physical activity, improve nutrition & health habits of youth
     - encourage/inspire students to learn about their body
  2. Use Exercise Science to ↑ desire to learn ***STEAM*** related educational topics
     - Science, Technology, Engineering, Art, Mathematics



VISION STATEMENT

"Our vision is for ALL youth to be inspired to care for the body through embracing the science of exercise, in addition to the promotion of physical activity, good nutrition, and health"

NJ CORE CURRICULUM CONTENT STANDARDS

- 2.1
  - Use terminology to identify body parts, explain how body parts work…
  - Explain how healthy eating provides energy, lowers risk of disease
  - Interpret food labels based on nutritional content
  - Identify healthy ways to lose, gain, or maintain weight

NJ CORE CURRICULUM CONTENT STANDARDS

- 2.5:
  - Apply concepts of force/motion, power, velocity to impact performance
  - Correct movement errors to improve performance
  - Use self-evaluation & external feedback to detect & correct errors in one's movement performance

NJ CORE CURRICULUM CONTENT STANDARDS

- 2.6:
  - Explain role of physical activity in health
  - Improve skill-related fitness vs health-related
  - Implement fitness plan; monitor health indicators
  - Apply training principles (FITT) to improve fitness
  - Evaluate effects of anabolic steroids & other performance-enhancing substances
  - Determine ways to achieve a healthy body composition

4TH GRADE STEAM PROJECT: *"TAKING CARE OF YOUR BONES"*

- Learning Objectives
  - Describe relationship b/t bone structure & function
  - Calculate diameter of bones by measuring circumference
  - List ways technology is used in exercise & nutrition
  - Discuss food sources to strengthen bone & factors that weaken bone
  - Calculate # of bones in all sections of spine; both hands/wrists; both feet

Objectives of STEAM Project

1. Have FUN!!!!

2. Improve Students' Fitness, Nutrition, Health, Safety, & Lifestyle Habits through STEAM

3. Improve Students' Desire to Learn STEAM concepts

4. Interest Students to Learn about Careers in STEAM

5. When in Doubt…Refer to Objective #1

OUTCOMES ASSESSMENT

Quiz

- What is the diameter of the femur if the circumference is 3 inches?
  a. ½ b. 1 c. 1 ½ (geometry)

- Which mineral is important for strong bones?
  a. iron b. calcium c. sodium (chemistry)

- Which food has nutrients that build strong bones?
  a. broccoli b. bananas c. carrots (food science)

SCIENCE BEHIND STRETCHING!!!

- Proprioceptive Neuromuscular Facilitation
  - Nervous systems control of muscle flexibility
  - Stretch reflex
    - muscle spindles
  - Autogenic Inhibition
    - Golgi tendon organs
  - Reciprocal Inhibition


SCIENCE BEHIND STRETCHING!!!
•Proprioceptive Neuromuscular Facilitation
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•Reciprocal Inhibition
MED GRAPHICS
COSMED

VO_{2MAX} TESTING

- Exercise Science Concepts (PE, Biology, Chemistry)
  - Oxygen Consumption
  - Heart Rate Max
  - Respiratory Exchange Ratio (RER)
  - Lactic Acid
  - Glycolysis
  - Aerobic vs Anaerobic
  - Mitochondria


Sport Science K-20

THE PHYSICS BEHIND WEIGHT LIFTING

Physics Concepts

- Power
  - watts
- Work
  - joules
- Force
  - Newtons
- Newton's 1st Law
  - inertia

Lifting Concepts

- Power vs strength
- Neutral Spine Position
- Movement Dysfunctions
- Knee Position
  - valgus vs varus forces

Sport Science K-20
Physics Behind Weight Lifting

BODY COMPOSITION ANALYSIS

- Science Concepts
  - Archimedes Principle
  - Buoyancy
  - Density
  - Volume
  - Mass
  - Displacement
  - Bio-electrical Impedance
- Exercise Science Concepts
  - Body composition
  - Fat mass
  - Fat Free Mass
  - Lean Body Mass
  - Designing fat loss programs


Sports Science K-20

BRIAN MITCHELL

Weight: 206.7 lbs Height: 6' 0" BMI: 28.0 kg/m²

02/09/2016
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Analysis

Results of examination

Function/rehabilitation

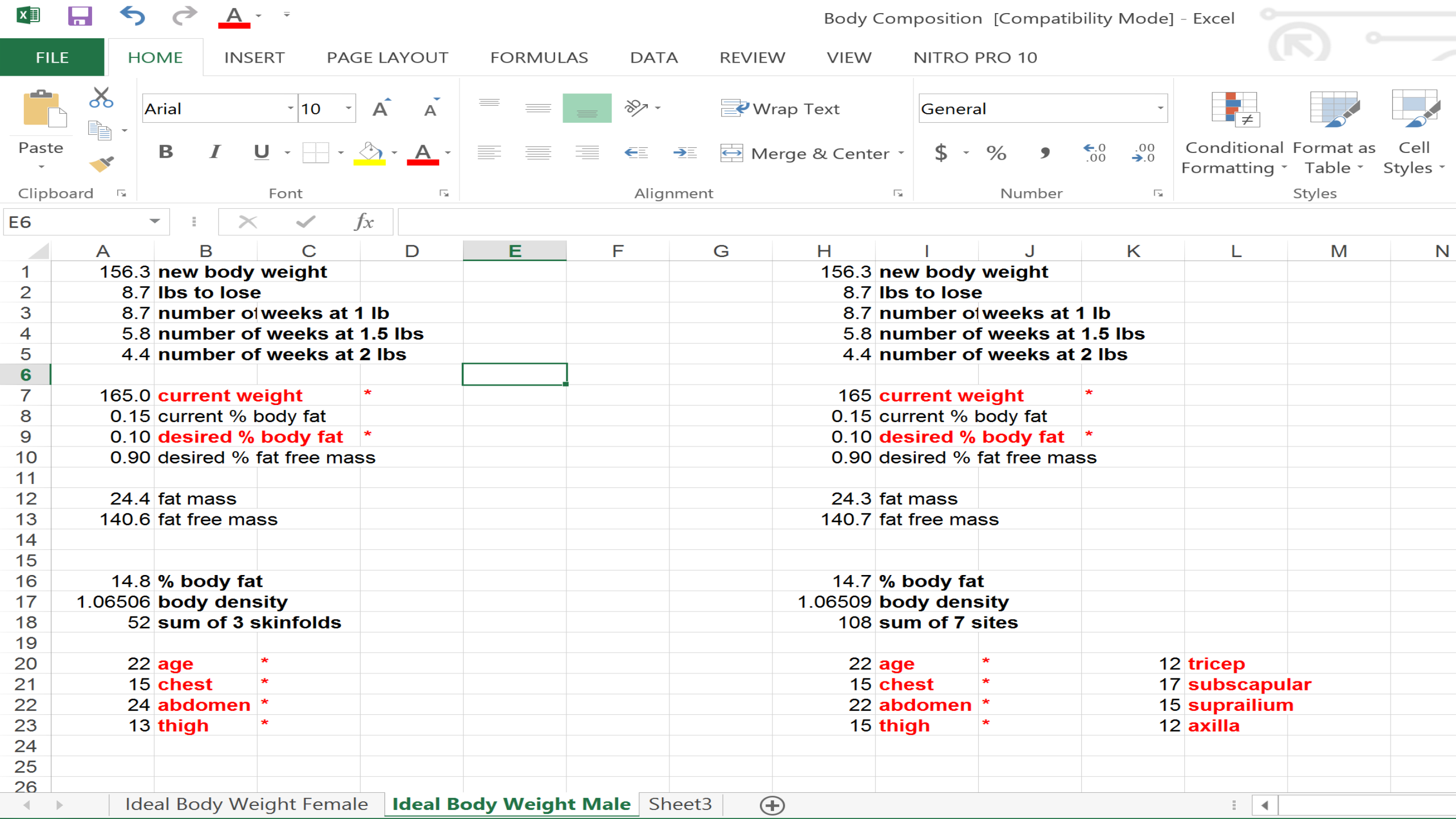
FFM	Fat-free mass	175.73 lbs	seca 2011
FM	Fat mass	30.95 lbs	
FM %	Fat mass %	15 %	
FMI	Fat Mass Index	4.2 kg/m²	
FFMI	Fat-Free Mass Index	23.8 kg/m²	
SMM	Skeletal muscle mass	89.99 lbs	

weight / height

bia

patient

analysis



Body Composition [Compatibility Mode] - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW NITRO PRO 10

Paste Arial 10 Wrap Text General Conditional Formatting Format as Table Cell Styles

Clipboard Font Alignment Number Styles

E6

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	156.3	new body weight						156.3	new body weight					
2	8.7	lbs to lose						8.7	lbs to lose					
3	8.7	number of weeks at 1 lb						8.7	number of weeks at 1 lb					
4	5.8	number of weeks at 1.5 lbs						5.8	number of weeks at 1.5 lbs					
5	4.4	number of weeks at 2 lbs						4.4	number of weeks at 2 lbs					
6														
7	165.0	current weight	*					165	current weight	*				
8	0.15	current % body fat						0.15	current % body fat					
9	0.10	desired % body fat	*					0.10	desired % body fat	*				
10	0.90	desired % fat free mass						0.90	desired % fat free mass					
11														
12	24.4	fat mass						24.3	fat mass					
13	140.6	fat free mass						140.7	fat free mass					
14														
15														
16	14.8	% body fat						14.7	% body fat					
17	1.06506	body density						1.06509	body density					
18	52	sum of 3 skinfolds						108	sum of 7 sites					
19														
20	22	age	*					22	age	*	12	tricep		
21	15	chest	*					15	chest	*	17	subscapular		
22	24	abdomen	*					22	abdomen	*	15	suprailium		
23	13	thigh	*					15	thigh	*	12	axilla		
24														
25														
26														

Ideal Body Weight Female | Ideal Body Weight Male | Sheet3

OPTIMAL PERFORMANCE TRAINING & INJURY PREVENTION

Functional Movement Assessments
- Overhead Squat
- Y Excursion
- Single Leg Squat

Shoulder Complex
- Rotator cuff muscles
- Scapular stabilizers

Knee Injuries
- ACL Injury Prevention Programs

- Sports Nutrition
  - How to optimize performance through proper nutrition

SPORT SCIENCE K-20 WEBSITE

SPORTS SCIENCE K20

HOME ABOUT EDUCATION RESEARCH NEWS & EVENTS SIGN UP

http://sportsciencek20.com/

ELEMENTARY SCHOOL

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MIDDLE SCHOOL

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HIGH SCHOOL

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STEAM ACADEMY

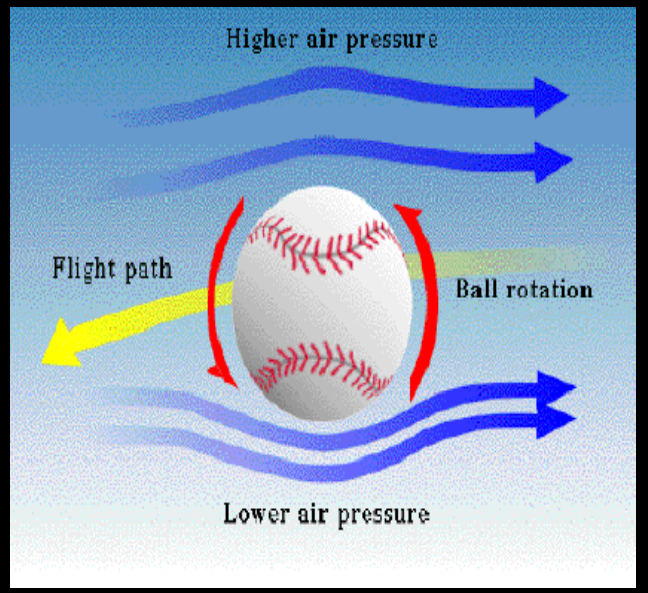
- 3 wk. residential academic program for high school students entering grades 10-12
- Earn Rowan credits in STEAM disciplines
- Experiential learning & educational field trips
- Workshops to enhance leadership skills
- Work with Office of Career Advancement & complete a personality & skills inventory

STEAM ACADEMY

- Units of Measurement: metric system to Exercise Science principles
  - Work
  - Power
  - Force
  - Pressure
  - Torque
  - Mass
  - Displacement
  - Volume, density
  - Forms of energy
  - Velocity

STEAM ACADEMY

- Gait Analysis
  - Heel strike vs Pose Method
  - Efficiency in running
  - Common running dysfunctions & injuries



AERODYNAMICS OF A BASEBALL OR SOFTBALL PITCH

- Linear Motion
- Rotary Motion
- Pressure differences
- Magnus Effect

EKG INTERPRETATION

- Forms of energy
  - Electrical
  - Thermal
  - Mechanical
  - Chemical

WHAT NEXT?

- We need your feedback!!!
  - questions, topic ideas, suggestions
- Partnership Schools
- Grants
- Research (effectiveness of learning science through use of Sport Science K-20)
- Video and lesson plan sharing

THANK YOU FOR YOUR TIME & SUPPORT

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