

Science of Soccer



Agenda

- Personal Introduction
- Poem & Class Expectations
- Vocab Fun
- Team Builder: Questions from a Hat
- 21st Century Skills
- Course Roadmap to the WOW!
- First Day
- Soccer & Space & Gravity
- Review

About M. Stone

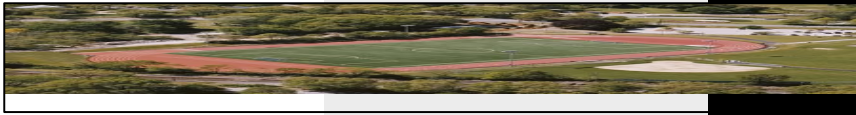






Brandeis University – Waltham,
MA



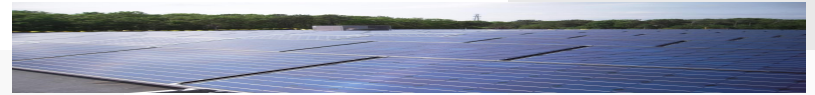




My Generation Energy, Inc.



Home Solar Array For Electricity



Larger Solar
Arrays

Other Activities



- Hiking
- Running
- Reading
- Enjoying time with Friends & Family

Poem & C Expectat

I am an individual.

I have dignity and worth.

I am unique.

I deserve respect

and I respect others.

I am part of the human family.

I have something special
to offer the world.

I am committed to

a peaceful world for all of us.

I accept difference,

and so do you.

I can accomplish

whatever I set out to do,

and so can you.

I am the key to peace.

Vocab

Gravity





Questions from a Hat

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**21st Century Skills in
Science of S**

Science Soccer Course Outline

- Class 1
- Class 2
- Class 3

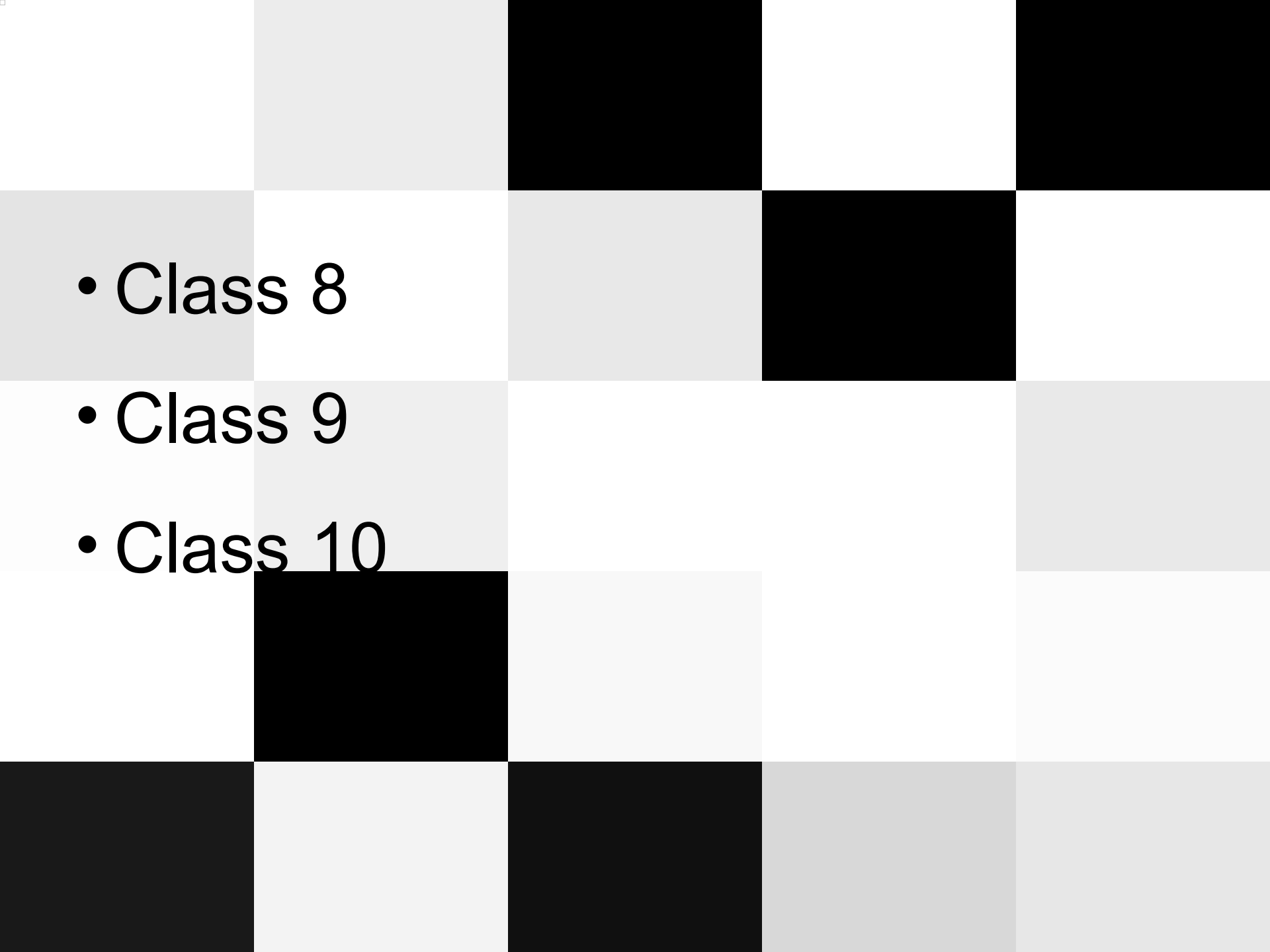


- Class 4

- Class 5

- Class 6

- Class 7

- 
- Class 8
 - Class 9
 - Class 10



**Falling Object
Group Demo**

Soccer Gravity



Space Gravity





The force that attracts a body toward the center of the earth,
or toward any other physical body having mass

Science of Soccer - We



Agenda

- 21st Century Skills
- Falling Objects Demo Recap
- Videos: Soccer & Gravity – Space & Gravity
- Gravity Definition
- Gravity Brainstorm Competition
- Resistance Demonstration: Ping-Pong, Paper and a Hair Dryer
 - Video: Soccer Game
- Outside Activity

21st Century Skills in Science of S

Make Observations,
Inferences and Draw
Conclusions

Use Technical Language and
Vocab



**Falling Object
Group Demo**

1. Which object will hit the table first and why?

2. What if we did the demo on the moon?
Which object would hit the m

3. What if you were to drop a 5 lb. weight with
the tennis ball? Which would hit the table first?

4. What if you were to drop a piece of paper
with the 5 lb. weight ? Which one would hit the
table first?

Soccer Gravity



Space Gravity





The force that attracts a body toward the center of the earth,
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Resistors Freefall

Demo



Paper



Ping Pong Ball



Hair Dryer

Resistance to Erodian



Air Resistance

- The force of air pushing against an object

Acceleration

- Increase in the rate or speed of something

Gravity

- The force that attracts a body toward the center of the earth, or toward any other physical body having mass



Outside Demo

Science of Soccer-Week



Agenda

- Team Builder
- Mini-Lesson with Volunteers
- Activity 1 : Center of Gravity
- Activity 2 : Potential Energy vs Kinetic Energy
- Activity 3 : Acceleration, Velocity and Deceleration
 - Outside
- Exit Ticket

21st Century Skills in Science of S

Make Observations,
Inferences and Draw
Conclusions

Use Technical Language and
Vocab

Center of Gravity



The center of mass of an object in the presence of a uniform gravitational field.

1. Why is the center of gravity of a baseball bat not at its midpoint? Draw a picture to support your answer.

2. How far can an object be tipped over before it topples over? Draw a picture to support your answer.

3. What factors are important for the stability of the Space Needle in Seattle?

Potential Energy vs. Kinetic Energy



Potential Energy: Energy from
Position

Kinetic Energy: Energy from Motion

Air Resistance

- The force of air pushing against an object

Acceleration

- Increase in the rate or speed of something

Gravity

- The force that attracts a body toward the center of the earth, or toward any other physical body having mass



Exit Ticket

Fill in the Blank Exercise

Science of Soccer - We



Science of Soccer Tools



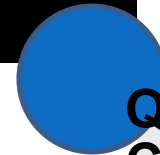
Team
Builder



Acceleration
Data Analysis



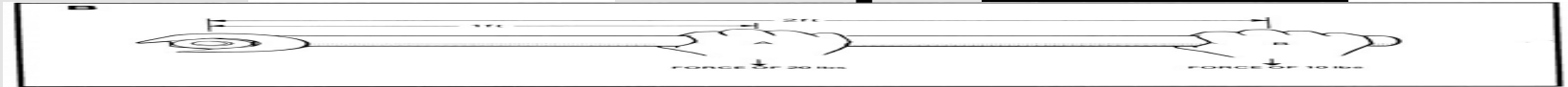
Torque
Data
Review

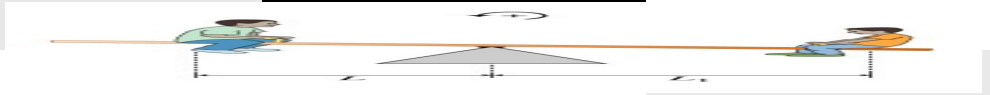


Question
Competition
or Play Soccer
Outside



Torque





Seconds			
Name	1	2	
Liam	3.6	6(2.4)	
Amir	5.99	2.99	
Takayai	3.57	2.69	4.6
Mr. James	2.6	2.38	2.8
Feet per Second (Velocity)			
	1	2	3
	13.89	20.83	11.96
	8.35	16.72	7.86
Takayai	14.01	18.59	10.87
Mr. James	19.23	21.01	17.86

Science of Summer-Week



Science of Soccer Today

Air Pressure

Team
Builder

Pressure'

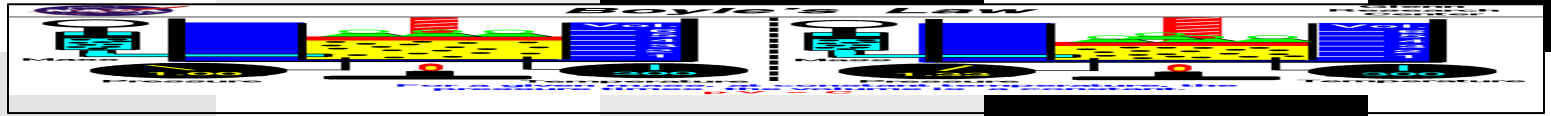
Air Pressure
How it works
'Book Blast'
Demo

Air
Pressure
Videos
'The
Magnus
Effect'

Question
Competition
or Do Demo
Outside &
then Play
Soccer



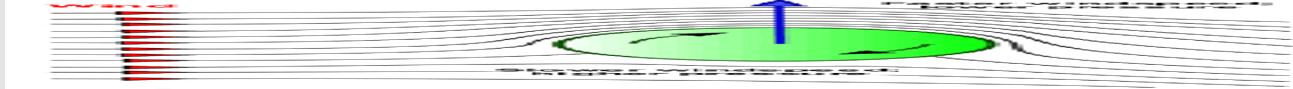
Air Pressure



Air Pressure and a Soccer



Magnus Effect



Bernoulli's Principle



Science of Summer-Weed



Science of the Human Body Today

Reaction Time

Intro

How does the body react?
Video

Different Types of Reactions

- Simple
- Recognition
- Choice

Test Your Reaction Time
w/Partners

Reaction Time Analysis

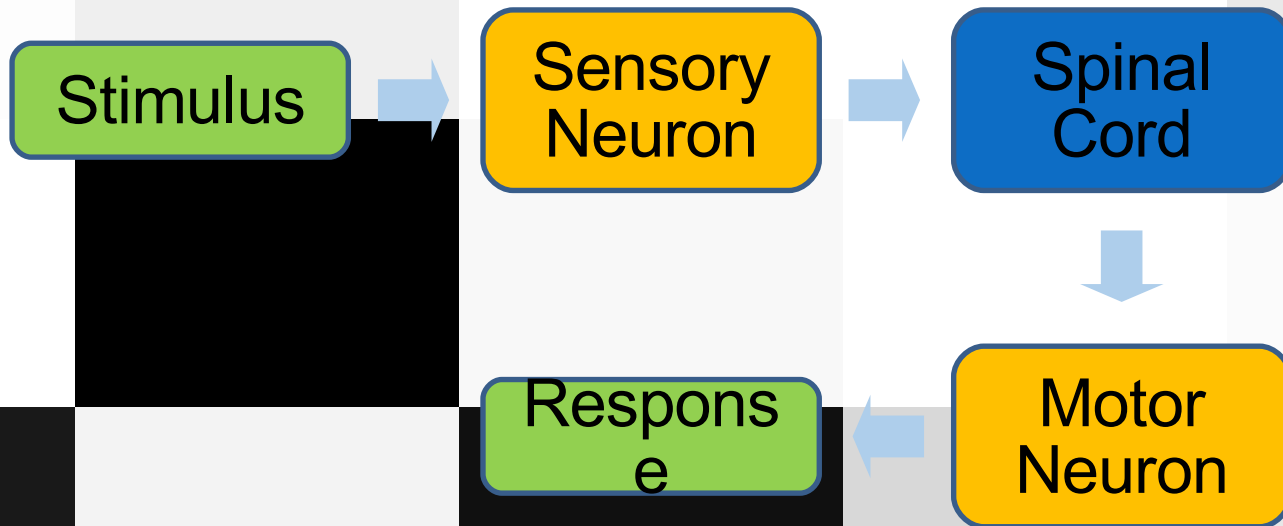
- Acceleration
- Gravity

Reaction Time



Reaction Time

Definition: the measure of time that elapses between a stimulus and the response to it by the nervous system.



Different Types of Reaction Time

- Simple Reaction Time: One stimulus and one response
- Recognition Reaction Time: Stimulus to respond to and stimulus to be ignored
- Choice Reaction Time: Multiple Stimuli and Multiple Responses

Simple Reaction I'



Recognition Reaction Time



Choice Reaction T₁



Simple Reaction Time

- 1st person holds ruler while 2nd person places thumb and index finger at the bottom of ruler
- 1st person drops ruler and the 2nd person grasps the ruler between the thumb and the index finger
- Record the number at the 2nd persons fingertips using worksheet
- Calculate the time it took the 2nd person to react and catch the ruler
- Repeat until all partners have recorded enough reaction times

Recognition Reaction Time

- 1st person holds ruler while 2nd person places thumb and index finger at the bottom of a vertical ruler
- 1st person drops ruler and the 2nd person grasps the ruler between the thumb and the index finger
- Determine a particular word as a signal to catch the dropped ruler
- Use a word that is not the signal before dropping the ruler; disregard ruler catch if wrong word
- 1) Record distance at the 2nd person's fingertips using worksheet 2) Calculate the time it took the 2nd person to react and catch the falling ruler 3) Repeat until both partners have recorded enough reaction times

Choice Reaction Time

- 1st person holds ruler while 2nd person places thumb and index finger at the bottom of a vertical ruler
- 1st person drops ruler and the 2nd person catches the ruler between the thumb and the index finger
- The 2nd person will catch the ruler with any word as a cue – do not predetermine the word – . However the 2nd person must also respond with the word.
- Keep trials that do not count because of lack of a word as well
- If there is a word association 1) Record the number at the 2nd person's fingertips using worksheet 2) Calculate the time it took the 2nd person to react and catch the falling ruler 3) Repeat until both partners have recorded enough reaction times

Scien

ce

Socce

r

21st Century

Skills

- Make Observations, Inferences & Draw Conclusions
- Use Technical Language and Vocabulary

Irving Middle

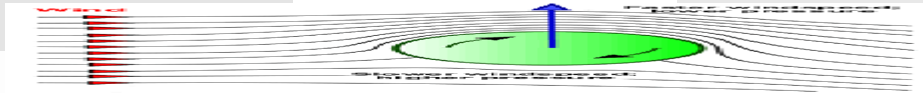
Gravity

The center of mass of an object(s) is the point of equivalence of a uniform gravitational field



Air Pressure

The pressure exerted by the atmosphere



The 'Magnus Effect'

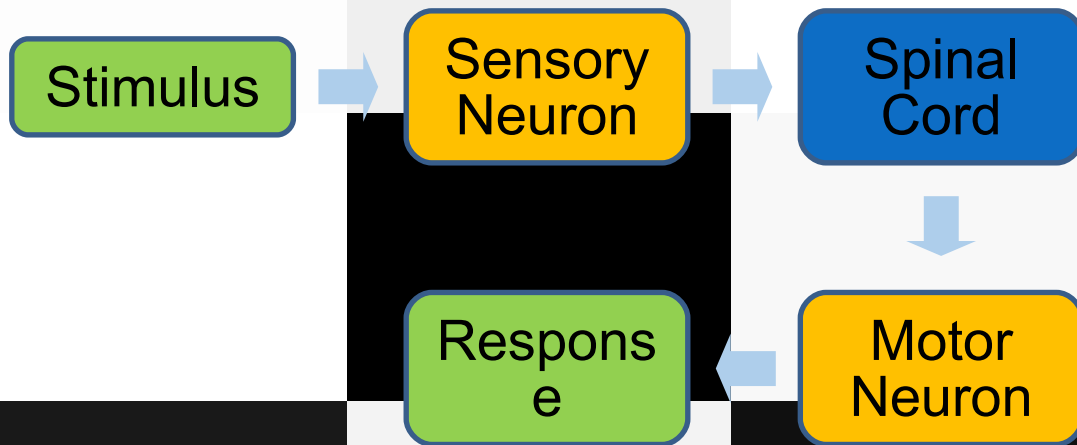
Air Resistance

The force of air pushing against a moving object



Reaction Time

The measure of time that elapses between stimulus and the response to it by an organism



Torque

A measure of the turning force of a

More Science of Soccer

- Potential Energy
- Kinetic Energy
- Acceleration
- Velocity