**Physiology - Meeting #9**

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| **Topics**  ***(Meeting # 9)*** | **Agenda/Activities** | **Time Required** |
| **Physiology**  *(Meeting #9)*    *\*WILL NEED COMPUTER ACCESS WITH INTERNET FOR VIDEOS* | 1. Students sign-in and have snack  2. Split Students into Groups *(Ideally 4-5 per group)*  3. Watch the dunk videos <https://www.youtube.com/watch?v=ZsPsKLjw-SI>  <https://www.youtube.com/watch?v=fWgU0J0F_hE>  4. Facilitate the Jumping Experiment (full description below)  5. Watch the sit and reach video <https://www.youtube.com/watch?v=uBrF5VfxrmM>  6. Facilitate the Reaching Experiment (full description below)  7. Professional Speaker via Google Hangout or career videos *(see below)* <https://www.youtube.com/watch?v=04yGUJTCAzI><https://www.youtube.com/watch?v=-_XiAbAe7f4>  8. Complete Content Questions and Microblogs  9. Handout Newsletter upon leaving | 5 min  4 min  30 min  2 min  20 min  10 min  10 min |

**Jumping and Reaching Experiment Instructions**

1. Students are asked to find a way to predict someone’s ability to **jump**.
   1. Students write down things they think will affect someone’s ability to jump high, then using a volunteer from the group, they measure their ability to jump vertically along with any things they think will affect it (e.g., height, weight, whether or not they are an athlete).
   2. Students are taught to take multiple measurements for accuracy and the concept of averages.
      1. This test is designed to measure your explosive leg power. All you need is a vertical jump measurer and a bit of room so you can jump and land safely.
      2. Start by standing side on to a wall and reach up the measurer as high as you can with the hand closest to the wall. Feet should remain flat on the ground. Make note of how high you can reach. This is called the standing reach height.
      3. Then stand a little away from the wall, and jump high as possible using both arms and legs to assist in projecting the body upwards.
      4. Attempt to place the magnet on the wall board at the highest point of the jump. Make note of where you placed the magnet at the height of the jump. Measure the distance between the standing reach height and the maximum jump height, and that is your result. This jump should be done at least 3 times and the average taken.
   3. The students then attempt to find an equation that uses their measurements to predict the jumping ability.
   4. Students then repeat the experiment with another volunteer to see how well the prediction works.
2. Group discussion on why certain equations worked and others did not.
3. Complete the experiment again but with the **sit and reach**
   1. Students write down things they think will affect someone’s ability to sit and reach long distances, then using a volunteer from the group, they measure their ability to sit and reach along with any things they think will affect it (e.g., leg length, arm length, age, whether or not they are an athlete).
   2. Place a meter stick or flexible tape measure on the ground.
   3. Secure a yardstick to the floor by placing tape (12 in. long) at a right angle to the 15-inch mark on the yardstick.
   4. Student sits on floor, straddling the yardstick with knees extended, heels of feet on 15-inch mark and 1 foot apart.
   5. Students reaches forward slowly, as far as possible, along the yardstick while keeping the hands parallel.
   6. Students holds position about two seconds.
   7. The score (in centimeters or inches) is the farthest point on the yardstick contacted by the fingertips. Students write down how far they reach. The reach should be completed and recorded 3 times and the average calculated.
   8. The students then attempt to find an equation that uses their measurements to predict their sit and reach ability.
   9. Students then repeat the experiment with another volunteer to see how well the prediction works.
4. Group discussion on why certain equations worked and others did not.

**What should students know before they leave the club?**

- The basics of predictive modeling

- Using creating and revising equations based on data.

- Physiological variables and how to measure them

**NC Essential Standards Met**

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| 7.L.1 | Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. |
| 7.RP.2 | Recognize and represent proportional relationships between quantities. |
| 8.EE.5 | Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. |
| 8.F.1 | Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. |

**More multimedia sites for further information**

**Interesting Articles/Videos:**

<http://www.higher-faster-sports.com/verticaljumpfaq.html>

<http://www.education.com/activity/probability-and-statistics/>

<https://www.youtube.com/watch?v=zDVb3PCcUmU>

<https://www.youtube.com/watch?v=CvHUhq0bfr8>

<http://unctv.pbslearningmedia.org/collection/mathcore/?topic_id=856>

<http://www.mathsisfun.com/data/standard-deviation.html>

<http://stattrak.amstat.org/2012/08/01/sports-statistician/>

<https://www.insidescience.org/news/making-sports-statistics-more-scientific>

<http://factsanddetails.com/china/cat12/sub79/item1008.html>

Chinese Olympian choice- “Doctors measure height, arm span, bone density, flexibility and other things to predict what a child will be like in the future. X-rays and bone tests are used to determine bone density and structure and predict future growth.”

**Vocab**

* Trend- A general direction in which something is developing or changing
* Quantitative data- Expressing a certain quantity, amount or range, usually measurement units are associated with this.
* Qualitative data- Relating to, measuring, or measured by the quality rather than its quantity.
* Standard deviation- A measure to show how spread out a set of data is
* Predictive Model- Made up of a number of predictors, which are variables that are likely to influence future results. The process uses data mining and probability to forecast outcomes.
* Average- A number that expresses the central or typical value in a set of data, calculated by dividing the sum of the values in the set by their number.
* Accuracy- The degree to which the result of a measurement, calculation, or specification conforms to the correct value or a standard.