

# Biophysics Flash Cards


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### Instructions

Print the flash cards from the templates on pages 2-3. Each page has 4 flash cards.  
The concept is on the left side of the template and the explanation is on the right side.

To create individual flash cards:

- 1) Trim the margins on the top, bottom, and sides of the page where you see the scissors icon 
- 2) Cut between the cards where you see the scissors icon to create individual cards.
- 3) Fold the cards in half at the dashed "Fold" line and align the front and back edges of each card.
- 4) Each template makes 4 flash cards of 2.5 x 3.75 inch (H x W). There are 8 cards in a set.

The colored border indicates that the cards are in the same set.

### Objectives & Grade Level

Teach students basic concepts about biophysics. Appropriate for middle school to high school students. Students can use the flash cards singly or in groups by studying the cards and testing themselves or others on concepts from the cards.

### Acknowledgements

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# Mean Value



Average of values:  
sum of all values  
divided by number  
of values (n)

# Standard Error of Mean



A measure of how much  
measurements differ from  
one another and from  
the mean, given as sem:

$$\text{sem} = \text{SD} / \sqrt{n}$$

SD = Standard Deviation  
n = number of values

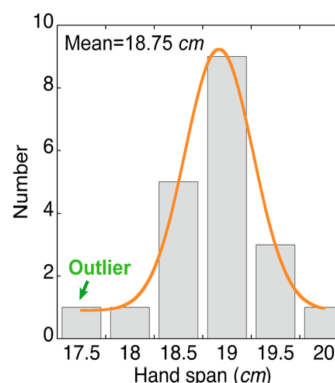
# Standard Deviation



$$\text{SD} = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

n = number of values  
x = each value in data set  
 $\bar{x}$  = mean of values in  
data set

# Gaussian Distribution



A normal  
or  
Poisson  
distribution

[www.biophysics.org/biophysics-basics](http://www.biophysics.org/biophysics-basics)

# Median



Middle value of a set of numbers or data set

3 5 6 10 18 25 26

**Median = 10**

3 5 6 8 10 18 25 26

**Median =  $(8 + 10)/2 = 9$**

# Outlier



A data point that is very different from the rest: lies outside the Gaussian distribution

# Replicates



Repeating tests to limit the effects of experimental error

# Experimental Error



Differences from measurement to measurement