Applied Statistics

Domain	**Designing Studies**	
Cluster	**Design and implement a plan to collect and analyze data**	
Standard(s)	M.ASHS.12	Design and conduct an experiment to compare two treatments. Instructional Note: Include randomization, replication, blocking, and control in the design.

Content Examples

» Introduction to experiment design: *https://youtu.be/DaBq0naj0YY*

Relevant Content

» Experiments (videos, articles, and questions): *https://www.khanacademy.org/math/statistics-probability/designing-studies/experiments-stats-library/v/introduction-to-experiment-design*

» Polio data and information: *https://ourworldindata.org/polio*

Vocabulary:

» Blocks: Blocks are groups of experimental units that are known before the experiment to be similar in some way that is expected to affect the response to the treatments.

» Completely Randomized Design: A completely randomized design is a design in which the experimental units are assigned to the treatments completely by chance.

» Direct Control: Direct control is an experimental design principle that mandates keeping other variables that might affect the response the same for all experimental units.

» Random Assignment: Random assignment is an experimental design principle where chance is used to assign experimental units to treatments. This helps create roughly equivalent groups of experimental units by balancing the effects of other variables among the treatment groups.

» Randomized Block Design: A randomized block design incorporates forming blocks consisting of individuals that are similar in some way that is important to the response. Random assignment of treatments is then carried out separately within each block.

» Replication: Replication is an experimental design principle involving using enough experimental units in each group so that any differences in the effects of the treatments can be distinguished from chance differences between the groups.

» Statistical analysis: *https://www.hasd.org/faculty/LenaArts/Adv122.pdf*

» Stats Medic – Estimating a Margin of Error (3.4): *https://www.statsmedic.com/intro-day37*

» The Memory Game (created by Adam Shrager): *http://www.apstatsmonkey.com/StatsMonkey/ReadBestPractice_files/Shrager_TheMemoryGame.doc*

Assessment Links or Tasks :

» Randomization applet: *www.rossmanchance.com/applets/Subjects.html*

» Included below are *Randomization applet instructions*

Randomization Applet

This applet allows students to randomize 24 subjects into:

(1) a completely randomized design;

(2) randomized block design; or

(3) both