



Statistics

A MyStemKits Curriculum Unit

Grades: 6-8

Subjects: *Science, Technology, Engineering, Mathematics*

Strands: *Computer Science, Earth and Space Science, Expressions and Equations, Functions, Geometry, Life Science, Nature of Science, Physical Science, Ratios and Proportions, Statistics and Probability*



Introduction

This curriculum is a comprehensive look at the statistics principles to be covered in 6th through 8th grades.

Newly emphasized in middle school, statistics and probability is often one of the most intimidating subjects to teachers, and so we've worked to make these standards both fun and easy to teach. This curriculum not only guides students through collecting, graphing, and analyzing data, but also it integrates assorted science and technology concepts throughout. Collect data with our Ball Bearing Catapult Kit or test out various sampling methodologies by probing the depths of the ocean to determine the topography below. Measure and compare hominid skulls or look at the environmental impacts of invasive species and climate change – all while collecting and analyzing data.

Utilized 3D Kits

Ball Bearing Catapult Kit



K-5
6-8
9-12

Science
Engineering
Mathematics

A great way to launch into learning! An integrated STEM kit featuring a designated-angle launch mechanism and variable-mass projectiles perfect for generating data.

6 Standards-Driven Lesson Plans

Bowling Kit



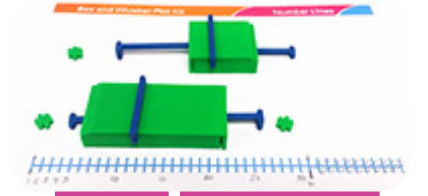
K-5
6-8
9-12

Science
Mathematics

It's all strikes with this interdisciplinary kit. Physics collides with statistics as students analyze bowling pin placement, lane length, and different sized bowling balls. Also useful for graphing and fractions.

1 Standards-Driven Lesson Plan

Box and Whisker Plot Kit



6-8

Mathematics

Create sliding box and whisker plots with this interactive kit - great with white boards or our included blank number lines!

1 Standards-Driven Lesson Plan

Color Key

All kits and lesson plans have been color-coded so you can more-easily find those relevant to you.

Mathematics

Interdisciplinary

Science



Statistics

A MyStemKits Curriculum Unit

Utilized 3D Kits (continued)

Bunnies Kit



6-8
9-12

Science
Mathematics

These 3D-printed bunnies provide the perfect manipulative for studying natural selection, genetic drift, or exponential growth.

1 Standards-Driven Lesson Plan

Clinometer Kit



K-5
6-8
9-12

Science
Technology
Mathematics

Clinometer, protractor helper, and launch-angle provider, this multi-use kit is a classroom staple.

1 Standards-Driven Lesson Plan

Clothing Combinations Kit



6-8
9-12

Mathematics

Grounded in a real-world scenario, this kit makes exploring combinations and tree diagrams a breeze.

1 Standards-Driven Lesson Plan

Lionfish Sampling Kit



6-8
9-12

Science
Mathematics

Explore lionfish populations with this kit designed to replicate real-world problem solving and sampling. Also great for statistical analysis!

3 Standards-Driven Lesson Plans

Loaded Dice Kit



6-8
9-12

Mathematics

Don't gamble with teaching statistics! Use these fun dice to get your students rolling!

1 Standards-Driven Lesson Plans

Ocean Topography Mapping Kit



6-8
9-12

Science
Mathematics

Map the ocean floor the way oceanographers would with this integrated STEM kit also perfect for investigating sampling methodology!

3 Standards-Driven Lesson Plans

Conkers Kit



6-8
9-12

Science
Mathematics

A mathematical twist on a classic game, this kit introduces a new activity for horse chestnut seeds, also called conkers.

1 Standards-Driven Lesson Plan

Graphing Kit



K-5
6-8
9-12

Science
Engineering
Mathematics

Create interactive graphs with this hands-on kit, including dot plots, line graphs, bar graphs, and scatter plots!

1 Standards-Driven Lesson Plan

Hominid Species and Tools Kit



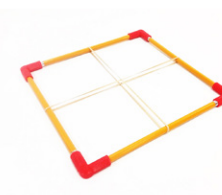
K-5
6-8
9-12

Science
Mathematics

A collection of hominid skulls and tools to scale to bring 7 million years of evolutionary history to life.

1 Standards-Driven Lesson Plan

Pencil Quadrat Kit



K-5
6-8
9-12

Science
Mathematics

An ideal kit for classroom explorations of biological sampling and modeling methods, explore sampling techniques and make inferences about populations while making use of structure.

3 Standards-Driven Lesson Plans

Planetary Temperatures Kit



6-8
9-12

Science
Mathematics

Set up a variety of experiments related to planetary temperatures with an artificial sun and bottles to simulate the effect of an atmosphere. Alternately, collect, graph, and analyze data related to energy efficiency in lightbulbs!

3 Standards-Driven Lesson Plans

Probability Kit



K-5
6-8
9-12

Mathematics

Create an open environment in which students can run a variety of probability exercises. Simply set up a problem and let the students determine the best way to run a simulation of the scenario using any of the provided kits.

2 Standards-Driven Lesson Plans



Statistics

A MyStemKits Curriculum Unit

Utilized 3D Kits (continued)

Rockets Kit



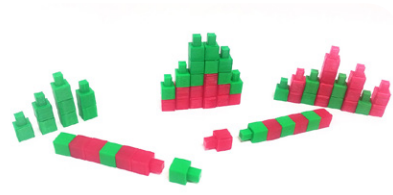
K-5
6-8
9-12

Science
Engineering
Mathematics

This exciting kit includes a variety of ready-to-fly, 3D printed rocket components and provides an interactive and engaging way to examine experimental design and variables.

1 Standards-Driven Lesson Plan

Stacking Blocks Kit



K-5
6-8
9-12

Science
Engineering
Mathematics

Reinforce mean, median, and mode while creating visual distributions in bar graphs, probability distributions and histograms or work on pattern recognition.

2 Standards-Driven Lesson Plans

Water Filtration Kit



6-8
9-12

Science
Technology
Engineering
Mathematics

Set up your own filtration experiments with this open-ended design and compare the water quality before and after. Note: Even after filtration, the water will not be potable/safe to drink. Do not drink the water!

1 Standards-Driven Lesson Plan

Zone Marking Kit



K-5
6-8
9-12

Science
Mathematics

Whether you're launching projectiles, gliding Hoverpucks, or flying gliders, this kit allows students to graph the data based on a simple Zone system.

2 Standards-Driven Lesson Plans



Lesson Plans: Sixth Grade

Statistical Questions

In this lesson, students will explore how scientists and mathematicians develop and plan investigations with statistical questions, taking into account a variety of attributes as part of the inquiry.

Standards Addressed

CCSS.MATH.CONTENT.6.SP.A.1 NGSS.MS-ETS1-1
CCSS.MATH.CONTENT.6.SP.B.5.A NGSS.MS-ETS1-4
CCSS.MATH.CONTENT.6.SP.B.5.B NGSS Science & Engineering Practices:
CCSS.MATH.PRACTICES: 2, 3, 4, 5 2, 3, 4, 5, 8

Grades: 6

Strands: Engineering Design,
Statistics and Probability

3D Kits Utilized

Hominid Species and Tools Kit (skulls only)

Statistical Questions and Surveys

In this lesson, students will explore how mathematicians develop and plan investigations with statistical surveys while taking into account a variety of attributes, including wording bias.

Standards Addressed

CCSS.MATH.CONTENT.6.SP.A.1 CCSS.MATH.PRACTICES: 3, 4
CCSS.MATH.CONTENT.6.SP.B.5.A NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.6.SP.B.5.B 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.7.SP.A.1

Grades: 6, 7

Strands: Statistics and Probability

3D Kits Utilized

N/A

Height Histograms

In this lesson, students will discover the usefulness of the histogram when trying to represent heights of students in their class. The lesson will start with gathering data and then progresses through the steps needed to create histograms. Further investigation will show how the distribution of data may or may not change based on the chosen intervals. There is also an opportunity to use stacked histograms to identify any relationships between male and female student height.

Standards Addressed

CCSS.MATH.CONTENT.6.SP.B.4 CCSS.MATH.PRACTICES:
CCSS.MATH.CONTENT.6.SP.B.5.D 1, 2, 3, 4, 5, 6, 7, 8
CCSS.MATH.CONTENT.7.SP.B.3 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.HSS.ID.A.1 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.HSS.ID.A.3

Grades:
6, 7, 9, 10, 11, 12

Strands: Statistics and Probability

3D Kits Utilized

Stacking Blocks Kit

Lionfish and Histograms

In this lesson, students will explore longitudinal data on a population of invasive lionfish and the usefulness of histograms to help visualize the changes in lionfish age groups over time. Students will base their information from random samples conducted each year for 5 years.

Standards Addressed

CCSS.MATH.CONTENT.6.SP.B.4 NGSS.MS-ESS3-3
CCSS.MATH.CONTENT.7.SP.B.3 NGSS.HS-LS2-1
CCSS.MATH.CONTENT.HSS.ID.A.1 NGSS.HS-LS2-2
CCSS.MATH.CONTENT.HSS.ID.A.3 NGSS.HS-LS2-6
CCSS.MATH.PRACTICES: 2, 4, 5, 7 NGSS.HS-LS2-7
NGSS.MS-LS2-1 NGSS.HS-ESS3-3
NGSS.MS-LS2-2 NGSS.HS-ESS3-4
NGSS.MS-LS2-4 NGSS Science & Engineering Practices:
NGSS.MS-LS2-5 2, 3, 4, 5, 8

Grades:
6, 7, 9, 10, 11, 12

Strands: Earth and Space Science, Life
Science, Statistics and Probability

3D Kits Utilized

Lionfish Sampling Kit

It Can Be a Zoo of Data!

In this lesson, students will explore how the mean and median are affected by different data distributions. Students will enhance their knowledge of mean and median as they are challenged to create a variety of distributions with specific criteria. They will also begin to develop an understanding of how these measures can be affected and therefore which measure may be a better statistic to describe the data.

Standards Addressed

CCSS.MATH.CONTENT.6.SP.A.3 CCSS.MATH.CONTENT.7.SP.B.4
CCSS.MATH.CONTENT.6.SP.B.5.C CCSS.MATH.PRACTICES: 2, 3, 4, 5
CCSS.MATH.CONTENT.6.SP.B.5.D

N/A

3D Kits Utilized

Grades: 6, 7

Strands: Statistics and Probability

Mean and Median Modification

In this lesson, students will explore how the mean and median are affected by different data distributions. Students will enhance their knowledge of mean and median as they are challenged to create a variety of distributions with specific criteria. They will also begin to develop an understanding of how these measures can be affected and therefore which measure may be a better statistic to describe the data.

Standards Addressed

CCSS.MATH.CONTENT.6.SP.B.4 CCSS.MATH.CONTENT.7.SP.B.4
CCSS.MATH.CONTENT.6.SP.B.5.C CCSS.MATH.PRACTICES:
CCSS.MATH.CONTENT.6.SP.B.5.D 1, 2, 3, 4, 5, 7, 8

3D Kits Utilized

Stacking Blocks Kit



Lesson Plans: Sixth Grade (continued)

Greenhouse Atmosphere

In this lesson, students will explore the effect of a greenhouse atmosphere on a planet’s temperature and use dot plots to help determine which measures of center may be appropriate to describe the data.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.B.4	NGSS.MS-ESS2-4
CCSS.MATH.CONTENT.6.SP.B.5.C	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.6.SP.B.5.D	1, 2, 5, 6, 8
NGSS.MS-ESS1-3	

Grades: 6

Strands: Earth and Space Science, Statistics and Probability

3D Kits Utilized
Planetary Temperatures Kit

Marshmallow Catapults

In this lesson, students will be presented with situations that require them to synthesize the knowledge they have gained over the entire statistics unit. Students will calculate the mean, median, mode, range, mean absolute deviation (MAD), and inter quartile range (IQR) for the data sets with and without outliers and represent the data in graphical displays. Students will determine the best statistical measure and graph to use for the data based on the distributions and situations they have been given.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.A.2	CCSS.MATH.CONTENT.7.SP.B.3
CCSS.MATH.CONTENT.6.SP.A.3	CCSS.MATH.CONTENT.7.SP.B.4
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.CONTENT.HSS.ID.A.1
CCSS.MATH.CONTENT.6.SP.B.5.C	CCSS.MATH.CONTENT.HSS.ID.A.3
CCSS.MATH.CONTENT.6.SP.B.5.D	CCSS.MATH.PRACTICES: 2, 4, 5, 7
CCSS.MATH.CONTENT.7.SP.A.1	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.7.SP.A.2	2, 3, 4, 5, 8

Grades: 6, 7, 9, 10, 11, 12

Strands: Statistics and Probability

3D Kits Utilized
Ball Bearing Catapult Kit

It’s Raining Cats and Dogs

In this lesson, students will discover how to create and interpret box plots. Students will also be introduced to the interquartile range as a measure of variability. This lesson uses an original student tutorial found at FloridaStudents.org. Content is delivered through text and narration, and students are presented with practice questions. Feedback will be provided to the students as they progress through the tutorial and answer the questions.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.CONTENT.7.SP.B.4
CCSS.MATH.CONTENT.6.SP.B.5.C	CCSS.MATH.PRACTICES: 2, 4, 5
CCSS.MATH.CONTENT.6.SP.B.5.D	

Grades: 6, 7

Strands: Statistics and Probability

3D Kits Utilized
N/A

Human Box Plot

In this lesson, students will create and interpret box plots based on their own birthdates. Students will experience the cluster or spread of data firsthand by creating a “human box plot” based on their birthdates. This activity is meant to allow students to explore data both visually and kinesthetically, since they will form the box plot and experience the clustering and spread of the data. They will see how some people are more squished together or spread apart, but every quartile has the same number of people in it.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.CONTENT.7.SP.B.4
CCSS.MATH.CONTENT.6.SP.B.5.C	CCSS.MATH.PRACTICES: 2, 4, 5
CCSS.MATH.CONTENT.6.SP.B.5.D	

Grades: 6, 7

Strands: Statistics and Probability

3D Kits Utilized
Box and Whisker Plot Kit

Measurement and Data Collection

In this interdisciplinary lesson, students will practice the skill of data collection with a variety of tools. They will then statistically analyze the class data sets and begin to understand that error is inherent in all data.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.A.2	CCSS.MATH.CONTENT.7.SP.A.2
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.CONTENT.7.SP.B.3
CCSS.MATH.CONTENT.6.SP.B.5.A	CCSS.MATH.PRACTICES: 2, 4, 5, 6
CCSS.MATH.CONTENT.6.SP.B.5.B	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.6.SP.B.5.C	2, 3, 4, 5, 8

Grades: 6, 7

Strands: Statistics and Probability

Sensors Utilized
HipScience Sensor Wand
HipScience Temperature Probe

(No 3D Kit Used)

Catapulting Data

In this interdisciplinary lesson, students will explore data collection using a catapult and perform statistical analysis of the data. Students will create boxplots for analysis that will help demonstrate the scientific concepts of forces and motion.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.A.2	NGSS.MS-PS2-2
CCSS.MATH.CONTENT.6.SP.B.4	NGSS.MS-PS3-5
CCSS.MATH.CONTENT.6.SP.B.5.C	NGSS Science & Engineering Practices:
CCSS.MATH.PRACTICES: 2, 4, 5	2, 3, 4, 5, 8
NGSS.MS-PS3-1	

Grades: 6

Strands: Physical Science, Statistics and Probability

3D Kits Utilized
Ball Bearing Catapult Kit



Lesson Plans: Sixth Grade (continued)

MAD Bickering Boys

In this lesson, students will explore the various statistical measures that can describe a data set and discover the usefulness of the mean absolute deviation (MAD) as a measure of variation.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.B.5.C	CCSS.MATH.PRACTICES: 1, 2, 3, 4, 7, 8
CCSS.MATH.CONTENT.6.SP.B.5.D	NGSS Science & Engineering Practices: 2, 4, 5, 8

Grades: 6

Strands: Statistics and Probability

3D Kits Utilized

N/A

Lionfish and Dot Plots

In this lesson, students will explore data on the invasive lionfish and the usefulness of dot plots to help visualize the frequency of lionfish age groups at five different locations. Students will base their information on random samples conducted at five different reefs in the Atlantic Ocean. For each location, students will also calculate the Mean Absolute Deviation value and then compare it to the locations' dot plots. This comparison will help further the conceptual understanding by analyzing the relationship between quantitative measures of dispersion and graphical distributions.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.PRACTICES: 2, 4, 5, 7
CCSS.MATH.CONTENT.6.SP.B.5.C	NGSS Science & Engineering Practices: 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.6.SP.B.5.D	
CCSS.MATH.CONTENT.6.SP.B.3	

Grades: 6

Strands: Statistics and Probability

3D Kits Utilized

Lionfish Sampling Kit

Sea Ice Analysis (Sixth Grade)

The changing climate is an important topic for both scientific analysis and worldly knowledge. This lesson uses data collected by the National Snow and Ice Data Center to create and use statistical analysis as a tool to evaluate the mean and variation from the mean of sea ice loss.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.A.3	NGSS.MS-ESS3-3
CCSS.MATH.CONTENT.6.SP.B.5	NGSS.MS-ESS3-4
NGSS.MS-ESS2-2	NGSS.MS-ESS3-5
NGSS.MS-ESS3-1	NGSS Science & Engineering Practices: 3, 4, 5, 8
NGSS.MS-ESS3-2	

Grades: 6

Strands: Earth and Space Science, Statistics and Probability

3D Kits Utilized

N/A

Let's Go to the Mall

In this lesson, students will be presented with situations that require them to synthesize the knowledge they have gained over the entire statistics unit. Students will calculate the mean, median, mode, range, MAD, and IQR for the data sets with and without outliers and represent the data in graphical displays. Students will determine the best statistical measure and graph to use for the data based on the distributions and situations they have been given.

Standards Addressed	
CCSS.MATH.PRACTICES: 1, 2, 3, 4, 5	NGSS Science & Engineering Practices: 2, 4, 5, 8

3D Kits Utilized

Grades: 6, 7, 9, 10, 11, 12

Strands: Statistics and Probability

Sensing Data

In this lesson, students will explore data collection using the Climate Sensor and perform statistical analysis of the data. Students will use a scientific method of inquiry to plan an investigation of their own. This activity is meant to allow students to use a variety of skills they have acquired throughout a statistics unit in a personally meaningful way. The specific standards addressed will vary based on the students' approach to the challenge.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.A.1
CCSS.MATH.CONTENT.6.SP.B.5.A	CCSS.MATH.CONTENT.HSS.ID.A.2
CCSS.MATH.CONTENT.6.SP.B.5.B	CCSS.MATH.CONTENT.HSS.ID.A.3
CCSS.MATH.CONTENT.7.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.B.5
CCSS.MATH.CONTENT.7.SP.A.2	CCSS.MATH.CONTENT.HSS.ID.B.6.A
CCSS.MATH.CONTENT.7.SP.B.3	CCSS.MATH.CONTENT.HSS.ID.B.6.B
CCSS.MATH.CONTENT.7.SP.B.4	CCSS.MATH.CONTENT.HSS.ID.B.6.C
CCSS.MATH.CONTENT.8.SP.A.1	CCSS.MATH.PRACTICES: 2, 4, 5, 7
CCSS.MATH.CONTENT.8.SP.A.2	NGSS Science & Engineering Practices: 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.8.SP.A.4	

Sensors Utilized
HipScience Climate Sensor
(No 3D Kit Used)

Grades: 6, 7, 8, 9, 10, 11, 12

Strands: Statistics and Probability



Lesson Plans: Seventh Grade

MAD Statapults

In this lesson, students will explore data collection using a catapult and perform statistical analysis of the data. Students will compare two sets of data using graphical and numerical representations, including standard deviation.

Standards Addressed

CCSS.MATH.CONTENT.7.SP.A.2 CCSS.MATH.CONTENT.HSS.ID.A.3
CCSS.MATH.CONTENT.7.SP.B.3 CCSS.MATH.PRACTICES: 2, 4, 5, 7
CCSS.MATH.CONTENT.7.SP.B.4 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.HSS.ID.A.1 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.HSS.ID.A.2

Grades:
7, 9, 10, 11, 12

Strands: Statistics and Probability

3D Kits Utilized

Ball Bearing Catapult Kit

Analyzing MAD Lionfish

In this lesson, students will practice calculating mean absolute deviations and increase their conceptual understanding of how the MAD is related to data distribution by comparing dot plots of multiple samples. This lesson uses the problem of invasive species as an engaging situation for statistical analysis. This lesson can be used after students have experienced an original student tutorial found at floridastudents.org that would help review the concepts.

Standards Addressed

CCSS.MATH.CONTENT.7.SP.A.2 CCSS.MATH.PRACTICES:
2, 4, 5, 6, 7, 8

Grades: 7

Strands: Statistics and Probability

3D Kits Utilized

N/A

Soap Bubbles

In this lesson, students will explore data collection by blowing soap bubbles and performing statistical analysis of the data. Students will compare two sets of data using graphical and numerical representations, including mean absolute deviation. Student will answer the question, "Do different soap brands produce different-sized bubbles?"

Standards Addressed

CCSS.MATH.CONTENT.7.SP.A.2 CCSS.MATH.CONTENT.HSS.ID.A.3
CCSS.MATH.CONTENT.7.SP.B.3 CCSS.MATH.PRACTICES: 2, 4, 5, 7
CCSS.MATH.CONTENT.7.SP.B.4 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.HSS.ID.A.1 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.HSS.ID.A.2

Grades:
7, 9, 10, 11, 12

Strands: Statistics and Probability

3D Kits Utilized

N/A

Catapulting Data

In this interdisciplinary lesson, students will explore data collection using a catapult and perform statistical analysis of the data. Students will create boxplots for data analysis that will help to demonstrate the scientific concepts of transfer of energy.

Standards Addressed

CCSS.MATH.CONTENT.7.SP.A.1 CCSS.MATH.PRACTICES: 2, 4, 5
CCSS.MATH.CONTENT.7.SP.A.2 NGSS.MS-PS3-1
CCSS.MATH.CONTENT.7.SP.B.3 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.7.SP.B.4 2, 3, 4, 5, 8

Grades: 7

Strands: Physical Science,
Statistics and Probability

3D Kits Utilized

Ball Bearing Catapult Kit

Baseball Statistics

In this lesson, students are presented with a problem-based learning challenge to showcase their previously-learned statistical skills. Students will use basic measures of center and variability to take opposing positions. This challenge has a baseball theme, but could be adapted for any sport that commonly collects multiple types of data.

Standards Addressed

CCSS.MATH.CONTENT.7.SP.B.3 CCSS.MATH.PRACTICES:
CCSS.MATH.CONTENT.7.SP.B.4 1, 2, 3, 4, 5, 6, 7
CCSS.MATH.CONTENT.HSS.ID.A.2 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.HSS.ID.A.3 2, 3, 4, 5, 8

N/A

3D Kits Utilized

Adjusting Data

In this lesson, students will explore how the mean and median are affected by adjusting values in a data set. Students will enhance their knowledge of mean and median as they are challenged to create a variety of data sets with specific criteria. They will also begin to develop an understanding of how these measures can be affected and therefore which measure may be a better statistic to describe the data.

Standards Addressed

CCSS.MATH.CONTENT.7.SP.B.3 NGSS Science & Engineering Practices: N/A
CCSS.MATH.CONTENT.7.SP.B.4 2, 3, 4, 5, 8

3D Kits Utilized



Lesson Plans: Seventh Grade (continued)

Reaction Time

In this lesson, students gather reaction data using two different procedures to help illustrate the bias that can occur due to human perception. This activity will further help to develop the idea that error is inherent in data collection. Understanding the concept of error in data is fundamental in being able to interpret and begin to understand confidence intervals and reliability in data analysis.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.A.3	N/A
CCSS.MATH.CONTENT.7.SP.A.2	CCSS.MATH.PRACTICES:	
CCSS.MATH.CONTENT.7.SP.B.3	1, 2, 3, 4, 5, 6, 7	
CCSS.MATH.CONTENT.7.SP.B.4	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.HSS.ID.A.2	1, 3, 4, 5, 8	

Measurement and Data Collection

In this interdisciplinary lesson, students will practice the skill of data collection with a variety of tools. They will then statistically analyze the class data sets and begin to understand that error is inherent in all data.

Standards Addressed		Sensors Utilized
CCSS.MATH.CONTENT.6.SP.A.2	CCSS.MATH.CONTENT.7.SP.A.2	HipScience Sensor Wand
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.CONTENT.7.SP.B.3	HipScience Temperature Probe
CCSS.MATH.CONTENT.6.SP.B.5.A	CCSS.MATH.PRACTICES: 2, 4, 5, 6	(No 3D Kit Used)
CCSS.MATH.CONTENT.6.SP.B.5.B	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.6.SP.B.5.C	2, 3, 4, 5, 8	

Energy Efficiency

In this lesson, students will gather information about different types of light bulbs and their efficiency at producing light. Based on their findings, they will identify cost-saving measures that people can take to reduce energy consumption.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.RP.A.3	NGSS.MS-ESS3-4	Planetary Temperatures Kit
CCSS.MATH.CONTENT.7.SP.B.4	NGSS Science & Engineering Practices:	
NGSS.MS-ESS3-3	1, 2, 5, 6, 8	

Grades:
7, 9, 10, 11, 12

Strands: Statistics and Probability

Grades: 6, 7

Strands: Statistics and Probability

Grades: 7

Strands: Earth and Space Science,
Ratios and Proportions,
Statistics and Probability

Sea Ice Analysis (Seventh Grade)

The changing climate is an important topic for both scientific analysis and worldly knowledge. This lesson uses data collected by the National Snow and Ice Data Center to create and use statistical analysis as a tool to evaluate the sea ice loss. Students will use technology to quickly generate graphs for each month, looking for trends, patterns, or deviations over time.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.A.2	NGSS.MS-ESS3-3	N/A
CCSS.MATH.CONTENT.7.SP.B.3	NGSS.MS-ESS3-4	
CCSS.MATH.CONTENT.7.SP.B.4	NGSS.MS-ESS3-5	
NGSS.MS-ESS2-2	NGSS Science & Engineering Practices:	
NGSS.MS-ESS3-1	3, 4, 5, 8	
NGSS.MS-ESS3-2		

Ocean Floor Sampling: Part 1

Not all measurements are easily or directly determinable. In this lesson, students will use 3D-printed ocean models to gather measurements, estimate the average depth of two different regions of the ocean, and then determine which portion has a different average depth. These activities facilitate understanding of how repeated random sampling techniques allow students to compare different populations.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.B.4	NGSS Science & Engineering Practices: 2, 4, 7	Ocean Topography Mapping Kit

Ocean Floor Sampling: Part 2

In this lesson, students will explore how the mean and median are affected by adjusting values in a data set. Students will enhance their knowledge of mean and median as they are challenged to create a variety of data sets with specific criteria. They will also begin to develop an understanding of how these measures can be affected and therefore which measure may be a better statistic to describe the data.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.A.1		Ocean Topography Mapping Kit
CCSS.MATH.CONTENT.7.SP.A.2		
CCSS.MATH.CONTENT.7.SP.B.4		

Grades: 7

Strands: Earth and Space Science,
Statistics and Probability

Grades: 7

Strands: Statistics and Probability

Grades: 7

Strands: Statistics and Probability



Lesson Plans: Seventh Grade (continued)

Statistical Quadrats

In this lesson, students will explore statistical sampling methods, specifically the quadrat method, and evaluate how well it produces samples similar to the population. Students will compare their sampling results to the entire population to scrutinize the validity of this sampling method.

Standards Addressed	
CCSS.MATH.CONTENT.7.SP.A.1	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.7.SP.A.2	2, 3, 4, 5, 8
CCSS.MATH.PRACTICES: 2, 4, 5, 7	

Grades: 7

Strands: Statistics and Probability

3D Kits Utilized
Pencil Quadrat Kit

Lionfish Sampling Methods

In this lesson, students will develop a sampling method to make inferences about the invasive lionfish in the Atlantic Ocean. Students will carry out their investigation, create histograms, and calculate quantitative data like mean absolute deviation to help make conjectures about the lionfish population. Students will then analyze their sampling methodology by repeating the procedure with the population data. This investigation not only allows students the opportunity to simulate and improve their own methodologies, but also provides a current and real-life scientific issue to be examined.

Standards Addressed	
CCSS.MATH.CONTENT.7.SP.A.1	CCSS.MATH.PRACTICES: 2, 3, 4, 5
CCSS.MATH.CONTENT.7.SP.A.2	CCSS.ELA-LITERACY.RST.6-8.3
CCSS.MATH.CONTENT.7.SP.B.3	CCSS.ELA-LITERACY.RST.11-12.3
CCSS.MATH.CONTENT.7.SP.B.4	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.HSS.IC.A.2	2, 3, 4, 5, 8
CCSS.MATH.CONTENT.HSS.IC.B.3	

Grades: 7, 9, 10, 11, 12

Strands: Reading in Science and Technical Subjects, Statistics and Probability

3D Kits Utilized
Lionfish Sampling Kit

Bean Bag Toss

In this lesson, students are presented with a problem-based learning challenge to showcase their previously-learned statistical skills. Students will use basic measures of center and variability to create a bean bag toss game board that adheres to specific parameters by testing and analyzing the frequencies within samples.

Standards Addressed	
CCSS.MATH.CONTENT.7.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.A.2
CCSS.MATH.CONTENT.7.SP.A.2	CCSS.MATH.CONTENT.HSS.ID.A.3
CCSS.MATH.CONTENT.7.SP.B.3	CCSS.MATH.PRACTICES:
CCSS.MATH.CONTENT.7.SP.B.4	1, 2, 3, 4, 5, 6, 7
CCSS.MATH.CONTENT.7.SP.C.7.A	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.7.SP.C.7.B	2, 3, 4, 5, 8

Grades: 7, 9, 10, 11, 12

Strands: Statistics and Probability

3D Kits Utilized
N/A

Introduction to Probability

Not all measurements are easily or directly determinable. In this lesson, students will use 3D-printed ocean models to gather measurements, estimate the average depth of two different regions of the ocean, and then determine which portion has a deeper average depth. These activities facilitate understanding of how repeated random sampling techniques allow students to compare different populations.

Standards Addressed	
CCSS.MATH.CONTENT.7.SP.C.5	CCSS.MATH.PRACTICES: 2, 4, 5, 6, 7, 8

Grades: 7

Strands: Statistics and Probability

3D Kits Utilized
Ocean Topography Mapping Kit

Predicting Outcomes

In this lesson, students will be introduced to the concept of using probability to determine the relative frequency that a specific event is expected to occur. Students will also see how recording data from experiments and/or trials can help them determine the long-run relative frequency of an event.

Standards Addressed	
CCSS.MATH.CONTENT.7.SP.C.6	CCSS.MATH.PRACTICES: 2, 4, 5, 6, 7, 8

Grades: 7

Strands: Statistics and Probability

3D Kits Utilized
N/A

Which Bag Is It?

In this lesson, students will explore the idea of probability in terms of confidence levels with repeated trials. The use repeated trials will help conceptualize the law of large numbers and its relationship to theoretical and experimental probability. The lesson also uses technology to simulate multiple trials. Students will also interpret the distribution of the trials in dot plots to help make inferential decisions.

Standards Addressed	
CCSS.MATH.CONTENT.7.SP.A.1	CCSS.MATH.CONTENT.HSS.IC.B.5
CCSS.MATH.CONTENT.7.SP.B.3	CCSS.MATH.CONTENT.HSS.ID.A.1
CCSS.MATH.CONTENT.6.SP.B.4	CCSS.MATH.CONTENT.HSS.ID.A.3
CCSS.MATH.CONTENT.7.SP.C.6	CCSS.MATH.PRACTICES: 2, 3, 4, 5
CCSS.MATH.CONTENT.7.SP.C.7.B	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.HSS.IC.A.2	1, 2, 4, 5, 6, 8

Grades: 7, 9, 10, 11, 12

Strands: Statistics and Probability

3D Kits Utilized
N/A

Theoretical and Experimental Probability

In this lesson, students will explore the use of probability models to compare and contrast theoretical probability and experimental probability. Student will use repeated trials to help conceptualize the law of large numbers and its relationship to theoretical and experimental probability.

Standards Addressed	
CCSS.MATH.CONTENT.6.SP.C.5	NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.7.SP.C.6	1, 2, 4, 5, 6, 8
CCSS.MATH.CONTENT.7.SP.C.7	

Grades: 6, 7

Strands: Statistics and Probability

3D Kits Utilized
Probability Kit



Lesson Plans: Seventh Grade (continued)

Probability Dice

In this lesson, students will explore theoretical probability and sampling methods to make inferences and conclusions about basic claims. This simulation will allow students to decipher which dice are loaded and which are fair, which will help them understand that basic knowledge of what “should” happen is essential when analyzing results from experiments and statistical manipulations.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.A.2	CCSS.MATH.PRACTICES: 2, 4, 5, 7	Loaded Dice Kit
CCSS.MATH.CONTENT.7.SP.C.5	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.7.SP.C.6	2, 3, 4, 5, 8	

Modeling Genetics with Probability

In this lesson, students will create their own probability models to simulate determining the experimental probability of certain genetic combinations through exploring genotypes and phenotypes. Students will then compare experimental probability to the theoretical probabilities based on the Punnett square.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.C.7.A	NGSS Science & Engineering Practices:	Probability Kit
CCSS.MATH.CONTENT.7.SP.C.7.B	1, 2, 4, 5, 6, 8	
NGSS.MS-LS3-2		

Natural Selection with Probability Models

In this lesson, students will explore the use of probability models to simulate natural selection of a type of organism. Using both theoretical and experimental probability concepts will demonstrate that simulations do not always behave as expected.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.C.7.A	NGSS Science & Engineering Practices:	Bunnies Kit
CCSS.MATH.CONTENT.7.SP.C.7.B	1, 2, 4, 5, 6, 8	
NGSS.MS-LS4-6		

How Many Outfits?

In this lesson, students will be introduced to the concept of compound events. Students will build a conceptual understanding of the function of tree diagrams by creating all the possible combinations of a scenario. Students will then create their own simulation to generate frequencies of the scenario.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.C.8.A	Florida Computer Science Standards:	Clothing Combinations Kit
CCSS.MATH.CONTENT.7.SP.C.8.B	SC.68.CS-CS.1.1	
CCSS.MATH.CONTENT.7.SP.C.8.C	SC.68.CS-CS.1.2	
CCSS.MATH.PRACTICES:	SC.68.CS-CS.1.3	
2, 4, 5, 6, 7, 8	SC.68.CS-CS.1.4	

Compound Events

In this lesson, students will be introduced to the concept of compound events. Students will build a conceptual understanding by relating the use of organized lists and/or tree diagrams to the multiplication rule of probability. Students will be exposed to basic independent and dependent events.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.C.8.A	CCSS.MATH.CONTENT.7.SP.C.8.B	N/A

Consumer Product Analysis

In this lesson, students will explore a statistical consumer analysis investigation on two different types of microwave popcorn. Students will use a scientific method of inquiry to plan an investigation of their own. This activity is meant to allow students to use a variety of skills they have acquired throughout a statistics unit in a personally meaningful way. Due to the multiple avenues the students can choose, the standards will vary.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.7.SP.A.1	CCSS.ELA-LITERACY.RST.6-8.3	N/A
CCSS.MATH.CONTENT.7.SP.A.2	CCSS.ELA-LITERACY.RST.11-12.3	
CCSS.MATH.CONTENT.7.SP.B.3	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.7.SP.B.4	2, 3, 4, 5, 8	
CCSS.MATH.PRACTICES: 2, 4, 5, 7		



Lesson Plans: Seventh Grade (continued)

Cold Soda Cups

In this lesson, students will collect data with a temperature probe and perform statistical analysis of the data. Students will use a scientific method of inquiry to plan an investigation to determine which soda cup is the best. This activity is meant to allow students to use a variety of skills they have acquired throughout a statistics unit in a problem-based STEM challenge. There are many standards covered in this lesson due to the multiple skills that students will use.

Strands: Reading in Science and Technical Subjects, Statistics and Probability

Grades:
7, 9, 10, 11, 12

Standards Addressed

- CCSS.MATH.CONTENT.7.SP.A.1
- CCSS.MATH.CONTENT.7.SP.A.2
- CCSS.MATH.CONTENT.7.SP.B.3
- CCSS.MATH.CONTENT.7.SP.B.4
- CCSS.MATH.CONTENT.HSS.ID.A.1
- CCSS.MATH.CONTENT.HSS.ID.A.2
- CCSS.MATH.CONTENT.HSS.ID.A.3
- CCSS.MATH.PRACTICES: 2, 4, 5, 7
- CCSS.ELA-LITERACY.RST.6-8.3
- CCSS.ELA-LITERACY.RST.11-12.3
- NGSS Science & Engineering Practices: 2, 3, 4, 5, 8

Sensors Utilized

- HipScience Sensor Wand
- HipScience Temperature Probe
- (No 3D Kit Used)



Lesson Plans: Eighth Grade

Rocket Balloons

In this lesson, students will be exposed to how a scatterplot shows a relationship in bivariate data. Students will learn to graph bivariate data, look for a basic trend or association, as well as create the equation of the trend line. Students will explore the relationship between the number of breaths in a balloon and the distance the balloon travels.

Standards Addressed

CCSS.MATH.CONTENT.8.SP.A.1 CCSS.MATH.PRACTICES: 2, 4, 5
CCSS.MATH.CONTENT.8.SP.A.2 NGSS.MS-PS2-2
CCSS.MATH.CONTENT.8.SP.A.3 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.8.F.A.3 2, 3, 4, 5, 8
CCSS.MATH.CONTENT.8.F.B.4

Grades: 8

Strands: Functions, Physical Science,
Statistics and Probability

3D Kits Utilized

Graphing Kit
Zone Marking Kit

Scattering Conkers

In this interdisciplinary lesson, students will explore bivariate data collection by dropping conkers (horse chestnuts), tracking seed dispersion, and performing statistical analysis of the data. Students will create scatterplots of the data to look for trends and/or associations between the altitude of the seed drop and the distance they land away from a target.

Standards Addressed

CCSS.MATH.CONTENT.8.SP.A.1 NGSS.MS-LS2-1
CCSS.MATH.CONTENT.8.SP.A.2 NGSS.MS-LS2-4
CCSS.MATH.CONTENT.8.F.A.3 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.8.F.B.4 2, 3, 4, 5, 8
CCSS.MATH.PRACTICES: 2, 4, 5

Grades: 8

Strands: Functions, Life Science,
Statistics and Probability

3D Kits Utilized

Conkers Kit

Let There Be Light

In this lesson, students will explore and perform statistical analysis of bivariate data by collecting ambient light data with a sensor. Students will create scatterplots of the data to look for trends and/or associations between the distance from the window and the amount of ambient light.

Standards Addressed

CCSS.MATH.CONTENT.8.SP.A.1 NGSS.MS-LS2-1
CCSS.MATH.CONTENT.8.SP.A.2 NGSS.MS-LS2-4
CCSS.MATH.CONTENT.8.SP.A.3 NGSS.MS.PS4-2
CCSS.MATH.CONTENT.8.F.A.3 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.8.F.B.4 2, 3, 4, 5, 8
CCSS.MATH.PRACTICES: 2, 4, 5

Grades: 8

Strands: Functions,
Life Science, Physical Science,
Statistics and Probability

Sensors Utilized

HipScience Climate Sensor

(No 3D Kit Used)

Bowling for Stats

In this lesson, students will use a 3D-printed bowling set to explore the relationship between bowling distance and the number of pins a student can expect to knock down. These activities facilitate understanding of interpreting the correlation coefficient, slope, and y-intercept of a least squares regression model.

Standards Addressed

CCSS.MATH.CONTENT.8.SP.A.1 NGSS.MS-PS2-2
CCSS.MATH.CONTENT.8.SP.A.3 NGSS Science & Engineering Practices:
CCSS.MATH.PRACTICES: 2, 4, 5 2, 3, 4, 5, 8

Grades: 8

Strands: Physical Science,
Statistics and Probability

3D Kits Utilized

Bowling Kit

Catapulting Data

In this interdisciplinary lesson, students will explore data collection using a catapult and perform statistical analysis of the data. Students will create scatterplots for analysis that will help demonstrate the scientific concepts of density and its impact on the characteristics of objects.

Standards Addressed

CCSS.MATH.CONTENT.8.SP.A.1 CCSS.MATH.PRACTICES: 2, 4, 5
CCSS.MATH.CONTENT.8.SP.A.2 NGSS.MS-PS3-1
CCSS.MATH.CONTENT.8.SP.A.3 NGSS Science & Engineering Practices:
CCSS.MATH.CONTENT.8.G.C.9 2, 3, 4, 5, 8

Grades: 8

Strands: Geometry, Physical Science,
Statistics and Probability

3D Kits Utilized

Ball Bearing Catapult Kit

Adjusting Jumps

This activity brings awareness to the students on how to better improve their estimated lines of fit. Students will collect data with two numerical variables, create scatterplots, and estimate a line of fit. They will then discover how y-value residuals can be minimized to improve their line of fit. Day 1 provides students with the opportunity to visually understand residuals while enhancing their understanding of actual values and predicted values from a line of fit. Day 2 offers the opportunity for students to use their algebraic skills to calculate the residuals by collecting new data.

Standards Addressed

CCSS.MATH.CONTENT.8.SP.A.1 CCSS.MATH.CONTENT.8.SP.A.3
CCSS.MATH.CONTENT.8.SP.A.2 CCSS.MATH.CONTENT.HSS.ID.8.6

3D Kits Utilized

N/A

Grades:
8, 9, 10, 11, 12

Strands: Statistics and Probability



Lesson Plans: Eighth Grade (continued)

Height Scatterplot

This activity focuses on collecting and analyzing data with two numerical variables. This kind of data analysis, known as bivariate analysis, explores the possible association between two variables. Students will create scatterplots and estimate a line of best fit. They will then use that linear regression line for interpolation. As an extension, they can work with a graphing calculator to determine the regression for the line of best fit and the correlation coefficient.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.C.8	N/A
CCSS.MATH.CONTENT.8.SP.A.2	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.8.SP.A.3	1, 2, 3, 4, 5, 6, 8	
CCSS.MATH.CONTENT.HSS.ID.8.6		

Outlier Effect

This activity allows students to explore how outliers may or may not affect lines of best fit. Students will explore this concept on a scatterplot by hand and with technology.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.B.6	N/A
CCSS.MATH.CONTENT.8.SP.A.2	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.8.SP.A.3	1, 2, 3, 4, 5, 6, 7, 8	
CCSS.MATH.CONTENT.HSS.ID.A.3		

Blindfolded Target Practice

This activity focuses on planning, collecting, and analyzing data with two numerical variables. This kind of data analysis, known as bivariate analysis, explores the possible association between two variables. Students will create scatterplots and estimate a best fit line. They will then use that linear regression line for interpolation. Finally, they will work with technology to determine the regression for the line of best fit and the correlation coefficient.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.1	CCSS.MATH.CONTENT.HSS.ID.B.6	N/A
CCSS.MATH.CONTENT.8.SP.A.2	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.8.SP.A.3	1, 2, 3, 4, 5, 6, 7, 8	

Sea Ice Analysis (Eighth Grade)

The changing climate is an important topic for both scientific analysis and worldly knowledge. This lesson uses data collected by the National Snow and Ice Data Center to create and use mathematical models as a predictive tool and do critical analysis of sea ice loss.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.1	CCSS.MATH.PRACTICES: 2, 4, 5, 6	N/A
CCSS.MATH.CONTENT.8.SP.A.2	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.8.SP.A.3	2, 4, 5, 8	

Planetary Thermometer

- In this lesson, students will:
1. Model the effect the Sun has on the temperature of the planets based on their distances from it.
 2. Use data to explore the effect of light and heat as the distance increases from the source.
 3. Use data to explore the impact that a model greenhouse atmosphere will have on the simulated inner three planets.
 4. Use data to explore linear and/or nonlinear models based on the temperatures of planets relative to their distance from the Sun and their atmospheric conditions.
 5. Relate the slope of lines in context to model the concept of temperature equilibrium.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.1	NGSS.MS-ESS1-3	Planetary Temperatures Kit
CCSS.MATH.CONTENT.8.SP.A.3	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.8.EE.B.5	1, 2, 5, 6, 8	

Minute Minded!

Two-way tables provide a way to organize bivariate categorical data. In this lesson, students will gather data about gender differences in estimating the length of a minute, organize the data into a two-way table, and then analyze the data using relative frequencies.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.4	NGSS Science & Engineering Practices:	N/A
	1, 2, 3, 4, 5, 6, 7, 8	



Lesson Plans: Eighth Grade (continued)

Categorically Catapulting Cheery Cereal

Two-way tables provide a way to organize bivariate categorical data. In this lesson, students will gather data about distances a projectile travels from a catapult, organize the data into a two-way table, and then analyze the data using relative frequencies.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.4	NGSS Science & Engineering Practices: 1, 2, 3, 4, 5, 6, 7, 8	Ball Bearing Catapult Kit Zone Marking Kit

Grades: 8

Strands: Statistics and Probability

Bivariate Rocket Launch

In this lesson, students will connect how the data in a scatterplot and a two-way frequency table can show a relationship in bivariate data. Students will graph bivariate data, perform a regression to develop the equation of the line of best fit, and use the mean of the x values and the mean of the y values to aggregate the data into four categories for a two-way table. Students will use both the scatterplot and two-way table to justify if there is a relationship between the bivariate data.

Standards Addressed		3D Kits Utilized
CCSS.MATH.CONTENT.8.SP.A.1	CCSS.MATH.CONTENT.8.F.B.4	Rockets Kit
CCSS.MATH.CONTENT.8.SP.A.2	CCSS.MATH.PRACTICES: 2, 4, 5	Clinometer Kit
CCSS.MATH.CONTENT.8.SP.A.3	NGSS.MS-PS2-2	
CCSS.MATH.CONTENT.8.SP.A.4	NGSS Science & Engineering Practices:	
CCSS.MATH.CONTENT.8.F.A.3	2, 3, 4, 5, 8	

Grades: 8

Strands: Functions, Physical Science, Statistics and Probability

Water Filtration Challenge (Eighth Grade)

In this interdisciplinary Problem Based Learning lesson, students will need to research a variety of concepts to prepare themselves for a water filtration engineering design challenge. Students will design, test, and present a water filtration system that meets specific parameters to help communities access safe drinking water during the future colonization of Mars.

Standards Addressed		3D Kits and Sensors Utilized
CCSS.MATH.CONTENT.7.RP.A.3	NGSS.MS-ETS1-3	Water Filtration Kit
CCSS.MATH.PRACTICES: 2, 4, 5, 6	NGSS.MS-ETS1-4	
NGSS.MS-ESS3-3	NGSS Science & Engineering Practices:	HipScience Turbidity Probe
NGSS.MS-ETS1-1	2, 3, 4, 5, 8	
NGSS.MS-ETS1-2		

Grades: 8

Strands: Earth & Space Science, Engineering Design, Ratios & Proportions, Statistics & Probability

