

Unit 5 - Statistics and Probability

Content Area: **Math**
Course(s): **Sample Course**
Time Period: **AprMay**
Length: **7 Weeks & Grade 6**
Status: **Published**

Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Statistics and Probability

Grade 6 - Unit 6

Belleville Board of Education

102 Passaic Avenue

Belleville, NJ 07109

Prepared by: Margaret M. Sabino

Dr. Richard Tomko, Superintendent of Schools

Mr. Thomas D’Elia, Director of Curriculum and Instruction

Ms. Diana Kelleher, District Supervisor of ELA/Social Studies

Mr. George Droste, District Supervisor of Math/Science

Board Approved: August 24, 2015

Board Approved Revisions: August 15, 2016

Unit Overview

After this unit 6th grade math student should be able to;

- Understand that a set of data has variety and distribution
- Comprehend that data can be manipulated to be misleading
- Data can be described using measures of central tendency
- Calculate the measures of central tendency of a set of data
- Interpret, analyze and make predictions based on data
- Display, organize, and analyze data by constructing different models of data representations
- Describe data using the five-number summary

NJSLS

Please link all standards that apply in this section within the curriculum of the unit being written. Please include all New Jersey Student Learning Standards.

MA.6.SP.A	Develop understanding of statistical variability.
MA.6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
MA.6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
MA.6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MA.6.SP.B	Summarize and describe distributions.
MA.6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MA.6.SP.B.5	Summarize numerical data sets in relation to their context, such as by:
MA.6.SP.B.5a	Reporting the number of observations.
MA.6.SP.B.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MA.6.SP.B.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
MA.6.SP.B.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Exit Skills

By the end of this unit 6th grade math students should be able to:

Develop an understanding of statistical thinking:

Build on and reinforcing their understanding of a number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute value) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.

Enduring Understanding

Students will understand that statistical questions;

- anticipate variability
- a set of data has a distribution
- center and spread are two related but different ways of describing a set of data
- the way that data is collected, organized and displayed influences interpretation
- The probability of an event's occurrence can be predicted with varying degrees of confidence
- accurate data can help one make decisions in everyday life.

Essential Questions

- What is a statistical question?
- What is a distribution?
- What is the difference between the center and the spread of a numerical set?
- How are data sets described?
- Why is data collected and analyzed?
- What is the purpose of displaying data?
- How does the selection of a sample affect conclusions based on the sample?
- Which measure of central tendency is most appropriate in a given situation?
- How do people use data to influence others?
- How can predictions be made based on data?
- How can data sets be modeled and represented visually?
- How can statistics assist one in daily life?

Learning Objectives

- Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers
- Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape.
- Recognize that a measure of center for a numerical data set summarizes all of its values in a single number, while a measure of variation describes how its values vary with a single number
- Display numerical data in plots on a number line, including dot plots, histograms and box plots
- Summarize data sets in relation to their context such as;
 - a. Reporting the number of observations
 - b. Describing the nature of the attribute under investigation, including how it was measured and units of measure
 - c. Giving quantitative measures of center (median/mean) and variability (interquartile range and/or mean absolute value), as well as describing any overall pattern and any striking deviation from the overall pattern.
 - d. Relating the choice of measures of center and variability to the shape of data distribution.

Interdisciplinary Connections

Science

Social Studies

Health & Nutrition

Consumer Math

Alignment to 21st Century Skills & Technology

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

21st Century/Interdisciplinary Themes

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

21st Century Skills

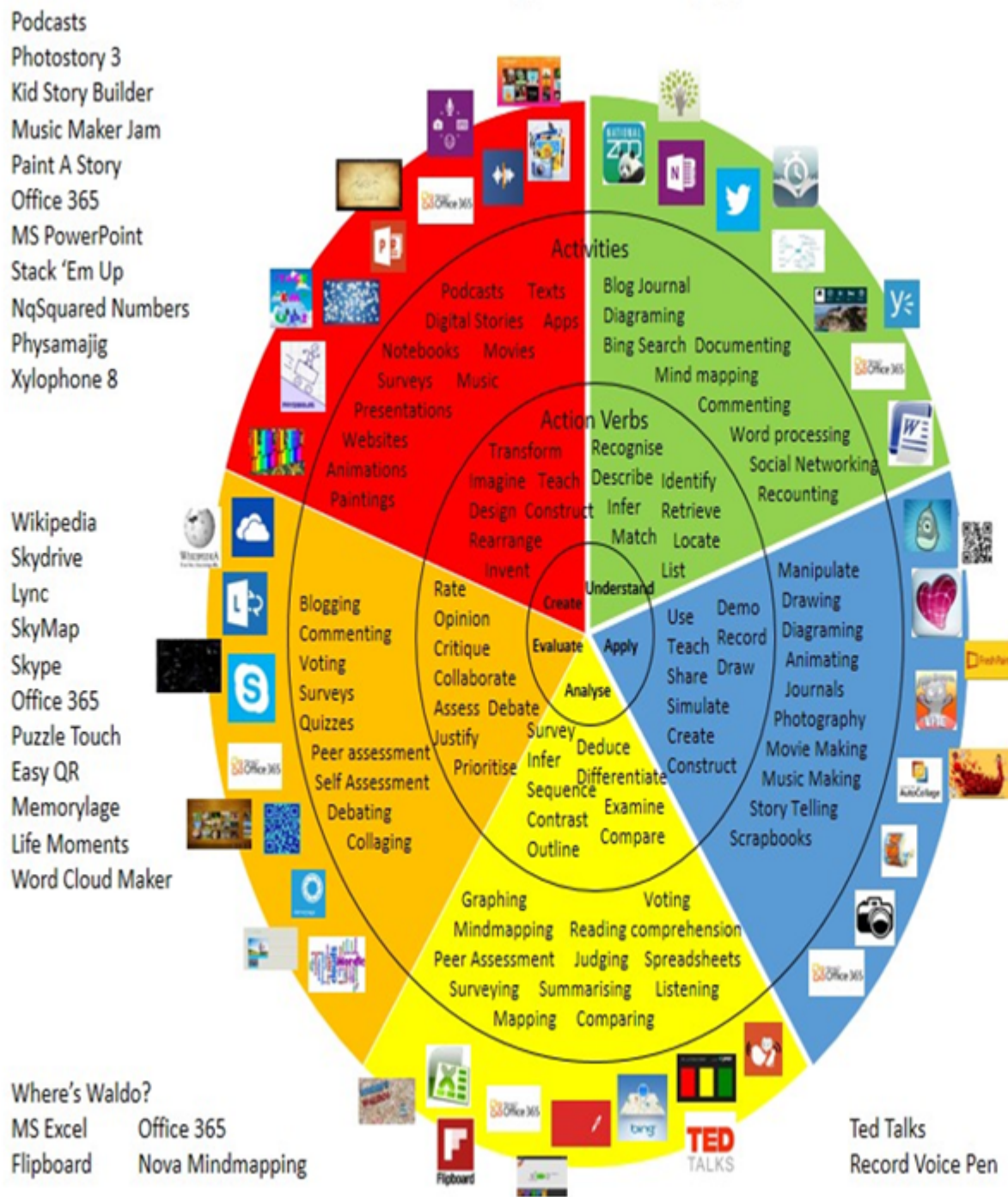
- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy

- Life and Career Skills
- Media Literacy

Technology Infusion

What technology can be used in this unit to enhance learning?

Win 8.1 Apps/Tools Pedagogy Wheel



Originally taken from <http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg>
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Differentiation

As a Reminder:

The basis of good differentiation in a lesson lies in differentiating by content, process, and/or product.

Resources:

- NJDOE: Instructional Supports and Scaffolds for Success in Implementing the Common Core State Standards <http://www.state.nj.us/education/modelcurriculum/success/math/k2/>
- Differentiation
 - Pre-teach new vocabulary and meaning of symbols
 - Connect new vocabulary and symbols to background knowledge and experience
 - Break down terms to familiar parts, suffixes and prefixes
 - Make dictionaries available to learners
 - Increase experience to academic vocabulary and language
 - Provide flash cards
 - Incorporate as many learners senses as possible to enhance retention
 - Brainstorm examples of use of new terms or symbols making real world applications
 - Engage student in relevant discussion about conceptual process
 - Post and refer to math guides and anchor charts when applicable
 - Clarify the relationships between the operations
 - Develop graphic representations of math processes
 - Make connections to formulas, concepts or structures previously learned
 - Utilize manipulatives to display structures
 - Offer various ways to solve math problems
 - Provide opportunities to integrate math, technology and art
 - Provide graphic organizers and anchor charts for all symbols and formulas
 - Create math journals for terms, formulas and symbols
 - Develop interactive games and activities to promote retention
 - Integrate videos
 - Utilize graphics, diagrams, charts

Special Education

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding

- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

ELL

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- providing study guides
- tutoring by peers

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices

- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- providing study guides
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using videos, illustrations, pictures, and drawings to explain or clarify

Evidence of Student Learning-CFU's

Please list ways educators may effectively check for understanding in this section.

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist

- Think, Pair, Share
- Unit tests

Primary Resources

Carnegie Learning Textbook Course 1

Standards Solution

NJ Model Curriculum

PARCC/Pearson

Ancillary Resources

Dinah Zike's Foldables-Interactive Study Guides, Macmillan/MacGraw Hill

Glencoe/MacGraw Hill Workbooks

<http://www.khanacademy.org>

<http://mathgoodies.com>

<http://purplemath.com>

<http://buzzmath.com>

<http://IXL.com/math>

<http://www.ncpublicschools.org/acre/standards/common-core-tools/>

<http://www.uen.org/commoncore/>

<http://www.parcconline.org/math-plds>

<http://www.parcconline.org/mcf/mathematics/parcc-model-content-frameworks-browser>

<http://ime.math.arizona.edu/progressions/>

http://www.nciea.org/publications/Math_LPF_KH11.pdf

http://www.nciea.org/publications/Math%20Expanded%20LPF%205-8_KH11.pdf

<http://www.corestandards.org/the-standards/mathematics>

Dan Meyer's Three-Act Lessons

<https://docs.google.com/spreadsheet/ccc?key=0AjIqyKM9d7ZYdEhtR3BJMmdBWnM2YWxWYVM1UWoWTEE#gid=0>

Sample Lesson

One Lesson per Curriculum must be in this lesson plan template. I.e. one lesson in one unit

Unit Name:

CCSS/NJCCCS:

Interdisciplinary Connection:

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:

Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

Integration of Technology:

