

## Strand IV - Data Analysis, Statistics, and Probability:

The student identifies patterns and special features of data and events of chance through experiences with meaningful mathematical problems that focus on comparing, predicting, representing data, and making decisions to communicate mathematical understanding.

**Benchmark (K – 5):** The student designs a data question and collects, represents and analyzes data. The student compares representations and understands measures of center. The student predicts outcomes and uses “likely” and “unlikely” to describe the probability of a given situation.

### Performance Standards:

#### Kindergarten:

##### Statistics

- **Collects** information through counting and tallying (e.g., How many buttons are on your shirt?).
- **Describes, sorts, and classifies** objects or information using representations.
- **Organizes and represents** categorical data.
- **Selects, counts, and describes** subsets of data, and **explains** the reasoning for the grouping.
- **Uses** the concept **NOT** as a category for organizing information and **explains** the reasoning.
- **Interprets** information based on simple graphs and surveys prepared by students.

##### Probability

- **Describes** patterns in nature and daily routines.
- **Makes** predictions based on familiar situations and **relates** to the concept of chance (e.g., Will it rain on a sunny day?).
- **Uses** probability terms such as “likely” and “unlikely”.

#### First Grade:

##### Statistics

- **Conducts** simple statistical experiments and **collects** data (e.g., survey number of students who walked to school today).
- **Compares** different ways of sorting, organizing, and representing the same data. **Plots** the data on a bar graph.
- **Answers** questions and **communicates** information based on data represented in bar graphs.
- **Identifies** a sorting rule based on the attributes of the data (e.g., Put all the blue blocks together.).

##### Probability

- **Describes** regularly occurring patterns in nature and in daily routines.
- **Describes** an event as likely or unlikely to occur.
- **Makes** predictions about events.

## Second Grade:

### Statistics

- **Conducts** a simple experiment:
  - ✓ **identifies** a problem,
  - ✓ **collects and records** data using pictorial and symbolic graphs and charts, and
  - ✓ **describes and interprets** data.
- **Compares** two data sets for similarities and differences.
- **Analyzes** data results both orally and in writing.
- **Identifies** range and unusual data points (e.g., Line up a class by height. Identify tallest and shortest student.).

### Probability

- **Describes** the outcomes of simple probability experiments.
- **Uses** probability terms such as likely, unlikely, impossible, probable, and certainty.

## Third Grade:

### Statistics

- **Conducts** a simple experiment:
  - ✓ **identifies** a question,
  - ✓ **develops** a hypothesis,
  - ✓ **collects and records** data,
  - ✓ **represents** data using pictorial and symbolic graphs or charts, and
  - ✓ **describes and interprets** data.
- **Describes** patterns in data that support a hypothesis.
- **Uses** averaging in everyday problem situations.
- **Interprets** information and predicts the meaning of data using graphs from content areas and current events.

### Probability

- **Analyzes and draws conclusions** about simple probability experiments.
- **Uses** probability terms such as likely, unlikely, possible, impossible, probable, and certainty.

## Fourth Grade:

### Statistics

- **Describes and interprets** data using mode and range, highlighting trends and important features.
- **Finds** the median in a set of data arranged in numerical order and **uses** it to describe a set of data and to compare one data set with another.
- **Conducts** a complete data analysis project:
  - ✓ **identifies** a question,
  - ✓ **develops** a hypothesis,
  - ✓ **collects and records** data,
  - ✓ **represents** data using pictorial and symbolic graphs or charts, and
  - ✓ **describes and interprets** data.
- **Uses** a line graph to show the relationship between two variables in an experiment.

## Probability

- ✓ **Explains** outcomes of probability experiments verbally and numerically (e.g., 3 out of 4, 3/4) using appropriate probability terms.

## **Fifth Grade:**

### Statistics

- **Compares** two related data sets. **Makes** hypotheses, **represents** the data using graphs and tables and **shows** median, mode, and range.
- **Identifies** a strategy for selecting a representative sample and **makes** appropriate interpretations for the associated populations.
- **Analyzes and communicates** a single data set in more than one way for both quantitative (numerical) and qualitative (categorical) data sets.
- **Represents and analyzes** data that involves more than one variable (e.g., amount of light and plant growth).
- **Conducts** a more complex data analysis project:
  - ✓ **identifies** a question,
  - ✓ **develops** a hypothesis,
  - ✓ **collects and records** data,
  - ✓ **represents** data using appropriate grade level statistical tools, and
  - ✓ **describes and interprets** data.

## Probability

- **Performs** simple probability experiments and **organizes** data in a useful way:
  - ✓ **identifies** patterns,
  - ✓ **predicts** outcomes, and
  - ✓ **explains** effects on outcomes when a probability experiment is conducted several times.
- **Explains** the fairness of games and outcomes of events using knowledge of probability concepts.
- **Explains** that the measure of the likelihood of an event can be represented by a number from 0 to 1 (e.g., If you flip a coin, you have  $\frac{1}{2}$  chance of getting either heads or tails.).

## **Strand IV - Data Analysis, Statistics, and Probability:**

The student identifies patterns and special features of data and events of chance through experiences with meaningful mathematical problems that focus on comparing, predicting, representing data, and making decisions to communicate mathematical understanding.

**Benchmark (6 – 8):** The student designs a data question with two variables and collects, represents and analyzes the data. The student uses a variety of graphical representations to display data and understand measures of center and spread. The student makes conjectures and computes simple probability outcomes using a variety of tools.

## **Performance Standards:**

### **Sixth Grade:**

#### Statistics

- **Collects** data using a variety of appropriate instruments (e.g., surveys, observations, & interviews).
- **Organizes** data using appropriate graphical representations (e.g., frequency tables, stem-and-leaf plots).

- **Conducts** a more complex data analysis project:
  - ✓ **identifies** a question,
  - ✓ **develops** a hypothesis,
  - ✓ **collects and records** data,
  - ✓ **represents** data using appropriate grade level statistical tools, and
  - ✓ **describes and interprets** data.
- **Draws** conclusions from data using measures of central tendency (e.g., mode, median, mean).
- **Selects and develops** appropriate display(s) (e.g., T-charts, graphs) of data.

#### Probability

- **Develops** and **evaluates** inferences, predictions, and arguments that are based on data.

#### **Seventh Grade:**

##### Probability

- **Applies** counting principles to determine sample space (e.g., tree diagrams, fundamental counting principle, combinations, and permutations).
- **Determines** simple probability in experimental and theoretical situations.
- **Determines** probability of dependent and independent events in experimental and theoretical situations.
- **Explains and uses** appropriate terminology to describe complementary and mutually exclusive events.

#### **Eighth Grade:**

##### Statistics

- **Interprets** relationships between two variables using scatter plots and/or multiple line representations.
- **Represents** data using a variety of statistical tools (e.g., circle graphs, box-and-whisker plots, and Venn diagrams).
- **Analyzes** graphical displays of data for misuse, distortions, or misleading representations.
- **Uses** data samples to make predictions about larger populations.
- **Conducts** a more complex data analysis project:
  - ✓ **identifies** a question,
  - ✓ **develops** a hypothesis,
  - ✓ **collects and records** data,
  - ✓ **represents** data using appropriate grade level statistical tools,
  - ✓ **describes and analyzes** data, and
  - ✓ **analyzes** data using measures of central tendency (e.g. mean, median, mode).
- **Interprets** data and **makes conclusions** from data.