Courtney Harriman & Taylor Guth

Unit Plan

Professor Shaffer

Teaching Reading and Writing in Content Area

Taylor Guth and Courtney Harriman

Stage 1- Desired Results

Established Goals:

1. Students will be able to collect, organize, and interpret data in frequency tables.
2. Students will demonstrate their understanding of collecting data by making hypotheses, constructing a survey, and creating graphs, based on the data collected.
3. Students will use argumentation skills to defend their positions on the use of appropriate graphs.
4. When given a graph, students will draw conclusions through written and verbal responses.
5. Students will work with various vocabulary strategies to help them understand the vocabulary found in the text.
6. Students will be able to distinguish the cause and effect relationship between collected data and its graph.
7. Students will analyze data by interpreting real-world scenarios.
8. Students will expand their understanding of data through cooperative learning.
9. Students will use literacy strategies to analyze text and construct summaries.

Standards:

1. **6.SP.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.

2. Use random sampling to draw inferences about a population. **CCSS.MATH.CONTENT.7.SP.A.1**

3. **S.IC.1.** Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

4. **CC.2.4.7.B.1** Draw inferences about populations based on random sampling concepts.

5. **CC.2.4.HS.B.3** Analyze linear models to make interpretations based on the data

Big Ideas:

1. Collecting and Organizing Data
2. Creating Graphs
3. Interpreting Data
4. Real-world applications

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Essential Questions:

1. Why is properly collecting and organizing data important?
2. What effect does the type of graph have on the way we interpret the data?
3. What is the significance of interpreting data?
4. How can data be used to solve real-world problems?
5. Why is the ability to recognize misleading statistics important?

Enduring Understanding:

1. Properly collecting and organizing data is a critical part of making decisions.
2. The way we interpret a graph is based on what type of graph is presented.
3. Interpreting data allows us to draw conclusions, answer questions, and make predictions.
4. Collecting, organizing, graphing, and interpreting real-world data can help solve real-world problems.
5. Misleading statistics and graphs lead to inaccurate interpretations.

Students will know:

- How to properly collect data
- How to construct a frequency table
- How to create bar graphs, line graphs, and circle graphs
- How to use graphs to make predictions
- How to calculate relative frequency, cumulative frequency, and total frequency
- How statistics are used in the real world

Students will be able to:

- Identify misleading graphs
- Construct appropriate graphs based on data
- Identify the similarities and differences between bar graphs, line graphs, and circle graphs
- Explain the relationship between statistics and marketing
- Construct surveys and display the data properly
- Draw conclusions and make predictions when provided data

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Performance Task with Goals

Goal: You are going to construct a survey based on the preferences of two different age groups. The age groups will consist of your classmates from ages 14-18 and adults from ages 40-45. You may pick a survey topic from the following **[Goal 1]:**

1. Favorite music genre out of country, Hip-hop/pop, rock and roll, rap, and alternative
2. Favorite sport out of football, basketball, baseball, volleyball, and hockey
3. Favorite subject in school out of math, history, English, science, and foreign language

Role: You are a survey constructor working for a marketing company. Your job is to collect and organize data through your chosen survey. Your data should first be displayed in a frequency table. Your frequency table will be used to construct a line graph, bar graph, and a pie chart.

Audience: Your audience is the marketing company that you are working for. You need to justify which of the three graphs you created (line graph, bar graph, or pie chart) would best display the data. For example, which graph is the easiest to read and clearly displays the purpose of the survey (determine what category appeals to the most people).

Situation: The tasks you will complete include:

- Working with others in assigned groups of three. **(Goal 8)**
- Picking a survey topic
- Hypothesizing what the outcome of the survey will be (what will be the favorite category of your topic) **(Goal 2)**
- Collecting, organizing, and interpreting your collected data through a frequency table. **(Goal 1)**
- Creating a line graph, bar graph, and pie chart using your frequency table. Be sure to properly label the x-axis, y-axis, and title of your graphs. **(Goal 2)**
- Analyzing the three graphs and determine which graph best displays the data. **(Goal 7)**
- Defending your position on why you think one graph is more effective than the others by presenting your position to the class. You will need to explain why the graph you chose is the best. **(Goal 3), (Goal 6)**

Product, Performance, and Purpose:

You will construct a survey, collect and organize the survey's data, create three graphs in order to interpret the data you collected, decide why one graph is the most effective, and present a clear explanation to which graph is the most effective.

Standards and Criteria for Success:

Your performance needs to demonstrate your ability to collect, organize, create, graph, and interpret your data. Then explain how you determined the most effective graph.

Your work will be judged by how well your understanding of surveys can be used to draw conclusions about data.

Your presentation must meet the following standards: Explain why you chose the survey you did, what the collected data revealed, Display the three graphs you created with proper labels, and defend which graph you found to be the most effective and why.

A successful result will demonstrate a deep understanding of collecting and interpreting data.

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Other Evidence

- Students will identify the similarities and differences between different types of graphs using a Venn diagram (Written). **(Goal 6)**
- Students will participate in a discussion focusing on the importance of statistics used in the everyday world (Observed)
- Students will write a summary that shows their understanding of the words on the vocabulary wall (Written) **(Goal 5)**
- Students will take quizzes to check for understanding based on collecting data, creating graphs, and interpreting data (Written).
- Students will complete a **RAFT**:
  -**Role:** The student is a customer who is angry about a misleading graph displayed by a company (graph provided)
  -**Audience:** The student writes to the owner of the company.
  -Format: A letter
  -Topic: The students will write to the company explaining why the graph they advertised is misleading. The letter should clearly address why the graph is misleading as well as what can be done to make the graph clear.

Stage 3 Overview with Learning Activities

- Vocabulary Word Wall
- Double Entry Journal
- Knowns/Unknowns
- Predict
- Close Reads (2)
- Quick Writes (4)
- KWL
- Venn Diagram
- Read with a Pencil
- Self-Knowledge
- Cooperative Learning Groups (3)
- Similarities and Differences
- Argumentation (3)
- Discussions (2)
- Read Aloud (2)
- Summarization (5)
- Hypothesize
- Create, interpret, explain
- Cornell notes

Calendar

Day 1

Introduction to Vocabulary

Anticipatory Set: Students will be given a **knowns/unknown's** chart of key vocabulary terms.

Facilitate: Students will be called on and we will discuss what students already know about the words, as well as clear up any misconceptions they may have.

Acquire New Knowledge: Explain a **word wall** and how it will be used throughout the unit (As we move through the unit more words will be added to the vocabulary wall). Students will use a **double entry journal** to organize acquired vocabulary.

Closure: Students will complete a **think-pair-share** prompted by the following: "Why do you think that understanding vocabulary is such an important part of math?"

Day 2

Procedural Lesson on Note-Taking/ Summarization on Collecting and Organizing Data

Acquire New Knowledge: Students will complete a summary on page 344-345 to the best of their ability as an anticipatory set. Students will complete **structured notes** during modeling and shaping of the **rule-based summarization process**.

Apply/Deepen: Students will use what they learned to revise their summary from the pages they did as an anticipatory set.

Facilitate: Class will discuss the key points and selected students will share their summaries

Closure/Homework: Students will turn in their summaries to be checked to make sure they covered key ideas.

Day 3

Procedural Lesson- Collecting and Organizing Data

Review: Students will have the opportunity to make any corrections from their turned in homework after reviewing comments and going over common mistakes/misunderstandings.

Acquire New Knowledge: More words will have been added to the **vocabulary wall and double entry journals**: Frequency table, relative frequency, cumulative frequency, and total frequency.

Modeling: The process of creating a frequency table will be explained and an example frequency table will be constructed on the board. The data in the frequency table will be based on

a class survey where students will share their favorite sports out of basketball, football, baseball, basketball, tennis, or golf. The data will be used to **construct** a frequency table.

Apply/Deepen: Students will **interpret** the frequency table by answering the following questions:

1. What does frequency mean?
2. What is the mode of the data?
3. What conclusions can we draw from the data?

Facilitate: Discuss the answers to each of the questions.

Day 4

Surveys and Samples

Anticipatory Set: Students will **hypothesize** about the importance of surveys.

Acquire New Knowledge: Students will participate in a **read aloud** on pages 346- 347. Questions will be asked throughout the read aloud including:

1. What is the purpose of a survey?
2. How can we use surveys to make predictions?
3. What is the difference between a voluntary response and a convivence response?

Closure: Students will complete a **quick write** prompted by the following: Write a **summary** on the key ideas of the read aloud.

Facilitate: Selected students will share their summaries.

Homework: Students revise their hypotheses from the anticipatory set.

Day 5

Procedural Lesson on Bar Graphs

Review: Go over revised hypotheses from the previous night.

Anticipatory Set: New words will be added to the vocabulary wall and students will add them/ their understanding to their double entry journals.

Acquire New Knowledge: Students will participate in a **close read** on bar graphs with a provided article.

Facilitate: Students will answer the following questions after the close read:

1. What impact does understanding vocabulary have on your ability to create bar graphs?

2. Why is labeling your graph important?
3. What would happen if we switched the x and y axes?

Day 6

Procedural Lesson on Bar Graphs Continued

Apply/Deepen: Students will be data that they will use to create a bar graph including proper titles, labels, and scale.

Facilitate: Students will interpret their data by writing a quick write prompted by the following: "What conclusions can be drawn from the graph? Are they any further predictions that can be made?". Students will compare their graphs and quick writes with a partner.

Day 7

Procedural Lesson on Line Graphs

Anticipatory Set: Students will complete a **KWL** on line graphs to check their prior knowledge. New vocabulary will be added to word wall and double entry journals.

Acquire New Knowledge: Students will complete a **close read** on pages 358-359.

Facilitate: Students will be asked the following questions:

1. When are line graphs used?
2. What does the trend of a line tell us?
3. What is the significance of the "key"?
4. What predictions can be drawn from the line graph on the bottom of page 358?

Apply/Deepen: Students will create a line graph based on the data they used to construct the bar graph.

Homework: Students will be asked to create a Venn Diagram displaying the similarities and differences between a bar graph and line graph.

Day 8

Line Graphs Continued & Beginning of Circle Graphs

Anticipatory Set: Students will get in **cooperative learning groups** of three and compare and revise their Venn diagrams they constructed for homework.

Facilitate: A Venn diagram will be created on the board based on feedback from students.

Acquire New Knowledge: Students will participate in a **close read** on pie charts given a provided handout.

Apply/Deepen: Students will construct a circle graph using the data they used to create the bar graph and line graph.

Day 9

Similarities and Differences

Students will compare all three graphs they have created thus far (bar graph, line graph, and circle graph)

Students will participate in a **large group discussion** with the following anchor questions:

1. Which graph best displays the data and why?
2. Which graph is the clearest (easiest to read)?
3. Do all of the graphs accurately display the data?

Day 10

Interactive Lecture on Misleading Statistics

Acquire New Knowledge: Students will hypothesize about what makes graphs misleading and why a company may choose to use a misleading graph. The power point will be presented as students take Cornell notes on the lecture (2 chunks). Students will compare their notes and summaries with a partner.

-Students will compare data to its graph and **explain** why it is misleading and then **create** a graph that better displays the data and **justify** why that graph is better through **argumentation**.

Day 11

Interactive Lecture on Misleading Statistics Continued

Apply/Deepen: In groups of four, students will **create** a graph based of provided data. Each group will present their graph by drawing it on the board and explaining why they chose that graph. Classmates will **interpret** the graph by determining whether or not the graph is misleading in any way.

Day 12

Discussion on Statistics in the Real World

Apply/Deepen: Students will participate in a large group discussion prompted by the following questions:

1. Where have you seen statistics used in the real world? (Examples)
2. How can you take what you learned and apply it outside of the classroom?

Closure: Students will use all of the words on the vocabulary wall to write a **summary** on how each word is used in statistics.

Facilitate: Selected students will share their summaries. All students will turn them in at the end of class.

Day 13

Performance Task

The Performance Task will be explained, and students will be put into groups. The students will begin to collect data.

Goal: You are going to construct a survey based on the preferences of two different age groups. The age groups will consist of your classmates from ages 14-18 and adults from ages 40-45. You may pick a survey topic from the following **[Goal 1]:**

1. Favorite music genre out of country, Hip-hop/pop, rock and roll, rap, and alternative
2. Favorite sport out of football, basketball, baseball, volleyball, and hockey
3. Favorite subject in school out of math, history, English, science, and foreign language

Role: You are a survey constructor working for a marketing company. Your job is to collect and organize data through your chosen survey. Your data should first be displayed in a frequency table. Your frequency table will be used to construct a line graph, bar graph, and a pie chart.

Audience: Your audience is the marketing company that you are working for. You need to justify which of the three graphs you created (line graph, bar graph, or pie chart) would best display the data. For example, which graph is the easiest to read and clearly displays the purpose of the survey (determine what category appeals to the most people).

Situation: The tasks you will complete include:

- Working with others in assigned groups of three. **(Goal 8)**
- Picking a survey topic
- Hypothesizing what the outcome of the survey will be (what will be the favorite category of your topic) **(Goal 2)**
- Collecting, organizing, and interpreting your collected data through a frequency table. **(Goal 1)**

- Creating a line graph, bar graph, and pie chart using your frequency table. Be sure to properly label the x-axis, y-axis, and title of your graphs. **(Goal 2)**
- Analyzing the three graphs and determine which graph best displays the data. **(Goal 7)**
- Defending your position on why you think one graph is more effective than the others by presenting your position to the class. You will need to explain why the graph you chose is the best. **(Goal 3), (Goal 6)**

Product, Performance, and Purpose:

You will construct a survey, collect and organize the survey's data, create three graphs in order to interpret the data you collected, decide why one graph is the most effective, and **present** a clear explanation to which graph is the most effective.

Standards and Criteria for Success:

Your performance needs to demonstrate your ability to **collect**, **organize**, **create**, **graph**, and **interpret** your data. Then **explain** how you determined the most effective graph.

Your work will be judged by how well your understanding of surveys can be used to draw conclusions about data.

Your presentation must meet the following standards: Explain why you chose the survey you did, what the collected data revealed, Display the three graphs you created with proper labels, and **defend** which graph you found to be the most effective and why.

A successful result will demonstrate a deep understanding of collecting and interpreting data.

Day 14

Performance Task Continued

Students will be given the day to finish collecting data and work in their groups.

Day 15

Performance Task Presentations

Groups will present their performance tasks. Their work will be graded based off of the quality of their presentation and their submitted work. Their work and presentation should demonstrate their understanding of collecting, organizing, graphing, interpreting of statistics. They should also show strong communication skills through the use of **argumentation** by defending their position.

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Introduction to Vocabulary

Lesson Date(s): Day 1

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does vocabulary have on understanding statistics?

- What words are confusing?
- Why do you think that vocabulary word is important?
- Have you heard any of these vocabulary words used in your daily life before?

PURPOSE:

The students will understand the importance of vocabulary in math.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will complete a knowns and unknown's chart about the vocabulary they will be learning in the unit. **(Goal 5)**

[During the lesson] Students will learn how to use a double entry journal

[After the lesson] Students will summarize the importance of vocabulary in math using a quick write

ANTICIPATORY SET:

Students will be given a **knowns and unknown's** chart of key vocabulary to complete.

INPUT/ ACQUIRE NEW KNOWLEDGE:

The teacher will go over the knowns and unknowns charts as a class and explain unknown vocabulary as well as clear up any misconceptions. Then, the teacher will explain a **word wall** and how it will be used throughout the unit (As we move through the unit, more words will be added to the vocabulary wall). Students will use a **double entry journal** to organize acquired vocabulary.

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

1. Explanation
2. Interpretation
3. Application
4. Perspective
5. Empathy
6. Self-Knowledge

Multiple Intelligences

1. Linguistic [words]
2. Visual [pictures]
3. Mathematical [numbers & reasoning]
4. Kinesthetic [hands-on]
5. Musical [music]
6. Interpersonal [social]
7. Intrapersonal [self]
8. Naturalist [nature]

Multiple Exposures [4 x 2]

1. Dramatization
2. Visualization
3. Verbal

Complex Interactions

1. Discussion
2. Argumentation

Bloom's Taxonomy

1. Knowledge [Verbatim]
2. Comprehension [Own Words]
3. Application [Problem-Solving]
4. Analysis [Identify components]
5. Synthesis [Combine information]
6. Evaluation [Decisions]

Aspects of the Topic

1. Facts
2. Compare
3. Cause/Effect
4. Characteristics
5. Examples
6. Relationships

9 Effective Strategies

1. Similarities and Differences
2. Summarization and Note Taking
3. Reinforcing Effort and Providing Recognition
4. Homework and Practice
5. Nonlinguistic Representations
6. Cooperative Learning
7. Setting Objectives and Providing Feedback
8. Generating and Testing

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CLOSURE/ASSESSMENT:

Students will complete a **Quick write** that **summarizes** key vocabulary that will be prompted by the following: “Why do you think that understanding vocabulary is such an important part of math?”

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Student Teacher Candidate: Taylor Guth / Courtney Harriman

Lesson Subject(s)/Title: Collecting and Organizing Data

Lesson Date(s): Day 3

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

Why is properly collecting and organizing data important?

- What is a frequency table?
- What is the difference between relative frequency, cumulative frequency, and total frequency?

PURPOSE:

Students will be able to collect, organize, and interpret data in frequency tables **(Goal 1)**

Students will demonstrate their understanding of collecting data by making hypothesis, constructing a survey, and creating graphs based on the collected data. **(Goal 2)**

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[After modeling] Students will be able to construct a frequency table

[During the lesson] Students will interpret a frequency table by answering questions.

[After the lesson] Students will use provided data to construct a frequency table independently.

ANTICIPATORY SET:

More words will have been added to the **vocabulary wall and double entry journals**: Frequency table, relative frequency, cumulative frequency, and total frequency.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Modeling: The process of creating a frequency table will be explained and an example frequency table will be constructed on the board. The data in the frequency table will be based on a class survey where students will share their favorite sports out of basketball, football, baseball, basketball, tennis, or golf. The data will be used to construct a frequency table.

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Facets of Understanding

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8. Interpretation
9. Application
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Multiple Intelligences

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and/or

APPLY/ DEEPEN NEW KNOWLEDGE:

Shaping: Students will interpret the frequency table by answering the following questions:

4. What does frequency mean?
5. What is the mode of the data?
6. What conclusions can we draw from the data?

Facilitate: Students will pair up with a partner to discuss their answers to the questions asked in shaping. Teacher will select pairs to share the answers they came up with and clear up any misconceptions the students have.

CLOSURE/ASSESSMENT:

Students will perform a **Quick write** prompted by the question "What conclusions can be made by interpreting a frequency table?"

HOMEWORK: (Purpose- Preparation, Practice, Expansion)

Students will create a frequency table based on the following data:

Favorite Ice Cream Flavor- Mint Chocolate Chip- 5 people, Chocolate- 12 people, Vanilla- 8 people, Cookie Dough- 10 people.

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Surveys and Samples

Lesson Date(s): Day 4

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

Why is properly collecting and organizing data important?

- What is the purpose of a survey?
- How can we use surveys to make predictions?
- What is the difference between a voluntary response and a convivence response?
- How do you calculate a percentage?

PURPOSE:

Students will be able to interpret surveys and explain their significance.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will form a hypothesis about how surveys and samples are useful to companies **(Goal 2)**

[During the lesson] Students will participate in a read aloud **(Goal 9)**

[After the lesson] Students will write a summary on the key ideas of the read aloud **(Goal 9)**

ANTICIPATORY SET:

Students will **hypothesize** about the importance of surveys.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Students will participate in a read aloud on pages 346- 347. Questions will be asked throughout the read aloud including:

1. What is the purpose of a survey?

2. How can we use surveys to make predictions?

3. What is the difference between a voluntary response and a convivence response?

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4. Why do you think the marketing director would choose to sue a random sample?

5. Do you think the marketing director will choose to add more low-calorie meals to the menu? Why or why not?

CLOSURE/ASSESSMENT:

Students will complete a **quick write** prompted by the following:

Write a summary on the key ideas of the read aloud.

Facilitate: Selected students will share their summaries

HOMEWORK: (Purpose- Preparation, Practice, Expansion)

Students revise their hypotheses from the anticipatory set.

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Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Bar Graphs

Lesson Date(s): Day 5/6

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does the type of graph have on the way we interpret the data?
What is the significance of interpreting data?

- What does the title of the graph tell us?
- What are the axes of a graph?
- Why is it important to label your axes?
- What does the height of each bar tell us?

PURPOSE:

Students will be able to **create** and **interpret** bar graphs

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will add vocabulary to their **double entry journals (Goal 5)**

[During the lesson] Students will participate in a **close read** and answer questions prompted by the teacher **(Goal 9)**

[When given data] Students will create a bar graph **(Goal 2)**

[After the lesson] Students will interpret their graphs by answering a prompted question through a quick write **(Goal 4)**

ANTICIPATORY SET:

Go over revised hypotheses from the previous night.

New words will be added to the vocabulary wall and students will add them/ their understanding to their double entry journals.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Students will participate in a close read on bar graphs with a provided article.

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Facilitate: Students will answer the following questions after the close read:

1. What impact does understanding vocabulary have on your ability to create bar graphs?
2. Why is labeling your graph important?
3. What would happen if we switched the x and y axes?
4. What's the difference between the first and second graph?
5. Which cereal has the highest frequency?
6. What time of day do the least amount of adults clean their teeth?

and/or

APPLY/ DEEPEN NEW KNOWLEDGE:

Students will be provided data that they will use to create a bar graph including proper titles, labels, and scale.

CLOSURE/ASSESSMENT:

Students will interpret their data by writing a **quick write** prompted by the following: "What conclusions can be drawn from the graph? Are they any further predictions that can be made?". Students will compare their graphs and quick writes with a partner.

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33. Linguistic [words]
34. Visual [pictures]
35. Mathematical [numbers & reasoning]
36. Kinesthetic [hands-on]
37. Musical [music]
38. Interpersonal [social]
39. Intrapersonal [self]
40. Naturalist [nature]

Multiple Exposures [4 x 2]

13. Dramatization
14. Visualization
15. Verbal

Complex Interactions

9. Discussion
10. Argumentation

Bloom's Taxonomy

25. Knowledge [Verbatim]
26. Comprehension [Own Words]
27. Application [Problem-Solving]
28. Analysis [Identify components]
29. Synthesis [Combine information]
30. Evaluation [Decisions]

Aspects of the Topic

25. Facts
26. Compare
27. Cause/Effect
28. Characteristics
29. Examples
30. Relationships

9 Effective Strategies

37. Similarities and Differences
38. Summarization and Note Taking
39. Reinforcing Effort and Providing Recognition
40. Homework and Practice
41. Nonlinguistic Representations
42. Cooperative Learning
43. Setting Objectives and Providing Feedback
44. Generating and Testing

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Line Graphs

Lesson Date(s): Day 7

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does the type of graph have on the way we interpret the data?

- When are line graphs used?
- What does the trend of a line tell us?
- What is the significance of a "key"?
- What is a multiple line graph?

PURPOSE:

Students will be able to **create** and **interpret** line graphs

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will complete a KWL on line graphs.

[During the lesson] Students will complete a close read and answer the prompted questions. **(Goal 9)**

[During the lesson] Students will create a line graph based on given data. **(Goal 2)**

[After the lesson] Students will be asked to create a Venn Diagram comparing similarities and differences between a line graph and a bar graph.

ANTICIPATORY SET:

Students will complete a **KWL** on line graphs to check their prior knowledge. New vocabulary will be added to **word wall** and **double entry journals.**

INPUT/ ACQUIRE NEW KNOWLEDGE:

Students will complete a **close read** on pages 358-359.

Facilitate: Students will be asked the following questions:

1. When are line graphs used?
2. What does the trend of a line tell us?
3. What is the significance of a “key”?
4. What predictions can be drawn from the line graph on the bottom of page 358?

and/or

APPLY/ DEEPEN NEW KNOWLEDGE:

Students will **create** a line graph based on the data they used to construct the bar graph.

CLOSURE/ASSESSMENT:

Students will compare their graphs with a partner and make any necessary revisions. Students will then fill out the “learned” section of their KWL chart.

HOMEWORK: (Purpose- Preparation, Practice, Expansion)

Students will be asked to create a **Venn Diagram** displaying the similarities and differences between a bar graph and line graph.

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Circle Graphs

Lesson Date(s): Day 8

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does the type of graph have on the way we interpret the data?

- How do you calculate a percentage?
- What does each sector represent?
- How is frequency displayed in a circle graph?

PURPOSE:

Students will be able to **create** and **interpret** circle graphs

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will get into cooperative learning groups of three and revise their Venn Diagrams they did for homework. **(Goal 8)**

[During the lesson] Students will participate in a Read with a pencil. **(Goal 9)**

[During the lesson] Students will construct a circle graph based on given data. **(Goal 2)**

[After the lesson] Students will use self-knowledge to reflect upon their understanding of graphs through writing.

ANTICIPATORY SET:

Students will get in **cooperative learning groups** of three and compare and revise their **Venn diagrams** they constructed for homework.

Facilitate: A **Venn diagram** will be **created** on the board based on feedback from students.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Students will participate in a **read with a pencil** on pie charts given a provided handout.

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

31. Explanation
32. Interpretation
33. Application
34. Perspective
35. Empathy
36. Self-Knowledge

Multiple Intelligences

41. Linguistic [words]
42. Visual [pictures]
43. Mathematical [numbers & reasoning]
44. Kinesthetic [hands-on]
45. Musical [music]
46. Interpersonal [social]
47. Intrapersonal [self]
48. Naturalist [nature]

Multiple Exposures [4 x 2]

16. Dramatization
17. Visualization
18. Verbal

Complex Interactions

11. Discussion
12. Argumentation

Bloom's Taxonomy

31. Knowledge [Verbatim]
32. Comprehension [Own Words]
33. Application [Problem-Solving]
34. Analysis [Identify components]
35. Synthesis [Combine information]
36. Evaluation [Decisions]

Aspects of the Topic

31. Facts
32. Compare
33. Cause/Effect
34. Characteristics
35. Examples
36. Relationships

9 Effective Strategies

46. Similarities and Differences
47. Summarization and Note Taking
48. Reinforcing Effort and Providing Recognition
49. Homework and Practice
50. Nonlinguistic Representations
51. Cooperative Learning
52. Setting Objectives and Providing Feedback
53. Generating and Testing

and/or

APPLY/ DEEPEN NEW KNOWLEDGE:

Students will **construct** a circle graph using the data they used to create the bar graph and line graph.

CLOSURE/ASSESSMENT:

Students will reflect on their understanding by answering the following questions through writing:

1. What did you find difficult about graphing? What did you find easy about graphing?
2. Is there any part of graphing that is still confusing to you and needs further explanation?

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Similarities and Differences of Graphs

Lesson Date(s): Day 9

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does the type of graph have on the way we interpret the data?

- How is a bar graph similar to a line graph?
- How can you distinguish between a bar graph and a line graph?
- What makes a circle graph different from bar graphs and line graphs?

PURPOSE:

Students will be able to determine the similarities and differences between bar graphs, line graphs, and circle graphs.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[During the lesson] Students will participate in a read aloud on the similarities and differences of different graphs. **(Goal 9) (Goal 6)**

[During the lesson] Students will participate in a **large group discussion** using argumentation skills to explain which graph best displays provided data. **(Goal 3)**

[After the lesson] Students will summarize what they learned in the large group discussion **(Goal 9)**

ANTICIPATORY SET:

Students will participate in a **read aloud** on a given article discussing the similarities and differences between bar graphs, line graphs, and circle graphs. Students will be asked:

1. How is a bar graph similar to a line graph?
2. How can you distinguish between a bar graph and a line graph?
3. Do you think one type of graph is easier to read than another?
4. What makes a circle graph different from bar graphs and line graphs?
5. If you were a marketing director, what type of graph would you choose to display data for your company?

APPLY/ DEEPEN NEW KNOWLEDGE:

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

37. Explanation
38. Interpretation
39. Application
40. Perspective
41. Empathy
42. Self-Knowledge

Multiple Intelligences

49. Linguistic [words]
50. Visual [pictures]
51. Mathematical [numbers & reasoning]
52. Kinesthetic [hands-on]
53. Musical [music]
54. Interpersonal [social]
55. Intrapersonal [self]
56. Naturalist [nature]

Multiple Exposures [4 x 2]

19. Dramatization
20. Visualization
21. Verbal

Complex Interactions

13. Discussion
14. Argumentation

Bloom's Taxonomy

37. Knowledge [Verbatim]
38. Comprehension [Own Words]
39. Application [Problem-Solving]
40. Analysis [Identify components]
41. Synthesis [Combine information]
42. Evaluation [Decisions]

Aspects of the Topic

37. Facts
38. Compare
39. Cause/Effect
40. Characteristics
41. Examples
42. Relationships

9 Effective Strategies

55. Similarities and Differences
56. Summarization and Note Taking
57. Reinforcing Effort and Providing Recognition
58. Homework and Practice
59. Nonlinguistic Representations
60. Cooperative Learning
61. Setting Objectives and Providing Feedback
62. Generating and Testing

Students will compare all three graphs they have created thus far (bar graph, line graph, and circle graph)

Students will participate in a **large group discussion** with the following anchor questions:

1. Which graph best displays the data and why?
2. Which graph is the clearest (easiest to read)?
3. Do all of the graphs accurately display the data?
4. What are the main differences between the graphs?
5. In what way are the graphs similar?

CLOSURE/ASSESSMENT:

Students will **summarize** what they learned in the group discussion.

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Circle Graphs

Lesson Date(s): Day 8

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does the type of graph have on the way we interpret the data?

- How do you calculate a percentage?
- What does each sector represent?
- How is frequency displayed in a circle graph?

PURPOSE:

Students will be able to **create** and **interpret** circle graphs

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will get into cooperative learning groups of three and revise their Venn Diagrams they did for homework. **(Goal 8)**

[During the lesson] Students will participate in a Read with a pencil. **(Goal 9)**

[During the lesson] Students will construct a circle graph based on given data. **(Goal 2)**

[After the lesson] Students will use self-knowledge to reflect upon their understanding of graphs through writing.

ANTICIPATORY SET:

Students will get in **cooperative learning groups** of three and compare and revise their **Venn diagrams** they constructed for homework.

Facilitate: A **Venn diagram** will be **created** on the board based on feedback from students.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Students will participate in a **read with a pencil** on pie charts given a provided handout.

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

1. Explanation
2. Interpretation
3. Application
4. Perspective
5. Empathy
6. Self-Knowledge

Multiple Intelligences

1. Linguistic [words]
2. Visual [pictures]
3. Mathematical [numbers & reasoning]
4. Kinesthetic [hands-on]
5. Musical [music]
6. Interpersonal [social]
7. Intrapersonal [self]
8. Naturalist [nature]

Multiple Exposures [4 x 2]

1. Dramatization
2. Visualization
3. Verbal

Complex Interactions

1. Discussion
2. Argumentation

Bloom's Taxonomy

1. Knowledge [Verbatim]
2. Comprehension [Own Words]
3. Application [Problem-Solving]
4. Analysis [Identify components]
5. Synthesis [Combine information]
6. Evaluation [Decisions]

Aspects of the Topic

1. Facts
2. Compare
3. Cause/Effect
4. Characteristics
5. Examples
6. Relationships

9 Effective Strategies

1. Similarities and Differences
2. Summarization and Note Taking
3. Reinforcing Effort and Providing Recognition
4. Homework and Practice
5. Nonlinguistic Representations
6. Cooperative Learning
7. Setting Objectives and Providing Feedback

and/or

APPLY/ DEEPEN NEW KNOWLEDGE:

Students will **construct** a circle graph using the data they used to create the bar graph and line graph.

CLOSURE/ASSESSMENT:

Students will reflect on their understanding by answering the following questions through writing:

1. What did you find difficult about graphing? What did you find easy about graphing?
2. Is there any part of graphing that is still confusing to you and needs further explanation?

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Similarities and Differences of Graphs

Lesson Date(s): Day 9

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

What effect does the type of graph have on the way we interpret the data?

- How is a bar graph similar to a line graph?
- How can you distinguish between a bar graph and a line graph?
- What makes a circle graph different from bar graphs and line graphs?

PURPOSE:

Students will be able to determine the similarities and differences between bar graphs, line graphs, and circle graphs.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[During the lesson] Students will participate in a read aloud on the similarities and differences of different graphs. **(Goal 9) (Goal 6)**

[During the lesson] Students will participate in a **large group discussion** using argumentation skills to explain which graph best displays provided data. **(Goal 3)**

[After the lesson] Students will summarize what they learned in the large group discussion **(Goal 9)**

ANTICIPATORY SET:

Students will participate in a **read aloud** on a given article discussing the similarities and differences between bar graphs, line graphs, and circle graphs. Students will be asked:

1. How is a bar graph similar to a line graph?
2. How can you distinguish between a bar graph and a line graph?
3. Do you think one type of graph is easier to read than another?
4. What makes a circle graph different from bar graphs and line graphs?
5. If you were a marketing director, what type of graph would you choose to display data for your company?

APPLY/ DEEPEN NEW KNOWLEDGE:

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

7. Explanation
8. Interpretation
9. Application
10. Perspective
11. Empathy
12. Self-Knowledge

Multiple Intelligences

9. Linguistic [words]
10. Visual [pictures]
11. Mathematical [numbers & reasoning]
12. Kinesthetic [hands-on]
13. Musical [music]
14. Interpersonal [social]
15. Intrapersonal [self]
16. Naturalist [nature]

Multiple Exposures [4 x 2]

4. Dramatization
5. Visualization
6. Verbal

Complex Interactions

3. Discussion
4. Argumentation

Bloom's Taxonomy

7. Knowledge [Verbatim]
8. Comprehension [Own Words]
9. Application [Problem-Solving]
10. Analysis [Identify components]
11. Synthesis [Combine information]
12. Evaluation [Decisions]

Aspects of the Topic

7. Facts
8. Compare
9. Cause/Effect
10. Characteristics
11. Examples
12. Relationships

9 Effective Strategies

10. Similarities and Differences
11. Summarization and Note Taking
12. Reinforcing Effort and Providing Recognition
13. Homework and Practice
14. Nonlinguistic Representations
15. Cooperative Learning
16. Setting Objectives and Providing Feedback

Students will compare all three graphs they have created thus far (bar graph, line graph, and circle graph)

Students will participate in a **large group discussion** with the following anchor questions:

1. Which graph best displays the data and why?
2. Which graph is the clearest (easiest to read)?
3. Do all of the graphs accurately display the data?
4. What are the main differences between the graphs?
5. In what way are the graphs similar?

CLOSURE/ASSESSMENT:

Students will **summarize** what they learned in the group discussion.

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Misleading Statistics

Lesson Date(s): Day 10/11

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

Why is the ability to recognizing misleading statistics important?

- What are the characteristics of a misleading graph?
- Why would companies intentionally create misleading graphs?

PURPOSE:

Students will be able to accurately display data and identify misleading graphs

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will create a hypothesis on why companies would choose to create misleading graphs. **(Goal 2)**

[During the lesson] Students will take Cornell Notes on the Power Point.

[During the lesson] Students will identify characteristics of a misleading graph and construct a graph that accurately displays the data. **(Goal 2)**

[In cooperative learning groups of 4] Students will be provided data. Students will use the data to create a graph that most accurately displays the given data. **(Goal 8)**

[After the lesson] Each group will use argumentation skills to defend their position on which graph they chose to display the data and why. Other classmates will identify whether or not the graph is misleading. **(Goal 3)**

ANTICIPATORY SET:

Students will **hypothesize** why a company may choose to use a misleading graph.

Facilitate: Students will participate in a **stand-up/ sit down** activity of the scenarios they came up with.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Power point presented (Chunk 1)- Identifying misleading graphs

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

13. Explanation
14. Interpretation
15. Application
16. Perspective
17. Empathy
18. Self-Knowledge

Multiple Intelligences

17. Linguistic [words]
18. Visual [pictures]
19. Mathematical [numbers & reasoning]
20. Kinesthetic [hands-on]
21. Musical [music]
22. Interpersonal [social]
23. Intrapersonal [self]
24. Naturalist [nature]

Multiple Exposures [4 x 2]

7. Dramatization
8. Visualization
9. Verbal

Complex Interactions

5. Discussion
6. Argumentation

Bloom's Taxonomy

13. Knowledge [Verbatim]
14. Comprehension [Own Words]
15. Application [Problem-Solving]
16. Analysis [Identify components]
17. Synthesis [Combine information]
18. Evaluation [Decisions]

Aspects of the Topic

13. Facts
14. Compare
15. Cause/Effect
16. Characteristics
17. Examples
18. Relationships

9 Effective Strategies

19. Similarities and Differences
20. Summarization and Note Taking
21. Reinforcing Effort and Providing Recognition
22. Homework and Practice
23. Nonlinguistic Representations
24. Cooperative Learning
25. Setting Objectives and Providing Feedback

- Students will take **Cornell Notes** on the characteristics on a misleading graph

Facilitate: Students will compare notes with a partner

Power point presented (Chunk 2)- Creating graphs that accurately display data

- Students will add to their Cornell Notes and then complete the summary section of the Cornell Notes

and/or

APPLY/ DEEPEN NEW KNOWLEDGE:

(Chunk 1)- Students will look at a given graph and explain why the graph is misleading

(Chunk 2)- Students will take the given misleading graph and construct a graph that accurately displays the data. Students will be put into cooperative learning groups of four and create a graph that best displays provided data

CLOSURE/ASSESSMENT:

Each group will present their graph and explain why it is the best graph to display the data through argumentation skills. Other classmates will identify whether or not the graph is misleading.

HOMEWORK: (Purpose- Preparation, Practice, Expansion)

Students will revise their hypothesis that they constructed at the beginning of class.

Taylor Guth and Courtney Harriman

Student Teacher Candidate: Taylor Guth/ Courtney Harriman

Lesson Subject(s)/Title: Discussion of statistics in the real world

Lesson Date(s): Day 12

Course & Grade(s):

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

How can data be used to solve real-world problems?

- What is the goal of a survey?
- Where have you seen statistics used in the real world? (Examples)
- How can statistics be applied outside of the classroom?
- What would life be like without statistics?

PURPOSE:

Students will understand how statistics can be used in the real world.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

[Before the lesson] Students will explain their understanding of the words on the word wall in preparation for the discussion. **(Goal 5)**

[During the lesson] Students will participate in a large group discussion where they will answer prompted questions to show their understanding of statistics and how they can be used in the real world. **(Goal 7)**

[During the lesson] Students will write a summary on the key ideas of the discussion. **(Goal 9)**

[After the lesson] Students will talk to friends and family about how they have used statistics in their lives.

ANTICIPATORY SET:

Students will participate in a review of the words from the **word wall** in preparation for the discussion. The review will be done orally and will be teacher led.

APPLY/ DEEPEN NEW KNOWLEDGE:

Students will participate in a **large group discussion** prompted by the following questions:

1. Where have you seen statistics used in the real world? (Examples)

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

19. Explanation
20. Interpretation
21. Application
22. Perspective
23. Empathy
24. Self-Knowledge

Multiple Intelligences

25. Linguistic [words]
26. Visual [pictures]
27. Mathematical [numbers & reasoning]
28. Kinesthetic [hands-on]
29. Musical [music]
30. Interpersonal [social]
31. Intrapersonal [self]
32. Naturalist [nature]

Multiple Exposures [4 x 2]

10. Dramatization
11. Visualization
12. Verbal

Complex Interactions

7. Discussion
8. Argumentation

Bloom's Taxonomy

19. Knowledge [Verbatim]
20. Comprehension [Own Words]
21. Application [Problem-Solving]
22. Analysis [Identify components]
23. Synthesis [Combine information]
24. Evaluation [Decisions]

Aspects of the Topic

19. Facts
20. Compare
21. Cause/Effect
22. Characteristics
23. Examples
24. Relationships

9 Effective Strategies

28. Similarities and Differences
29. Summarization and Note Taking
30. Reinforcing Effort and Providing Recognition
31. Homework and Practice
32. Nonlinguistic Representations
33. Cooperative Learning
34. Setting Objectives and Providing Feedback

2. How can you take what you learned and apply it outside of the classroom?
3. Have you personally used statistics outside of the classroom?
4. What is the goal of a survey?
5. Could statistics be useful in your future career path? (Relevancy)
6. What would life be like without statistics?

CLOSURE/ASSESSMENT:

Students will write a **summary** prompted by the following: "How are statistics used in the real world?".

Facilitate: Selected students will share their summaries. All students will turn them in at the end of class.

HOMEWORK: (Purpose- Preparation, Practice, Expansion)

Talk to friends and family and discuss how they have used statistics in their lives.

Taylor Guth and Courtney Harriman

Data for Graphs

Poll of Favorite Snacks		
Snack	Frequency	Relative Frequency
Potato Chips	26	28.9%
Beef Jerky	14	15.6%
Popcorn	21	23.3%
Cheetos	12	13.3%
Fruit	5	5.6%
Cookies	12	13.3%
Total:	90	100%

Taylor Guth and Courtney Harriman

Key Words	Known	Familiar	Unknown	Picture/Phrase
Cumulative Frequency				
Total Frequency				
Relative Frequency				
Survey				
Statistics				
X-axis				
Y-axis				
Key				
Trend				
Sector				
Mode				
Frequency				
Percentage				
Venn Diagram				