Grade Level: 6-8
Time Estimate: 3-5 days

REPRESENTING DATA GRAPHICALLY / INSTRUCTOR INFO

Summary

This lesson includes vocabulary, content, examples, and activities to help students learn and understand tables and graphs. Using data collected from the OCEARCH Global Shark Tracker™, students will be able to represent real-life data in tables, line plots, bar graphs, X-Y plots, and line graphs.

Part 1. Introduction and Tables
Part 2. Graphs
Part 3. Review
Part 4. Activity 1. Line Plots, Bar Graphs, and X-Y Plots
Part 5. Activity 2. Line Graphs

Goals & Objectives

The students will:

- understand that the way a set of data is displayed influences its interpretation;
- solve problems by collecting, organizing, displaying, and interpreting data;
- select the appropriate representation (line plot, bar graph, X-Y plots, or line graph) for presenting and displaying relationships among collected data and then justify the selection;
- make inferences and convincing arguments based on an analysis of collected data.

// STANDARDS

This lesson aligns with the following Common Core Math Standards:
6th Grade Math: SP.B.4, SP.B.5, SP.B.5a, SP.B.5b
7th Grade Math: SP.A.2
8th Grade Math: SP.A.1, SP.A.2

This lesson aligns with the following TEKS:
Grade 5 Math (Revised): 1A, 1B, 1C, 1D, 1E, 1F, 1G, 8A, 8B, 8C, 9A, 9B
Grade 6 Math: 1A, 1C, 10A, 10D, 12A, 12B, 13A, 13B
Grade 6 Math (Revised): 1A, 1B, 1C, 1D, 1E, 1F, 1G, 2C, 2D, 5A, 6A, 12A, 13A
Grade 7 Math: 11A, 11B, 14A, 14B, 15A, 15B
Grade 7 Math (Revised): 1A, 1B, 1C, 1D, 1E, 1F, 1G, 2
Grade 8 Math: 12A, 12B, 14C, 15A, 15B, 16A, 16B
Grade 8 Math (Revised): 1A, 1B, 1C, 1D, 1E, 1F, 1G, 2D

This lesson aligns with the following Next Generation Science Standards:

Framework
1. Asking questions and defining problems
4. Analyzing and interpreting data
8. Obtaining, evaluating, and communicating information

MS. Natural Selection and Adaptations

Science and Engineering Practices

Analyzing and Interpreting Data

- Analyze displays of graphical data to identify linear and nonlinear relationships. (MS-LS4-3)
- Construct, analyze, and interpret data to determine similarities and differences in findings. (MS-LS4-1)

Constructing Explanations and Designing Solutions

- Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena. (MS-LS4-4)

Crosscutting Concepts

Patterns

- Graphs, charts, and images can be used to identify patterns in data. (MS-LS4-1) (MS-LS4-3)

MS. Human Impacts

Crosscutting Concepts

Patterns

- Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2)

Helpful Tips

1) The content in this lesson is based on the conservation work of OCEARCH™ and the Global Shark Tracker™. Spend a few minutes getting familiar with the website and the tracker if you have not done so already. The Global Shark Tracker™ is also available as an app for iPhone and Android.
2) This lesson plan is designed to be adaptable to suit your specific needs. Use the entire lesson plan or just parts of it. This material can be expanded to be an entire unit or condensed for just one day in the classroom.
3) Vocabulary words will be underlined as they first appear in the lesson plan. A complete list of vocabulary words is included as well.
4) Answers to questions and prompts for discussions will appear in *italics*.
5) Optional activities and content (side notes) will appear in a box. Use these to enhance your lesson and adapt it to suit your needs!
6) Have questions for OCEARCH Expedition Leader, Chris Fischer? Email info@OCEARCH.org to schedule a Skype session and let your students/child talk directly to Chris and the OCEARCH crew!
7) Email all questions about this lesson to info@OCEARCH.org.

Vocabulary

Bar Graph – A graph that uses bars to compare both numeric and categorical variables.
Categorical Variable – Variable not associated with a number such as gender, hair color, ethnicity, etc.
Data – A collection of information. The most important part of a table or graph is the information, or data, it represents.
Dependent Variable – A variable that *is* influenced and changed by other variables.
Graph – A drawing or diagram used to display information.
Independent Variable – A variable that *is not* influenced or changed by other variables.
Line Graph – A graph that uses lines to join points that represent data. Line graphs track changes over time and reveal trends.
Line Plot – A number line that encompasses all numbers in a set of data, showing a dot or other mark over the position corresponding to each number. Line plots show the frequency (how often) a variable appears in a set of data. It is sometimes called a dot plot.
Numeric Variable – Variable associated with a number such as age, weight, height, etc.
Table – Information organized in columns and rows.
Variable – A characteristic, number, or quantity that may change over time or vary in different situations.
X Axis – The horizontal axis of a graph.
X-Y Plot – A graph used to determine relationships between the two different variables. The x-axis is used to measure one variable and the y-axis is used to measure the other. It is also called a scatter plot.
Y Axis – The vertical axis of a graph.

Vocabulary Game (15 – 30 minutes)

Try this fun game to practice and review vocabulary words!

Materials – For this game, students should make vocabulary cards with index cards or cut up paper. Write the word on one side and the definition on the other.

Select one student volunteer to be the game host then divide the rest of the students into two teams. Give the list of vocabulary words and definitions to the host for reference. Have every student spread out his/her cards on their desk word side up. The host announces the definition of one of the words and the students race to pick up the word that matches that definition. The first team with all students holding up the correct word wins a point! It is certainly fair for teammates to help each other out. Tell students to place each card word side down after it has been announced. Once all words have been announced, reverse the procedure and announce the word and students pick up the definition. For an added twist, make a rule where the teams play silently!

Grade Level: 6-8

Time Estimate: 5-15 mins

REPRESENTING DATA GRAPHICALLY / PRE-LESSON ASSESSMENT

Use the following true/false and multiple choice questions as an introduction/warm-up to the lesson topics. You can do this in a verbal or written format, as a game, individually, or as a whole class! A handout is provided if you wish to hand the questions out in a quiz format.

The questions do not need to be graded. They are intended to give the students an idea of what they will be learning and to see what they already know.

1) True or False A graph is a picture representation used to display data.
Answer: *True*

2) True or False There are many types of graphs used for different reasons.
Answer: *True*

3) True or False Line graphs and bar graphs show changes over time.
Answer: *True*

4) What is an example of numerical data? (Select all that apply.)

a. age
b. weight
c. hair color
d. shoe size
e. time

Answers: *a, b, d, e*

5) What is an example of categorical data? (Select all that apply.)

a. gender
b. height
c. names
d. colors
e. birth date

Answers: *a, c, d*

6) Every graph requires the following: (Select all that apply.)

a. a descriptive title
b. labels on the X and Y axis
c. pretty colors
d. a key with a unit of measurement
e. a scale

Answers: *a, b, d, e*

Student handout on next page.

Name: _____ Date: _____

Tables and Graphs

Select the correct answer(s) to each of the following questions.

1) True or False A graph is a picture representation used to display data.

2) True or False There are many types of graphs used for different reasons.

3) True or False Line graphs and bar graphs show changes over time.

4) What is an example of numerical data? (Select all that apply.)
   a. age
   b. weight
   c. hair color
   d. shoe size
   e. time

5) What is an example of categorical data? (Select all that apply.)
   a. gender
   b. height
   c. names
   d. colors
   e. birth date

6) Every graph requires the following: (Select all that apply.)
   a. a descriptive title
   b. labels on the X and Y axis
   c. pretty colors
   d. a key with a unit of measurement
   e. a scale

Grade Level: 6-8

REPRESENTING DATA GRAPHICALLY / LESSON PLAN

Part 1. Tables (10 – 20 minutes)

Tables represent organized information, or data, which is easier to view and interpret than a long list of random information. Which of the options below do you think is the easiest to interpret? Both represent the exact same data.

Option A.

Shark 1, Female, Immature, 10 feet (3 m), 1,800 pounds (817 kg); Shark 2, Female, Mature, 15 feet (4.5 m), 2,700 pounds (1,225 kg); Shark 3, Female, Mature, 12.5 feet (3.8 m), 2,300 pounds (1,043 kg); Shark 4, Female, Mature, 16 feet (4.9 m), 2,700 pounds (1,225 kg); Shark 5, Male, Mature, 13 feet (4 m), 2,000 pounds (907 kg).

Option B.

Great White Sharks Tagged by OCEARCH

Name	Gender	Stage of Life	Length	Weight
Shark 1	Female	Immature	10 feet (3 m)	1,800 pounds (817 kg)
Shark 2	Female	Mature	15 feet (4.6 m)	2,700 pounds (1,225 kg)
Shark 3	Female	Mature	12.5 feet (3.8 m)	2,300 pounds (1,043 kg)
Shark 4	Female	Mature	16 feet (4.9 m)	2,700 pounds (1,225 kg)
Shark 5	Male	Mature	13 feet (4 m)	2,000 pounds (907 kg)

Option B. is much easier to interpret because the data is organized into a table with a descriptive title and headings for each variable.

Name, gender, stage of life, length, and weight are all variables within this set of data. A variable is a characteristic, number, or quantity that may change over time or vary in different situations. We have two types of variables in this set: numeric and categorical. A numeric variable is a variable associated with a number. A categorical variable is a variable not associated with a number.

Which of the above variables are numeric variables? *Length and weight.*
Which of the above variables are categorical variables? *Name, gender, and stage of life.*

Marine biologists, as well as many other scientists, use tables to organize data as it is collected in the field. Afterwards, a table can be easily converted into a graph, which is a diagram that visually displays the data.

Have students recreate their own table with the above information. We will be referencing it often throughout the lesson.

Part 2. Graphs

Introduction (5 minutes or less)

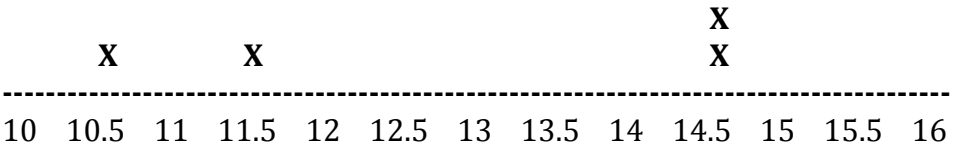
Graphs are used to display data in a manner that is easy to interpret. There are many types of graphs including but not limited to line plots, bar graphs, and line graphs. Each type of graph has a fairly specific use. What graph you choose to present your data with depends on what information you would like to focus on and the idea you want to convey.

Line Plot (20 – 35 minutes)

A line plot shows the frequency (how often) a variable appears in a set of data in the form of a number line. Line plots are perfect for representing a single numeric variable and are often best to represent large data sets. After deciding what scale of numbers to use (which depends on your data), simply place an "X" or another type of marker over the corresponding number for each data point. When a number is repeated, place another "X" over that point. Below is an example of a line plot that displays the length of the five great white sharks represented in the following table.

Great White Sharks Tagged by OCEARCH

Name	Gender	Stage of Life	Length	Weight
Shark 1	Female	Mature	14 feet (4.3 m)	2,300 pounds (1,043 kg)
Shark 2	Male	Mature	14 feet (4.3 m)	2,100 pounds (952.5 kg)
Shark 3	Male	Immature	10 feet (3 m)	950 pounds (431 kg)
Shark 4	Female	Mature	16 feet (4.9 m)	3,400 pounds (1,542 kg)
Shark 5	Female	Immature	11 feet (3.4 m)	1,200 pounds (544 kg)



Length of Great White Sharks Tagged by OCEARCH (Feet)

Notice the descriptive title given to this graph. The title offers a short explanation of what is in your graph. This helps the reader identify what they are looking at. It can be creative or simple as long as it tells what is in the graph. Without a title, you will not know what information a graph represents.

Just by glancing at the above line plot, you can quickly see that two of the sharks are 14 feet in length. Which other variable(s) given in the table would be best to display with a line plot? *Weight. Remember, line plots are great for displaying numeric variables. But you could certainly use categorical variables as well.*

Students should now practice making a line plot. A handout is provided on the next page.

Line Plot

Shows the frequency (how often) a variable appears in a set of data.

Name: _____

Using what you just learned about line plots, create your own line plot in the space provided below! Use the back of the paper if needed.

Instructions

1. Select a numeric variable from the table below.

Great White Sharks Tagged by OCEARCH

Name	Gender	Stage of Life	Length	Weight
Shark 1	Female	Immature	10 feet (3 m)	1,800 pounds (817 kg)
Shark 2	Female	Mature	15 feet (4.6 m)	2,700 pounds (1,225 kg)
Shark 3	Female	Mature	12.5 feet (3.8 m)	2,300 pounds (1,043 kg)
Shark 4	Female	Mature	16 feet (4.9 m)	2,700 pounds (1,225 kg)
Shark 5	Male	Mature	13 feet (4 m)	2,000 pounds (907 kg)

2. Draw a line for your graph in the space below.
3. Before adding numbers to the line, you should decide what scale of numbers to use. Then write your scale of numbers below the line.
4. Plot your data points accurately on the line.
5. Give your line plot a descriptive title.

Choosing a Scale

You do not always have to start with 0! Choose a range of numbers that will include all of your data points and is easy to interpret. For example, if your highest data point is 16, your scale should not continue to 30. And if your lowest data point is 10, your scale should not start at 0.

Bar Graph (20 – 35 minutes)

With a bar graph, you can compare variables or track changes over time. Bar graphs are ideal to use when you expect the changes to be large.

Bar graphs display data on an x and y axis.

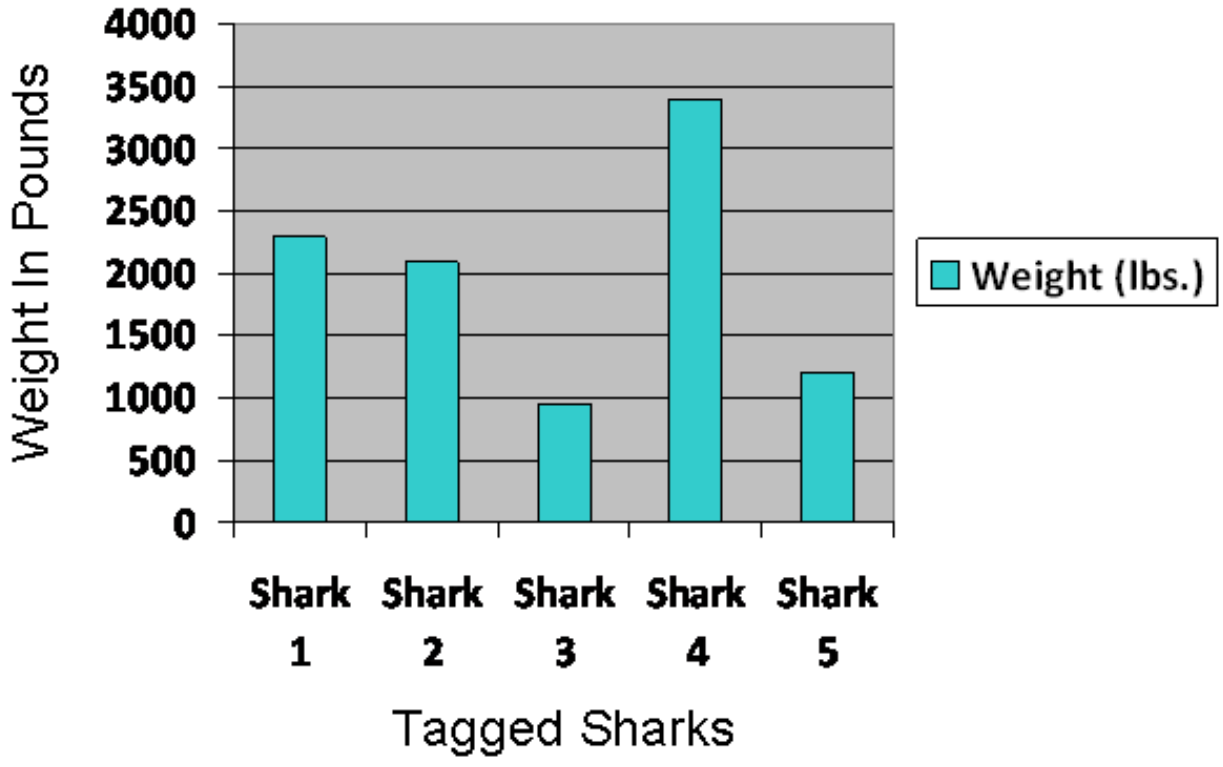
The x axis is the horizontal (left to right) line on the graph. In the example below, we show the name of the sharks on the x axis. The variable shown on the x axis is *typically* an independent variable – a variable that *is not* influenced or changed by other variables. Time is an excellent example of an independent variable since it is not influenced by other variables.

The y axis is the vertical (up and down) line on the graph. In the example below, we show the weight of the sharks on the y-axis. The variable shown on the y axis is *typically* a dependent variable – a variable that *is* influenced and changed by other variables.

Again notice that this graph has a descriptive title, so you know exactly what information we are looking at. This graph also has a key, which shows the unit of measurement. Without the key, we wouldn't know what the bars represent – pounds, grams, kilograms?

Weight of Great White Sharks Tagged by OCEARCH

Students should now practice making a bar graph. A handout is provided on the next page.



Bar Graph

Compares both numeric and categorical variables.

Name: _____

Using what you just learned about bar graphs, create your own bar graph in the space provided below! Use the back of the paper if needed.

Instructions

1. Select a dependent, numeric variable from the table below. Your independent variable will be the names of the sharks.

Great White Sharks Tagged by OCEARCH

Name	Gender	Stage of Life	Length	Weight
Shark 1	Female	Immature	10 feet (3 m)	1,800 pounds (817 kg)
Shark 2	Female	Mature	15 feet (4.6 m)	2,700 pounds (1,225 kg)
Shark 3	Female	Mature	12.5 feet (3.8 m)	2,300 pounds (1,043 kg)
Shark 4	Female	Mature	16 feet (4.9 m)	2,700 pounds (1,225 kg)
Shark 5	Male	Mature	13 feet (4 m)	2,000 pounds (907 kg)

2. Draw an x axis and a y axis for your graph in the space below.
3. Write the names of the sharks below the x axis where the bars will be.
4. Decide on a scale for the y axis. Consider the lowest and greatest values of the variable you have chosen.
5. Label the x axis and the y axis.
6. Draw a bar for each shark to show how it relates to the dependent variable.
7. Give your bar graph a descriptive title.

Dependent vs. Independent

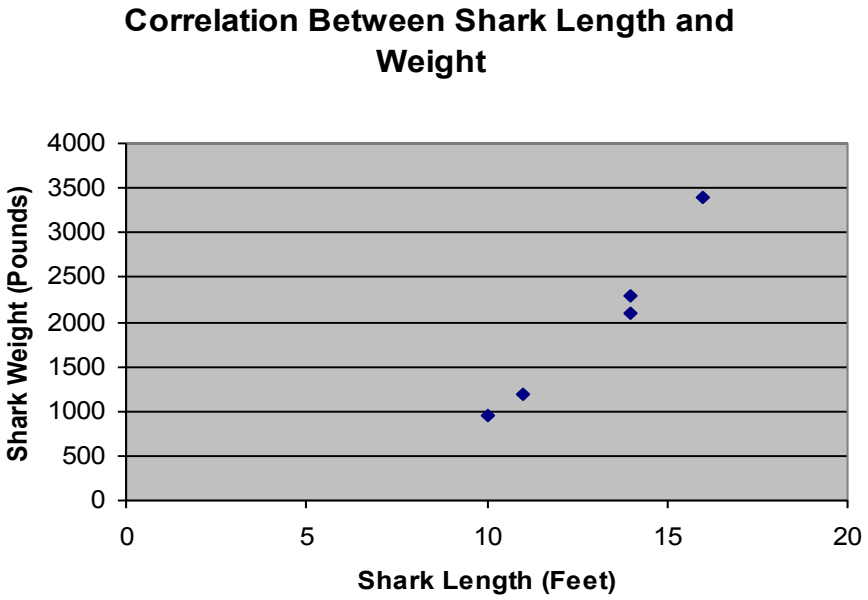
Independent variable – a variable that *is not* influenced or changed by other variables (x axis).

Dependent variable – a variable that *is* influenced and changed by other variables (y axis).

X-Y Plot (20 – 35 minutes)

X-Y plots, also known as scatter plots, are used to determine relationships between two different numeric variables. The x axis represents one variable and the y axis represents another.

The graph below compares the lengths of great white sharks to their weights. Each dot on the graph represents a shark's length versus its height as a coordinate (x,y).



If both variables increase at the same time, there is a positive relationship, like the one you see in the graph above. Scientists can easily see that as length increases, weight increases.

If one variable decreases while the other increases, there is a negative relationship. Sometimes the variables do not follow any pattern and therefore have no relationship.

Students should now practice making an x-y plot. A handout is provided on the next page.

X-Y Plot

Determines relationships between the two different numeric variables.

Name: _____

Using what you just learned about x-y plots, create your own x-y plot in the space provided below to compare the lengths of the sharks to the weights of the sharks! Use the back of the paper if needed.

Instructions

Great White Sharks Tagged by OCEARCH

Name	Gender	Stage of Life	Length	Weight
Shark 1	Female	Immature	10 feet (3 m)	1,800 pounds (817 kg)
Shark 2	Female	Mature	15 feet (4.6 m)	2,700 pounds (1,225 kg)
Shark 3	Female	Mature	12.5 feet (3.8 m)	2,300 pounds (1,043 kg)
Shark 4	Female	Mature	16 feet (4.9 m)	2,700 pounds (1,225 kg)
Shark 5	Male	Mature	13 feet (4 m)	2,000 pounds (907 kg)

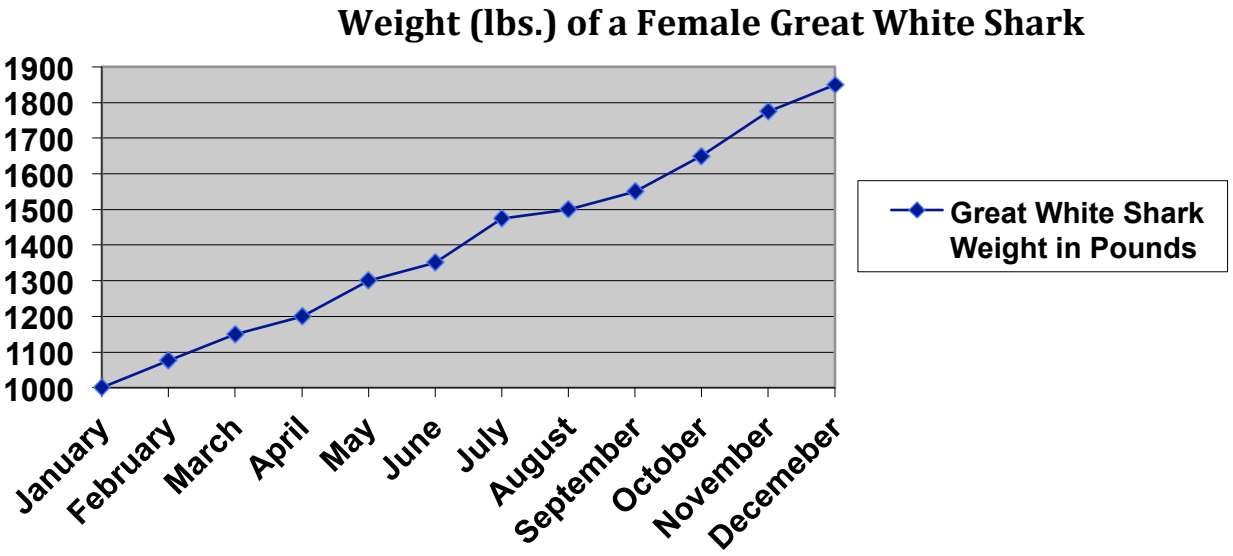
1. Draw an x axis and a y axis for your graph in the space below.
2. Decide on a scale for each axis. Consider the lowest and greatest values of the variable you have chosen.
3. Label the x axis and the y axis.
4. Plot each sharks length and weight on the graph as a coordinate (x,y).
5. Give your graph a descriptive title.

What type of relationship do you see?

Line Graph (20 – 35 minutes)

Line graphs are used to track changes over time, much like a bar graph. However, line graphs are more ideal to use when you expect the changes to be relatively small.

Consider this scenario: A female great white shark weighed 1,000 pounds in January when she was first tagged. She was then weighed once a month for an entire year by the marine biologists who were tracking her. The following line graph represents the shark's growth over an entire year.



With this graph, you can easily see a trend. What trend do you see? *The shark's weight steadily increases every month*.

Is this a positive or negative relationship? *Positive. Weight increases with time.*

Students should now practice making a line graph. A handout is provided on the next page.

Line Graph

Shows how a variable changes over time.

Name: _____

Using what you just learned about line graphs, create your own line graph in the space provided below! Use the back of the paper if needed.

Instructions

Weight of a Juvenile Great White Shark (recorded bi-monthly)

Month	January	March	May	July	September	November
Weight (lbs.)	800 (362.9 kg)	1,000 (453.6 kg)	1,100 (499 kg)	1,400 (635 kg)	1,700 (771.1 kg)	2,000 (907 kg)

1. Draw an x axis and a y axis for your graph in the space below.
2. Label the x axis with the independent variable and the y axis with the dependent variable.
3. Plot the weight of the shark for each month.
4. Draw a line to connect all the points.
5. Give your line graph a descriptive title.

Titles

All graphs need a descriptive title. This helps the reader identify what they are looking at. It can be creative or simple as long as it tells what is in the graph.

Part 3. Review (10 – 20 minutes)

Students should now understand why tables are used to organize data, recognize four different types of graphs, and understand that different types of graphs have unique purposes.

What type of graph would you use if you wanted to:

1. Track small changes over time? *Line graph.*
2. Show how often a variable occurs? *Line plot.*
3. Compare variables or track large changes over time? *Bar graph.*
4. Determine the relationship between two variables? *Scatter plot.*

Students should have an understanding of vocabulary used in the lesson.

1. What is an example of a numeric variable? *Weight, length.*
2. What is an example of a categorical variable? *Stage of life, gender.*
3. What is an independent variable? *A variable that is not influenced or changed by other variables.*
4. What is a dependent variable? *A variable that is influenced and changed by other variables.*
5. What is typically labeled on the x-axis? *The independent variable.*
6. What is typically labeled on the y-axis? *The dependent variable.*

Representing Data Graphically – Tables and Graphs

ACTIVITY 1. Line Plots, Bar Graphs, and X-Y Plots

(45 minutes – 60 minutes or take home)

Introduction

Students will create their own table to organize data collected from the OCEARCH Global Shark Tracker. Each student will choose eight sharks and record name, gender, stage of life, length, and weight on their table. The students will then represent the data graphically, interpret the graph(s), and make inferences based on what they see.

An optional student handout is provided with instructions for this activity.

Materials

- Computer with internet access
- Paper (lined, blank, or graphing)
- Pencil
- Ruler or straight-edge
- Colored pencils, crayons, or markers

Instructions

Students may work individually or in small groups.

Collect the Data

1. First the students will need to collect data for eight different great white sharks including the name, weight, length, gender and stage of life. Students should construct a table to contain this information as it is collected. The table should include five columns (for each variable) and nine rows (eight for each shark and one for the headings). See example below.

Name	Weight	Length	Gender	Stage of Life

2. The students will then go to the OCEARCH website, where they will collect their data. *Remember, students should only select great white sharks for this activity.
3. Students should choose eight great white sharks from the list. Information for each shark is found in its profile. Record name, weight, length, gender, and stage of life (mature or immature) in a table. *Make sure the students choose both male and female sharks.

With this data, the students can now begin to display the data graphically so that it can be interpreted.

Display the Data Graphically

1. Students should use the lengths of the eight sharks to make a line plot (weight can also be used for this activity).

* Discussion Questions: Which weights were most common? What was the largest weight of each student/group? Of the class? What was the smallest?

2. Students should use the sharks' gender to make a bar graph (Stage of life can also be used for this activity).

* Discussion Questions: Did everyone have more females than males? Why do you think there are more females? This question is a puzzle that OCEARCH researchers are currently working to solve. They do not yet understand why they are able to tag more females than males. Do the students have any ideas?

3. The students should use the lengths and weights of the eight sharks to create a scatter plot. Plot weight on the y-axis and length on the x-axis.

*Discussion Questions: Ask the students to form conclusions about the relationship between weight and length. Ask the class to explain why weight increases as length increases.

*** For line graphs, see Activity 2. Line Graphs!

Conclusion

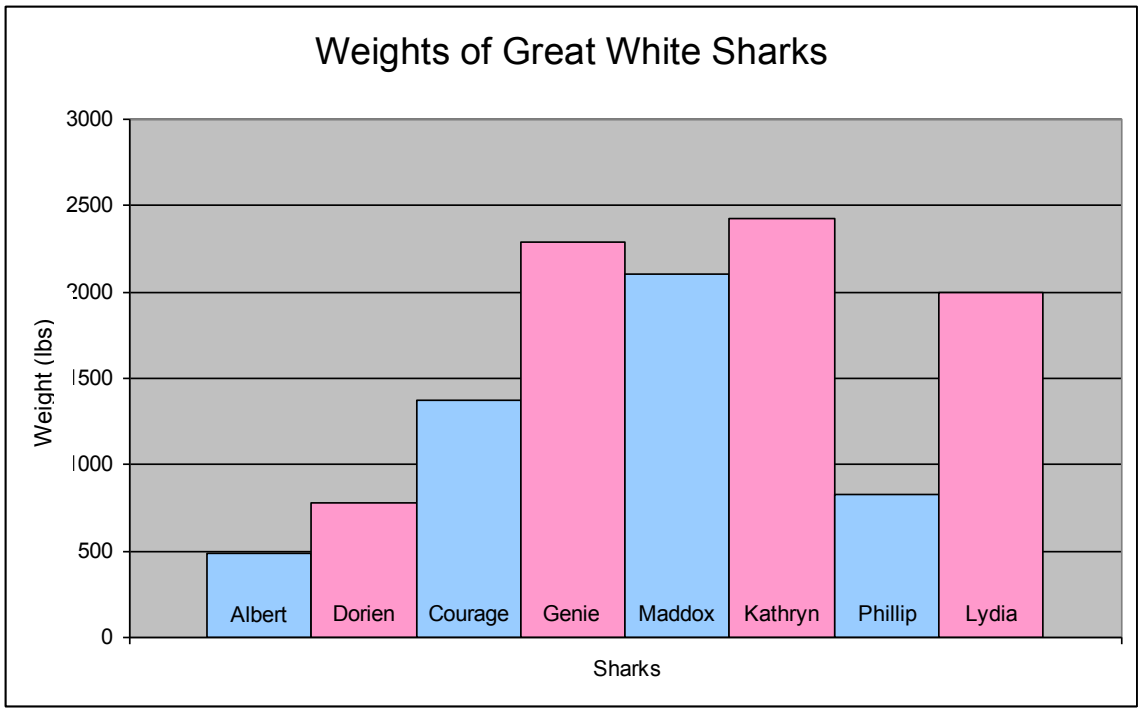
As a conclusion ask the students what would be the best graph to use if they wanted to find out if males or females are generally heavier.

- Go through each type of graph and discuss whether it would be appropriate for this scenario.
    - *A line plot will only show how frequently a variable occurs. Not appropriate.*
    - *A line graph compares numerical variables or tracks changes over time. Not appropriate.*
    - *A scatter plot is used to determine if there is a positive, negative, or no relationship between two variables. Not appropriate.*
    - *A bar graph, however, will allow you to compare a categorical variable against a numerical variable and view their relationship. Not appropriate.*

- This scenario is also a fun way to show the students that they can use color in their graphs to make them easier to read. Have the students choose two different colors, one for males and one for females.
    - Put the names of the eight sharks on the x axis and the weights of each shark on the y axis. After drawing the bars, color code the bars for males versus females.

* Discussion: Can you look at this graph and easily interpret the information? Are male sharks or female sharks generally heavier? Why do you think there is a difference?

Your graph should end up looking similar to this one:



Activity 1. Line Plots, Bar Graphs, and X-Y Plots

Name: _____

Date: _____

Instructions

Go to www.ocearch.org

Use the list sharks to view a shark's profile. Choose 8 great white sharks and record the name, weight, length, gender, and stage of life (mature or immature) on the table below. Make sure to choose both male AND female sharks.

NAME	WEIGHT	LENGTH	GENDER	STAGE OF LIFE

You will be using this table to make three types of graphs: line plot, bar graph, and an x-y plot.

Which of the variables in your table are independent variables?

Which of the variables in your table are dependent variables?

Graph 1 – Line Plot

Use the weights of your 8 sharks to make a line plot in the space below. **Don't forget to label and title your graph.*

How heavy is the heaviest shark?

How heavy is the lightest shark?

Use the lengths of your 8 sharks to make a bar graph in the space below. **Don't forget to label and title your graph.*

What gender and stage of life is your longest shark?

Graph 3 – Scatter Plot

Use the lengths and weights of your sharks to create an x-y plot.
Plot the weight on the y axis and length on the x axis.
**Don't forget to label and title your graph!*

What conclusion can you form about the relationship between weight and length? Is it a positive or negative relationship?

_____

_____

_____

_____

_____

Representing Data Graphically – Tables and Graphs

ACTIVITY 2. Line Graphs

(45 minutes – 60 minutes or take home)

Introduction

Students will create their own table to organize data collected from the OCEARCH Global Shark Tracker. Each student will choose one shark and record its name and the number of "pings" for the past ten days. The students will then represent the data graphically, interpret the graph, and make inferences based on what they see.

What is a ping?

Each dot on the Global Shark Tracker represents a ping. A shark "pings in" when its dorsal fin comes above the surface of the water long enough for the shark's tag to send a signal to an overhead satellite. The satellite interprets the signal and records the shark's location, which the satellite

An optional student handout is provided with instructions for this activity.

Materials

- Computer with internet access
- Paper (lined, blank, or graphing)
- Pencil
- Ruler or straight-edge

Instructions

Students may work individually or in small groups.

Collect the Data

1. First, the students will need to collect data about the shark and where that shark has traveled. They should construct a table to contain this information as it is collected. The table should include eleven columns (ten for the days and one for the headings) and two rows (one for the "pings" and one for the dates). See example below.

Date	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar
Pings	IIIII	II	O	IIIII IIII	IIIII	III	III	IIII	IIII	IIIII III

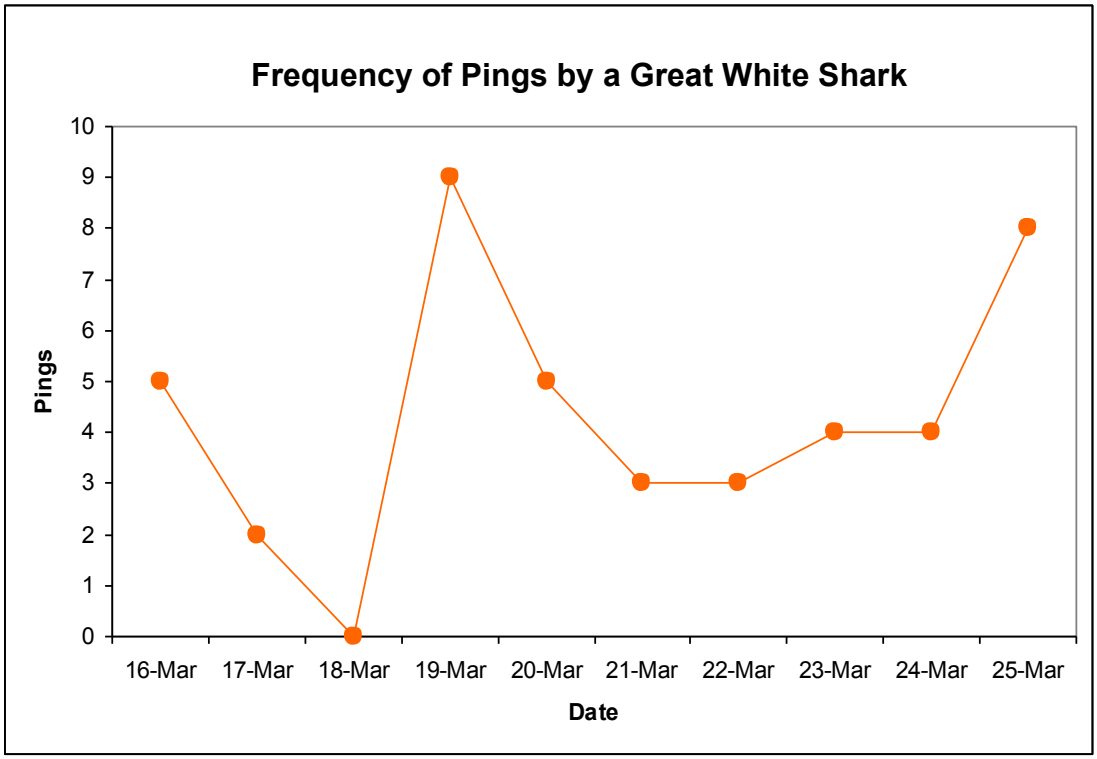
2. The students will then go to the OCEARCH website, where they will collect their data. Students should select one great white shark from the list and view its movement on the tracker.
3. Record the number of times the shark pings in each day for the past ten days. Students can use tally marks or numbers to record. If there are no pings for a particular day, it should be recorded as zero.

With this data, the students can now begin to display the data graphically so that it can be interpreted.

Display the Data Graphically

1. Use the table to make a line graph. Plot the dates on the x axis and the number of pings on the y axis.

Your graph should end up looking similar to this one:



* Discussion Questions:
Why did we use a line graph? Why do you think your shark came to the surface of the water more some days than others? Have the students compare their graphs with their classmates. How are they different? How are they the same? Why do you think some sharks come to the surface more often than others?

Activity 2. Line Graphs

Name: _____

Date: _____

Instructions

Go to www.ocearch.org

You will pick one great white shark to track and record how many times it "pinged in" each day for the past ten days. Use tally marks or numbers to record the pings in the table below.

Each dot on the Global Shark Tracker represents a ping. A shark "pings in" when its dorsal fin comes above the surface of the water long enough for the shark's tag to send a signal to an overhead satellite. The satellite interprets the signal and records the shark's location, which the satellite then sends back to earth for scientists to analyze.

Date										
Pings										

Now use this data to make a line graph on a separate piece of paper.
Plot dates on the x axis and number of pings on the y axis.
**Don't forget to label and title your graph!*

1. Why did we use a line graph to represent this data?

_____

_____

2. Compare your graph with another student's. How are they different? How are they the same?

_____

_____

_____

_____