

LessonTitle: Predictions from Data and Graphs**Alg 4.8****Utah State Core Standard and Indicators** Algebra Standard 2, 5 Process Standards 1-5**Summary**

In this lesson, students collect data to answer real-life questions. They must report their predictions and conclusions using graphs, tables, equations and writing. Then they write their own question requiring data collection, organization and interpretation. This activity should help students experience the value of algebra.

Enduring Understanding

Many real world settings involve collecting and organizing data and then creating graphs and equations to help us understand, make predictions, and communicate mathematical stories.

Essential Questions

How do you collect, organize, analyze, and communicate the data which tell the mathematical stories in the real world?

Skill Focus

- Data collection
- Graphs and equations
- Making predictions

Vocabulary Focus**Assessment**

Materials: Graphing calculators.

Launch**Explore****Summarize****Apply****Directions:**

You could select from the activities below for a whole class activity. Or you may wish to divide the class up and have different groups each do a different activity and then present the results to the class.

For predicting a mystery person's height, students could also try using different bones. The following equations are estimates for this kind of activity.

<u>Male Height (cm)</u>	<u>Female Height (cm)</u>
$(3.6 \times \text{radius}) + 81$	$(4.2 \times \text{radius}) + 62$
$(3.2 \times \text{humerus}) + 67$	$(3.3 \times \text{humerus}) + 60$
$(2.3 \times \text{femur}) + 64$	$(2.4 \times \text{femur}) + 64$
$(2.4 \times \text{tibia}) + 83$	$(2.7 \times \text{tibia}) + 67$

After the students have experience with data collection to answer questions, writing their own question should be fun. This activity will make algebra meaningful to students!

Alg 4.8

Predictions from Data and Graphs

Many real world settings involve collecting and organizing data and then creating graphs and equations to help us understand or make predictions. The following activities demonstrate this.

1) Predicting a Person/s Height From a Single bone Measurement

The following article, “Bone Puzzles Scholars,” appeared in a newspaper.

“Construction workers in Provo, Utah unearthed a human bone today while excavating for a new office building. The bone is 28 cm long. Anthropologists from Brigham Young University identified it as a radius bone. Based on other artifacts found at the site, they estimated the bone was buried shortly after the city was founded in 1849.

One team of scholars is working to identify the gender of the mystery person, while others search for clues as to why the bone may have been buried in the downtown location.”

YOUR TASK:

As part of the team of scholars trying to identify the gender of the mystery person, you are to prepare an oral report to the Provo Historical society. In your report, be sure to discuss everything you did, your reasoning and methods, data collection and organization. Provide a mathematically sound justification for your prediction.

Steps for you to follow:

- Decide what you could do to figure out the probable gender and height of the mystery person.
- Collect Data. Be certain to collect a large enough sample of data and measure accurately.
- Summarize and represent your data using a table and graph.
- Estimate an equation you could use to predict the height (use your table and graph).
- Make a prediction about the gender and height of the mystery person.
- Create the report.

2) How much do sharks eat?

According to Steve Vogel, an employee at the South Carolina Aquarium (www.scaquarium.org), a shark is fed approximately 4 to 5% of its body weight per week.

YOUR TASK:

As part of the team of marine biologists, you want to know approximately how much food different varieties of sharks eat per week. You will be reporting back to the aquarium in order for them to make decisions about purchasing food. In your report, be sure to discuss everything you did, your reasoning and methods, data collection and organization. Provide a mathematically sound justification for the information you are reporting

Steps for you to follow:

- Decide on plan of action
- Collect Data. Where will you go to get your data?
- Summarize and represent your data using a table and graph.
- Estimate an equation you could use to figure out the food needed (use your table and graph).
- Prepare your report.

3) How much should you feed your dog?

YOUR TASK:

You work at the humane society of Utah. You want to prepare information for people who are adopting dogs. Part of their decision about what size dog to adopt may be related to how much food different sized dogs eat. You must prepare the information so they can see what they need to know quickly and easily. They also want to take the information with them. In your report to the adoptees, be sure to discuss everything you did, your reasoning and methods, data collection and organization. Provide a mathematically sound justification for the information you are reporting

Steps for you to follow:

- Decide on plan of action.
- Collect Data. Where will you go to get your data?
- Summarize and represent your data using a table and graph.
- Estimate an equation you could use to figure out the food needed for different sized dogs (use your table and graph).
- Prepare your report.

4) What do you know about an alligator if you know it's height?

YOUR TASK:

You work in a nature preserve in Florida. You have been asked to find out whether or not you can predict an alligator's weight based on its height. You will prepare a short report to answer this question. In your report, be sure to discuss everything you did, your reasoning and methods, data collection and organization. Provide a mathematically sound justification for the information you are reporting.

Steps for you to follow:

- Decide on plan of action
- Examine the data.
- Summarize and represent your data using a table and graph.
- Estimate an equation you could use to figure out the food needed (use your table and graph).
- Prepare your report.

Length inches	58	61	63	68	69	72	72	74	74	76	78	82	85	86	86
Weight pounds.	28	44	33	39	36	38	61	54	51	42	57	80	84	83	80

Continued length	86	88	89	90	90	94	94	114	128	147
Continued Weight	90	70	84	106	102	110	130	197	366	640

5) Write your own question.

Decide on a question which would require data collection in order to answer. Write the question. Then research or collect the data and organize a report to answer your question.