

## Activity 8.1 How can we show ranges of variation of traits?

### What Will We Do?

We will use the height data collected last week to represent and analyze data on a trait that has more than two variations.

Height is a trait that is controlled by more than one gene. It has what is called **continuous variation**, not just two or three phenotypes.

Yesterday you reviewed some different types of graphs.

**Predict:** What do you think would be the best type of graph to represent the height data for our class? Why?

### Procedure:

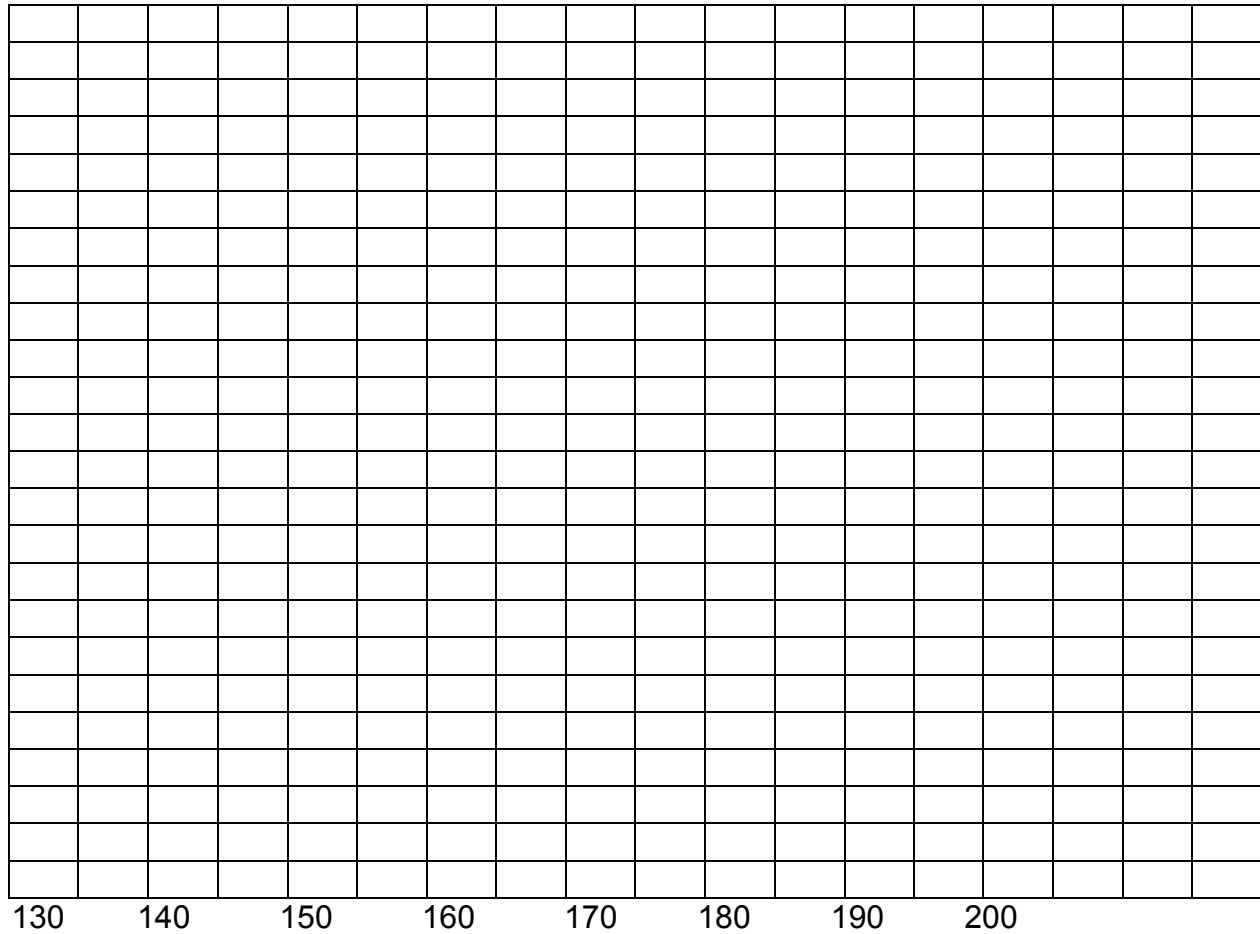
Histograms are often used to represent the patterns and variation in height data. Your teachers have determined the range of the data by identifying the shortest height in cm and the tallest height in cm and divided the data evenly into 8 bins. You will be constructing a histogram to represent your classmates' heights.

2. **Set up:** Complete the following steps to create a histogram of the class data
  - a. **Observe the labels on the X axis:** On the X axis there are bins of 10 cm each ranging between 130 cm -200 cm. Each bin is 2 columns wide
  - b. **Add a label to the Y axis** (# of students)
  - c. **Number the Y axis:** Start at 0 and go up by 2s (you can label every other line)
  - d. **Add a Title:** Write a descriptive title for the graph including the two variables
  - e. **Graph the data:** Make a bar for each height range with the number of students in that height range

CYMS 8<sup>th</sup> Grade Science Student Height Data

Height Range (cm)	# of Students
130-139	0
140-149	2
150-159	17
160-169	40
170-179	25
180-189	5
190-199	0

Title: \_\_\_\_\_



Label for X axis include (units) \_\_\_\_\_ ( )

1. Describe the patterns you see in the class data for height
2. How does making a histogram help you to see patterns
3. Why would a pie chart not have been as useful?

Mark the text for the reading on the next page. Underline a main idea in each paragraph and circle a few key science words per paragraph.

## **From Reading 8.4 Height- Unraveling the Genetic Puzzle**

Your teachers collected and analyzed data on height. Height is one trait that scientists have studied for a very long time. However, height is a trait that they know very little about. Height, you have learned, has many variations due to the fact that more than one gene influences the trait. Scientists do not know how many genes affect height, but it may be several, maybe even as many as 20. They know that more than one region of DNA may affect height, but they do not know yet things like why, in general, men are taller than women. Scientists have also identified environmental factors that can affect height, such as nutrition. (We learned about this in IC3 in a reading about Mayan children compared with American children)

Even in one family, people can be very different heights, Two siblings might have very different heights perhaps because the mom had very different medical care or eating habits from one pregnancy to the next. Doctors know that medical care and nutrition affect the health of a baby. To what extent do those things also affect how genetic material is expressed? In order to learn more about the effects of the environment on traits, scientists often study twins.

### ***More about Twins***

Identical twins are offspring that come from a single egg, fertilized by a single sperm, so they have exactly the same DNA. Fraternal twins result from two different eggs being fertilized by two different sperm. Fraternal twins' genetic material is like that of any other brother and sister, but the offspring are born at the same time

Scientists often look at identical twins when they want to study the effects of environment. Because both have the same genetic material, if one develops a disease that the other does not develop, the role of environment can be studied more carefully. Scientists look at fraternal twins for other reasons. Because twins' environment in the womb was similar, and their environment after they are born is similar, studying twins lets scientists focus on their genes more closely. The environmental factors are never exactly the same, but they are close, given that the twins were conceived, born, and raised at the same time. Certainly the environmental factors are closer than the factors between siblings born at different times.

Scientists have looked at many pairs of twins to look for patterns in their genes. They learned that an important DNA region for height is on one chromosome, and other significant regions for height are on other chromosomes. They have narrowed their search down to a small number of regions. Now that those key regions have been identified, scientists can focus on finding the primary gene (or genes) associated with height. With all of the traits that could be studied, you can imagine that scientists who study genetics will be asking (and answering) important research questions for many years to come.



