

Using the Scientific Method With Genetics



Introduction:

Humans are classified as a **separate species** because of all the special characteristics that they possess. These **characteristics are controlled by strands of DNA** located deep inside their cells. This **DNA contains the code for every protein** that an organism has the ability to produce. These proteins combine with other chemicals, within the body, to produce the cells, tissues, organs, organ systems, and finally the organism itself. The appearance of these organs, such as the shape of ones nose, length of the fingers, or the color of the eyes is called the **phenotype**.

Even though humans contain hands with five fingers, two ears, or one nose, there are **subtle differences that separate these organs from another**. There are **subtle differences in a person's genes** that allows for these different phenotypes. In this lab, we are going to observe some of these differences in phenotype. All human hands look pretty much alike, but there are genes on your chromosomes that code for the characteristics making up your hand. We are going to examine two of these characteristics (**hand width and hand length**) and try to determine why these phenotypic differences occurred.

Materials:

- metric ruler (see end of lab)
- pencil
- calculator



Procedures:

Day 1

1. Choose a partner and have them measure the **length of your right hand** in **centimeters**. (Measure from the tip of your middle finger to the beginning of your wrist as shown in figure 1.) Record your measurements in Table 1.
2. Now measure and record the length in centimeters of your partners hand.
3. Have your partner measure the **width of your right hand**, straight across the palm, and record the data in Table 1. (see figure 1.)
4. Now measure & record the width of your partner's hand.

Figure 1.



Table 1

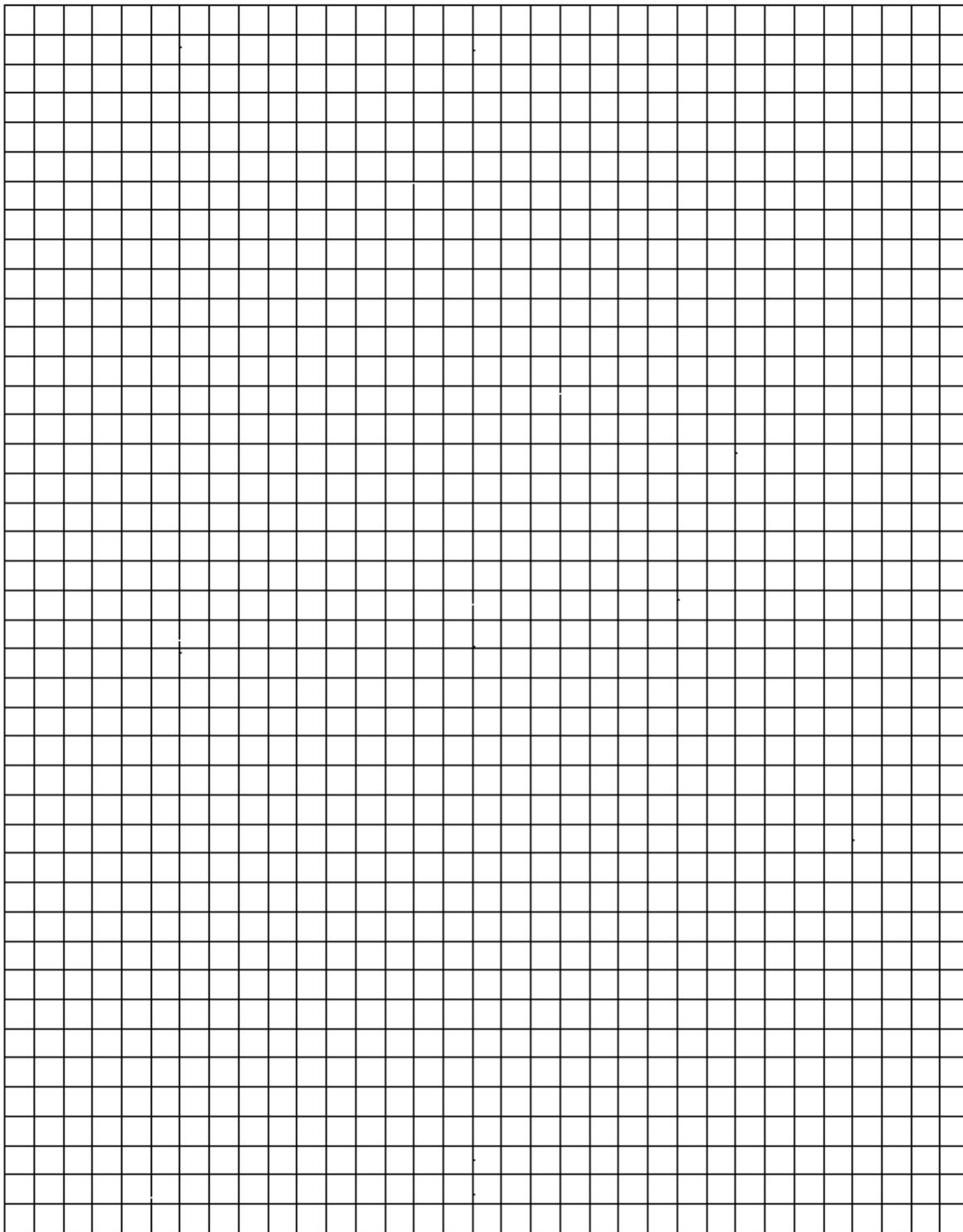
Group Data on Right Hand Width and Length		
Student Name	Length of Hand (cm)	Width of Palm (cm)

5. After the entire class has completed Table 1, record your group data on the **Class Data Table** at the front of the room
6. Record the Class Data Table information on your lab sheet's **Table 2**.

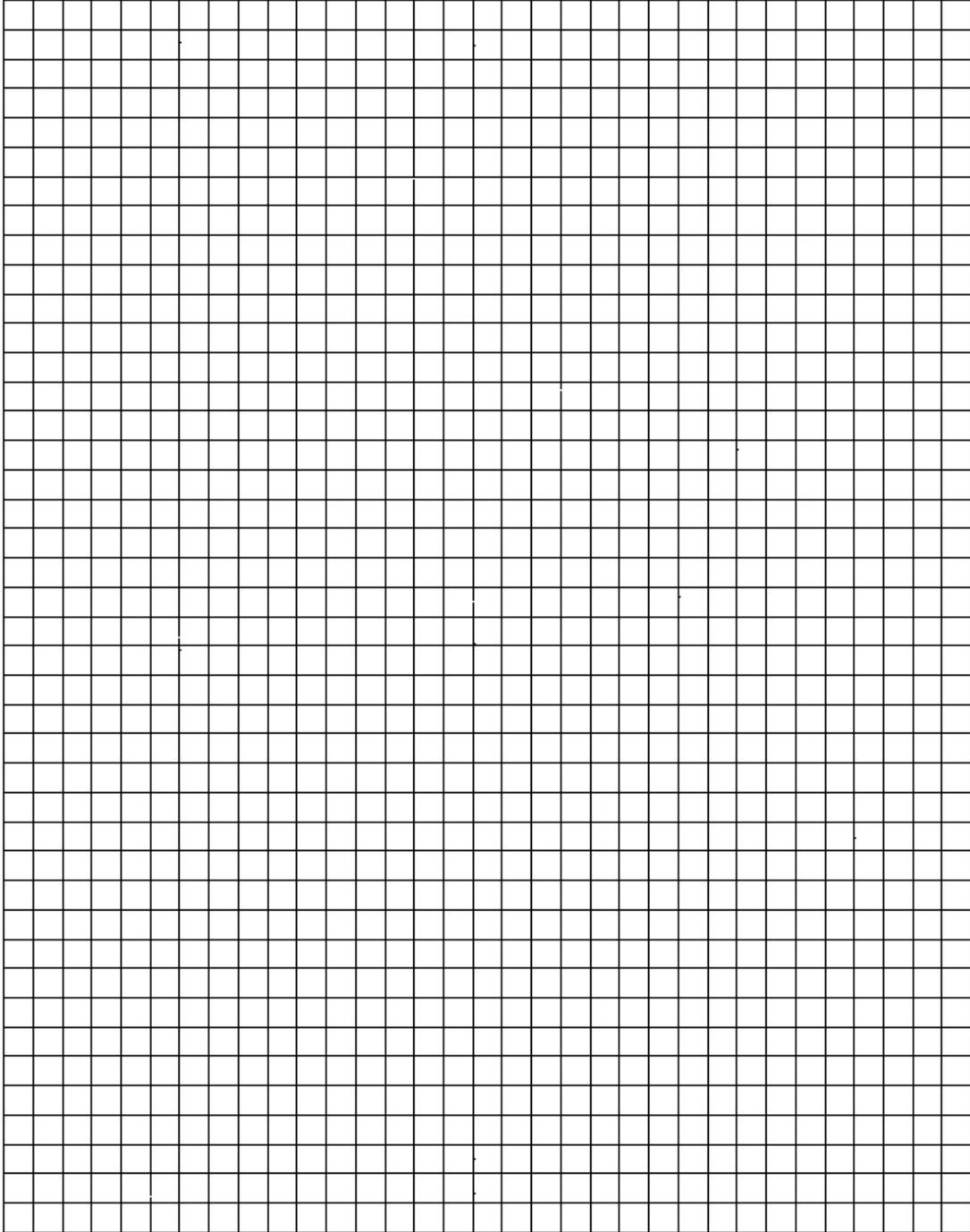
Table 2

Class Data on Right hand Width and Length (cm)			
Class Period:			
Student	Gender (M / F)	Hand Length (cm)	Hand Width (cm)
1.	M / F		
2.	M / F		
3.	M / F		
4.	M / F		
5.	M / F		
6.	M / F		
7.	M / F		
8.	M / F		
9.	M / F		
10.	M / F		
11.	M / F		
12.	M / F		
13.	M / F		
14.	M / F		
15.	M / F		
16.	M / F		
17.	M / F		
18.	M / F		
19.	M / F		
20.	M / F		
21.	M / F		
22.	M / F		
23.	M / F		
24.	M / F		

Graph Title:



Graph Title:



Analysis:

1. Examine the above graphs. What is the shape of the line for hand length? for the palm width?
2. What is the most abundant measurement (mode) for hand length?
3. What was the average hand length (mean) for males? for females? for total students?
4. What is (are) the least abundant measurement(s) for hand length?
5. What is the most abundant measurement (mode) for palm width?
6. What is the least abundant measurement for palm width?
7. What was the average palm width (mean) for males? for females? for total students?
8. Are there any similarities in the graph of the above two characteristics and if so, what are they?
9. Are there any differences in the graph of the above two characteristics and if so, what are they?

10. Is there a difference in the length of the male and female hand?
11. Is there a difference in the width of the male and female hand?
12. Does gender have an effect on the phenotype of a trait? Explain.

Cut and use:

