

1.1 Understand the Question

trait: a physical or behavioral characteristic of an individual that can be passed down to the next generation.

variation: what makes one kind different from others of the same kind.

How Do Your Classmates Differ from One Another?

To help you think about how organisms that appear similar can actually be so different, you will begin by looking at differences among human beings. You will observe several physical **traits** that may make you different from your classmates. You will record the differences and estimate the amount of **variation** among students in your class.



Get Started

Imagine that an alien from another planet has landed on Earth and walked into your classroom. After looking around, the alien concludes that all human beings look very much the same. Do you agree with the alien's conclusion?

To help you decide if you agree with the alien or not, you will work with your group to identify similarities and differences in the way people look. Then you will use that data as evidence to decide if you agree with the alien.

On a piece of paper, make two columns, one for similarities among humans and the other for differences.

Discuss with your class how human beings are similar to each other in their physical characteristics. Some physical characteristics are traits. Think about the physical traits you share with other human beings. These can be how many legs or how many eyes you have. Try to identify traits that human beings have in common. List those in the “Similarities” column.

Then, work with your class to identify traits that are different among human beings. What makes you different from your classmates? Record those in the “Differences” column.

Conference

In your group, look at the Human Traits photos shown on the next page. The four traits on that page vary among human beings. As you look at the traits, think about which ones you have. Can you roll your tongue? Do you have an attached or a detached ear lobe? Look at the photos on the page to understand how each trait varies among humans. In the My Traits row of an *Inventory of Traits* data page, make a check mark in each of the boxes that identifies your traits.

Work with your group to fill in the second part of the *Inventory of Traits* page. For each of the traits you investigated, record how many members of your group have each variation of that trait. Record your data in the space for My Group’s Traits.

For example, suppose two members of your group have the trait “Attached ear lobe.” Write the number “2” in the corresponding space on the page. If none of the members of your group have a specific trait, write “0” on the page. You will fill in the rest of the page later.

Inventory of Traits

Name: _____ Date: _____

My Traits

In the table below, mark the checkbox next to each trait you have.

Trait	Traits I have	
Ear lobe	Attached _____	Detached _____
Sex	Female _____	Male _____
Rolling tongue	Can roll tongue _____	Cannot roll tongue _____
Thumbs when clasping hands	Left thumb over right thumb _____	Right thumb over left thumb _____

My Group’s Traits

Record in the space below how many students in your group have each of the traits listed.

Trait	Number of students with trait	
Ear lobe	Attached _____	Detached _____
Sex	Female _____	Male _____
Rolling tongue	Can roll tongue _____	Cannot roll tongue _____
Thumbs when clasping hands	Left thumb over right thumb _____	Right thumb over left thumb _____

My Class’s Traits

Record in the space below how many students in your class have each of the traits listed.

Trait	Number of students with trait	
Ear lobe	Attached _____	Detached _____
Sex	Female _____	Male _____
Rolling tongue	Can roll tongue _____	Cannot roll tongue _____
Thumbs when clasping hands	Left thumb over right thumb _____	Right thumb over left thumb _____

Human Traits



Detached earlobe



Attached earlobe



Can roll tongue



Cannot roll tongue



Right thumb over left thumb



Left thumb over right thumb

Analyze Your Data

Discuss the results with your group. As you look at the data, think about the following questions:

- Are there traits shared by all members of your group? Which traits are these?
- Are there traits none of your group members have? Why might this be so?
- Suppose you had collected data from all the students in your class instead of only your group. How do you think your results would change with data from a larger group?
- Does any other member of your group have the exact same traits you have? Do you expect to have the same traits as another student? Why or why not?
- What other traits does each member of your group have that might make them different from others?
- Which of the human traits you investigated do you think are common among human beings? Which ones do you think are less common?

As you discuss your answers to the questions, listen carefully as others present their ideas. Pay attention to the evidence presented by your group members to support their conclusions. Take notes during the discussion. Be prepared to present your group's data and conclusions to the rest of your class.

Communicate your Results

Each group will have a chance to present to the class their data and their answers to the questions. As you listen to other groups' presentations, compare your group's data with the data of other groups. Are the data similar? Listen carefully to other groups' answers to the questions. All the groups may not agree with each other. Keep track of the variation in traits across other groups, and record data about the class on your *Inventory of Traits* page.

After all groups have shared their data, revisit the answers to the questions. Which traits are more common or less common across the class? Is there more or less variation in traits in your class as a whole, compared to your group? Using all the data you have now, work with the class to answer the questions.

Think again of the conclusion made by the visiting alien that all human beings look the same. Based on the class's results, do you think the alien's conclusion is justified? Why or why not?

What are traits?

Traits are characteristics of an individual, an animal or a plant, that can be passed on to the next generation. Traits can be physical or behavioral. For example, eye color is a physical trait in people. Flying south for the winter is a behavioral trait of some birds. The size or shape of rice grains are physical traits in rice.

Conference

Now, think about rice. Rice also have many traits. What do rice and human traits have in common? What traits does rice have? Identify two questions about the traits of rice or rice plants. How might you investigate to find answers to your questions?

Update the Project Board

Your class started a *Project Board* to help you keep track of your investigations and questions about how to develop a new rice plant. To prepare for updating the *Project Board*, share the questions your group came up with. Discuss with your class your ideas about how to investigate to find answers to those questions.

You've seen differences in humans, now update the *Project Board*. Record what you think you know about traits and differences among rice plants in the *What do we think we know?* column. Record your questions about rice and rice plants in the *What do we need to investigate?* column



What's the Point?

In this investigation, you looked at differences in traits among students in your class. You are all human beings and have many traits in common. But you also have differences. These differences set you apart from other human beings and make you unique.

Like humans, rice plants also show variations in traits. For the scientists to develop a better plant for the farmers, it will be important to understand how one rice plant differs from another.

