# **STUDENT GUIDE** EXPLORE 1 LESSON 3



Part 1: Our Motivation

Record questions we were trying to figure out that led to this investigation.



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### Part 2: Creating Initial Claims

Make a claim that answers the question, "What organs most help digest milk? How?" Choose between the mouth/esophagus, stomach, small intestine, and large intestine. You can choose one organ or more than one organ.

I think milk is digested in the \_\_\_\_\_. This happens by...

Review the claims the class made. Which claim is most favored by our class currently? Record the reasons that your classmates share to support this claim.

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## Part 3: Obtaining Evidence About What Is in Milk

Using the "Chemistry of Milk" handout, identify the specific types of molecules that are found in milk. Record at least two specific examples for each of the four categories of nutrients in milk.

Category of Nutrient	Examples
Proteins	
Carbohydrates	
Fats	
Vitamins and Minerals	

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## Part 4: Working With Orders of Magnitude

Analyze the Size & Orders of Magnitude tool to compare the relative sizes of the organs, tissues, cells, and molecules represented in the models on the "Enzyme Illustration" handout.

Object	Size (Max)	Scale Difference from Previous Model	Scale Difference from Human Body	Order of Magnitude Difference from Previous Model	Order of Magnitude Difference from Human Body
Gastrointestinal Tract	0.5 m in width	N/A	1	N/A	0

How does using orders of magnitude better help you understand what is shown in the "Enzyme Illustration" models?

Record a summary of what you see in the "Enzyme Illustration" models about how a digestive enzyme breaks down the molecule sucrose.

## Part 5: Obtaining Evidence About How Enzymes Digest Molecules in Milk

At each station, read the text provided to help you gather additional information on the hierarchical function of each organ in the digestive system and how its cells support this function. Then, conduct the investigation described to gather evidence on how enzymes produced by the cells of each digestive organ help to break down the different molecules present in milk.

#### **Station Reading: The Mouth**

Organ	Function of Organ in	Role of Specialized	How Enzymes Break Down
Organ	Digestion	Cells	Molecules in Milk

#### Station Reading: The Stomach

Organ	Function of Organ in Digestion	Role of Specialized Cells	How Enzymes Break Down Molecules in Milk

## Station Reading: The Small Intestine

Organ	Function of Organ in Digestion	Role of Specialized Cells	How Enzymes Break Down Molecules in Milk

Organ	Function of Organ in Digestion	Role of Specialized Cells	How Enzymes Break Down Molecules in Milk

#### Part 6: Defending Claims

Use the evidence you gathered from each station to evaluate the claims that the class made at the start of the lesson.

- Choose two of the claims the class made.
- Record evidence in each column that is relevant to supporting or refuting the claim in the column.
- Explain your reasoning for how the evidence you chose helps you evaluate the claim.
- In the conclusion, decide if the evidence leads you to support, partially support, or refute the claim.

In your evidence and reasoning, be sure to:

- Describe how specialized cells and enzymes contribute to the function of digesting milk.
- Use orders of magnitude to identify the relative sizes of organs, glands, cells, and molecules involved in the digestion process.

Claim A:	Claim B:

Evidence:	Evidence:
Reasoning:	Reasoning:
Conclusion:	Conclusion: