STUDENT GUIDE
EXPLAIN LESSON 5

Food and Agriculture Center for Science Education

Part 1: Our Motivation

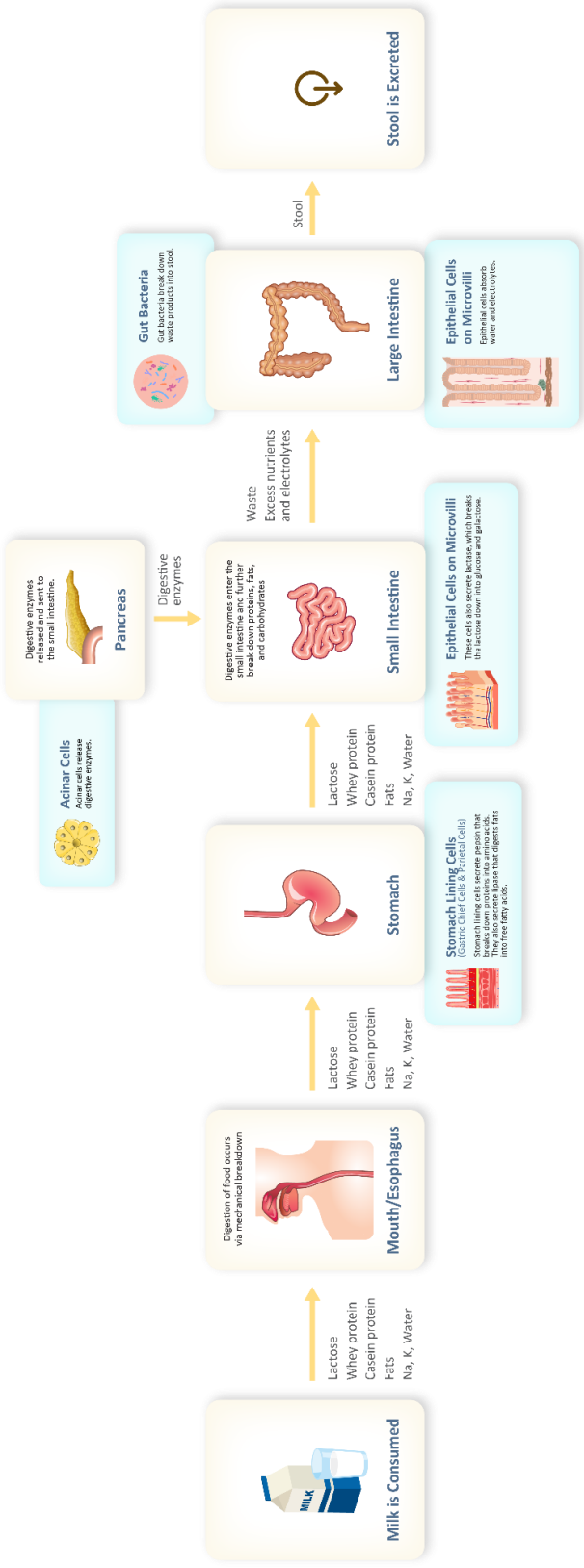
Record what we are now trying to explain about the Module Phenomenon.

We saw how different molecules of milk were broken down in the process of digestion. We have gathered a lot of evidence about how milk is digested, so we will now return to our module phenomenon to try to explain it.

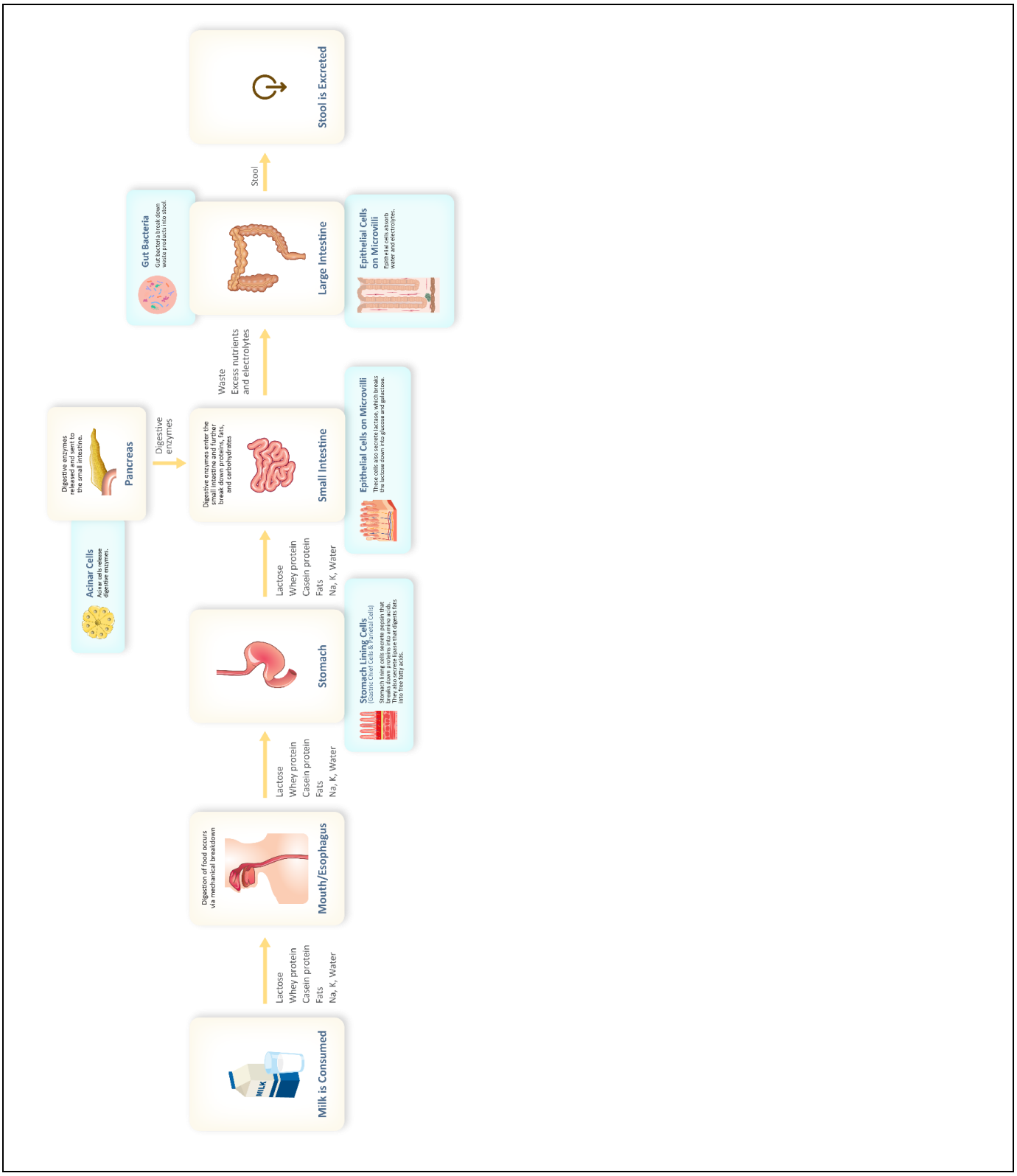
Part 2: Revising a Model of How Milk is Digested

Using the evidence we have gathered, revise the Class Consensus Model from Lesson 2 that answers our Module Question, *How is milk digested after it is consumed?* In your models, be sure to include the following:

- Boxes to show each organ or component of the digestive system. Within each box, describe in one sentence the function of the organ.
- Arrows that show the molecules that move from one organ to another.
- Zoom-ins that show what specialized cells are present in each organ and a short description of the role the cells and their enzymes play in digestion.
- An indication of the size (e.g., in, m, cm, mm, um, or nm) of the organs and cells shown in the model.


Milk is Consumed
Lactose
Whey protein
Casein protein
Fats
Na, K, Water
Mouth/Esophagus
Digestion of food occurs via mechanical breakdown
Lactose
Whey protein
Casein protein
Fats
Na, K, Water
Stomach
Stomach Lining Cells
(Gastric Chief Cells & Parietal Cells)
Stomach lining cells secrete pepsin that breaks down proteins into amino acids. They also secrete lipase that digests fats into free fatty acids.
Lactose
Whey protein
Casein protein
Fats
Na, K, Water
Small Intestine
Epithelial Cells on Microvilli
These cells also secrete lactase, which breaks the lactose down into glucose and galactose.
Digestive enzymes enter the small intestine and further break down proteins, fats, and carbohydrates
Digestive enzymes
Pancreas
Digestive enzymes released and sent to the small intestine.
Acinar Cells
Acinar cells release digestive enzymes.
Waste
Excess nutrients and electrolytes
Large Intestine
Epithelial Cells on Microvilli
Epithelial cells absorb water and electrolytes.
Gut Bacteria
Gut bacteria break down waste products into stool.
Stool
Stool is Excreted

Be ready to share features of your model to help the class construct a consensus model. Record the Class Consensus Model in the space below.



Part 3: Asking New Questions

Record any new questions that you have that might help you:

- Find additional information about how milk is digested after it is consumed.
- "Fill in a gap" in your model or our class model.
- Settle an area of disagreement that we've identified in our models.

- How are fatty acids, amino acids, and sugars used by the body after they are absorbed into the bloodstream?
- How do fatty acids, amino acids, and sugars help in recovery?
- Do fatty acids, amino acids, and sugars help in recovery in different ways?
- What happens to the body when exercising?