

## Got Milk?

### DNA, Enzymes, and Lactose Intolerance

What is lactose intolerance, and how does it relate to human evolution? Students remove lactose from milk by creating sodium alginate beads containing the enzyme lactase. Through this hands-on experience, they:

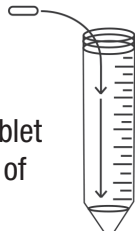
- Explore the structure and function of DNA
- Make connections between genes, proteins, and enzymes
- Explore the mechanism and evolution of lactose intolerance in humans

### Safety


Use established laboratory safety practices, including wearing appropriate personal protective equipment (PPE), at all times.

### Procedure

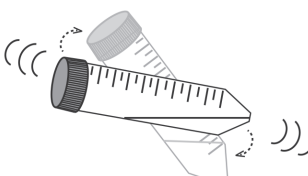
**1** Dissolve lactase tablet in 2.5 mL of water.



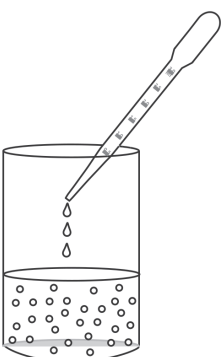
**2** Combine 2.5 mL lactase with 15 mL sodium alginate.



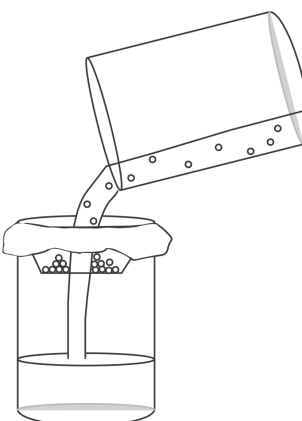
**3** Mix.



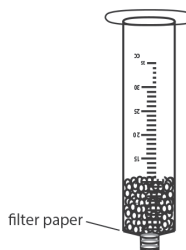
**4** Add sodium alginate to calcium chloride.



**5** Separate beads from calcium chloride.



**6** Put filter paper in place. Pack beads into syringe.



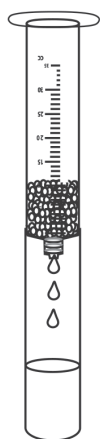
### Materials

Milk  
Glucose Test Strips  
Sodium Alginate Solution  
Syringe, 30 mL  
Lactase Tablets  
Coffee Filter  
Disposable Pipettes  
Calcium Chloride

*(continued on back)*

7

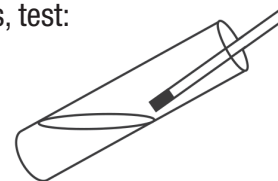
Pour 10 mL milk into syringe with beads.



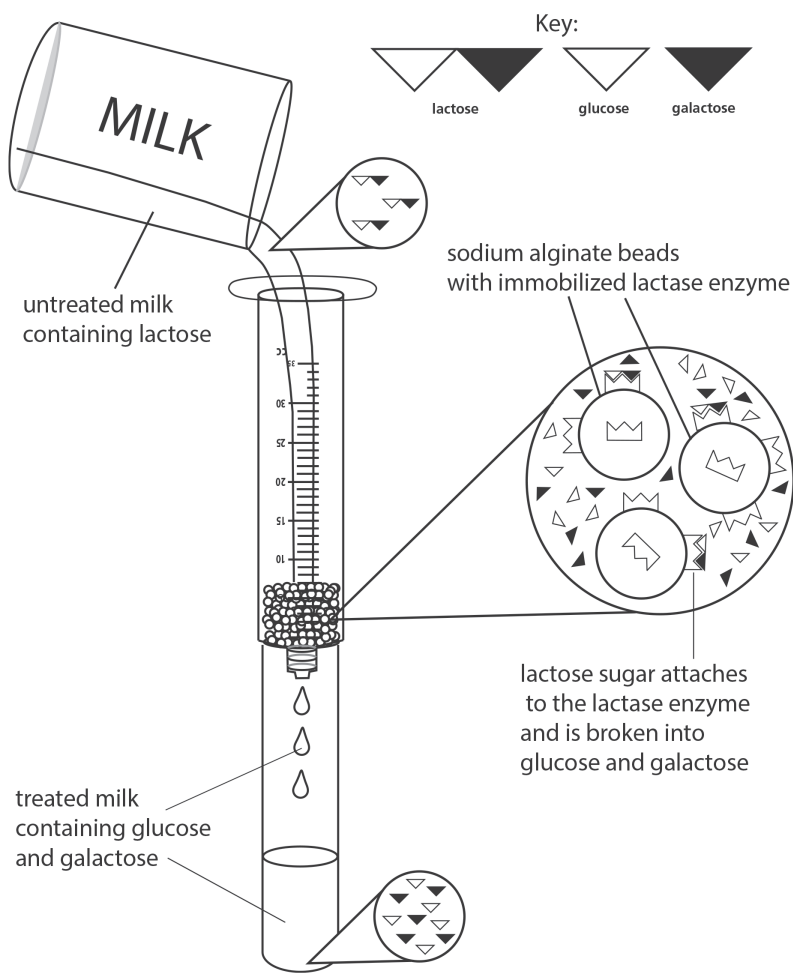
8

Using glucose test strips, test:

- Untreated milk
- Treated milk
- Water
- Glucose control solution



## What Happens in the Column?



### DNALC Making Lactose-Free Milk Kit (Item #211337)

- Designed for 8 groups of 2–4 students
- Can be completed in a 50-minute class period
- Includes 1-year access to digital resources

