

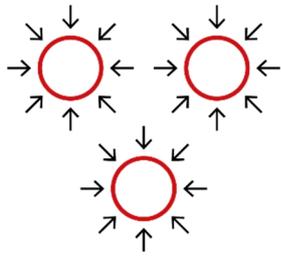
## Mechanical and chemical transformation

### MECHANICAL AND CHEMICAL TRANSFORMATION OF FOOD

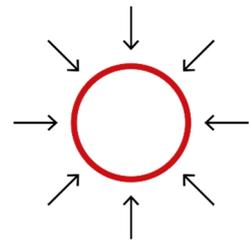
Back to the pebbles...

How can these pebbles get through the holes in the tube? The most obvious solution is to break them up into smaller pieces. This is the **mechanical solution**. However, there is a second option, a **chemical solution**. This involves dissolving the pebbles with something like acid. For this to work, the pebbles must be relatively small. Why? Because the acid needs a large surface to attack.

The acid cannot easily attack a **large particle**.



However, it will be much more effective on several **small particles**. So, in the end, both approaches are needed and it is optimal to use both mechanical and chemical digestion.



Teeth, for example, participate in the mechanical transformation of food, and the stomach's gastric juices contribute to the chemical transformation. For the chemical transformation to be more effective, teeth must do their part **BEFORE** the gastric juices come into play.

In DIGESTIX, both mechanical and chemical transformations are illustrated.

## Mechanical and chemical transformation

---

Which processes do not take place during digestion?

- Manual
- Chemical
- Mechanical

---

Mechanical transformation reduces the size of food into small particles.

- False
- True

---

Chemical transformation always takes place before mechanical transformation.

- False
- True

---

How do teeth transform food?

- Chemically
- Mechanically
- Biologically

---

How does saliva transform food?

- Mechanically
- Chemically
- Both mechanically and chemically

---

What type of transformation takes place in the stomach?

- Chemical
- Mechanical
- Chemical and mechanical

---

Lipids are transformed...

- mechanically
- chemically
- both mechanically and chemically

---

Proteins are transformed...

- mechanically
- chemically
- both mechanically and chemically

---

Carbohydrates are transformed...

- mechanically
- chemically
- both mechanically and chemically

---

What type of transformation takes place in the colon?

- Chemical
- Mechanical
- Both chemical and mechanical

## Answers

---

Which processes do not take place during digestion?

- Manual**  
*Well done! That's correct!*
- Chemical**  
*Wrong! Digestion does include chemical processes.*
- Mechanical**  
*Wrong! Digestion does include mechanical processes.*

---

Mechanical transformation reduces the size of food into small particles.

- False**  
*Wrong! That's not the right answer.*
- True**  
*Well done! That's correct!*

---

Chemical transformation always takes place before mechanical transformation.

- False**  
*Well done! Mechanical transformation takes place before chemical transformation. This ensures it is more effective.*
- True**  
*Wrong! That's not the right answer.*

---

How do teeth transform food?

- Chemically**  
*Wrong! Try again!*
- Mechanically**  
*Well done! Teeth transform food mechanically, by tearing it apart, cutting it up and grinding it.*
- Biologically**  
*Wrong! That's not the right answer.*

---

How does saliva transform food?

- Mechanically**  
*Wrong! That's not the right answer.*
- Chemically**  
*Well done! Saliva moistens food and, as saliva contains enzymes, it triggers the chemical digestion process.*
- Both mechanically and chemically**  
*Wrong! Nice try, though!*

---

What type of transformation takes place in the stomach?

- Chemical**  
*Wrong! That's only part of the answer.*
- Mechanical**  
*Wrong! That's only part of the answer.*
- Chemical and mechanical**  
*Well done! Your stomach transforms food mechanically by contracting to reduce the size of food; your gastric juices transform food chemically.*

---

Lipids are transformed...

- mechanically**  
*Wrong! Try again!*
- chemically**  
*Well done! Enzymes break down lipids.*
- both mechanically and chemically**  
*Wrong! That's not the right answer.*

---

Proteins are transformed...

- mechanically**  
*Wrong! Try again!*
- chemically**  
*Well done! Enzymes break down proteins.*
- both mechanically and chemically**  
*Wrong! That's not the right answer.*

---

Carbohydrates are transformed...

- mechanically**  
*Wrong! Try again!*
- chemically**  
*Well done! Enzymes break down carbohydrates.*
- both mechanically and chemically**  
*Wrong! That's not the right answer.*

---

What type of transformation takes place in the colon?

- Chemical**  
*Well done! Fibre is fermented in your colon.*
- Mechanical**  
*Wrong! That's not the right answer.*
- Both chemical and mechanical**  
*Wrong! Try again!*

## Bread

---

*[8-10 years old and 11-13 years old]*

Instructions:

Take a piece of white bread and chew it for three minutes without swallowing it.  
Has the taste of the bread changed?

Explanation:

The longer we chew the bread, the sweeter the taste becomes. Why? Because saliva contains enzymes that start the digestive process by breaking down the starch in the bread. When starch is broken down, this releases the sugars in it. We can then discern a sweet taste.