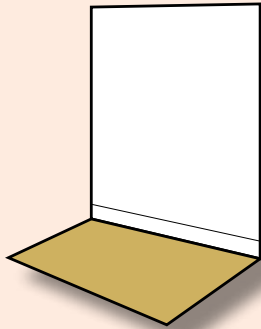




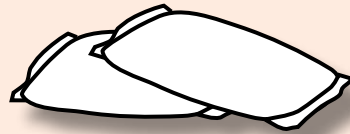
## Upside-Down Food Science

### Find What You Need...

- A wall to lean against
- Pillows
- Sample food that's easy to swallow
- A cup of juice with a straw



A wall



Pillows



Apple Sauce



Juice

### How can astronauts swallow in zero gravity?

John Glenn was the first American astronaut to eat in space. He ate a tube of applesauce. Yummy! Before that, scientists were worried that astronauts would not be able to swallow in space. How could the food go down in zero gravity when everything else was floating up? You're going to find out if it's possible to swallow in zero gravity. But how can you test what happens in zero gravity? You'll do this by standing on your head! When you stand on your head, your mouth will be below your stomach so your food will have to travel up – against gravity. Make a guess – what do you think will happen to your food? Will your lunch defeat gravity? What do you think is going on?

### Space Fact:

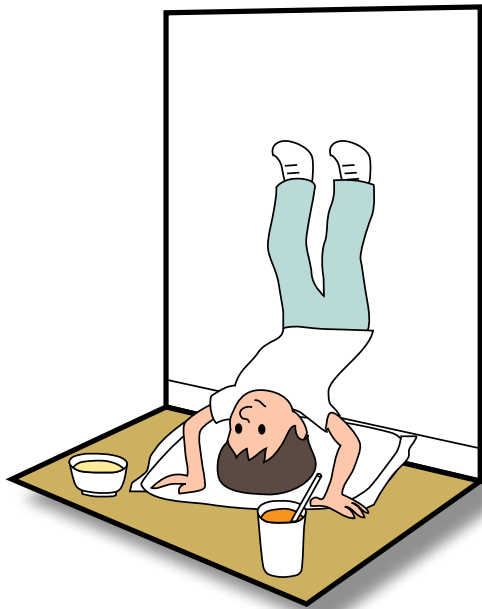
In your digestive system, there are muscles which push your food from your mouth to your stomach. This wavelike motion of your muscles as they contract and relax is called peristalsis. It takes about 3 seconds for food to be pushed into your stomach once you chew and swallow it.

## Activity Instructions

1. First select a food that you want to sample. Be sure to use an easy-to-swallow food. You can even try apple sauce, just like John Glenn.



2. Ask an adult to supervise you. They can even help hold up your legs.
3. Find a wall to lean against and spread out some pillows to rest your head and shoulders on.
4. Now, get into a headstand in whatever way you can. It's okay to lean against the wall. There you go—how does the world look up-side-down?



5. Once you are in a comfortable headstand, take a bite of your food sample. Chew and swallow. What happens? Does the food stay in your mouth or does it go “down” to your stomach?

## Conclusions

You should have noticed that the food did go from your mouth to your stomach, even while you were standing up-side-down. Your esophagus (e-sof-u-gus) is a tube that goes between your throat and your stomach. It is made up of strong muscles. When you eat, these muscles push your food down into your stomach. When John Glenn took his first bite of food in zero gravity, the muscles in his esophagus pushed the apple sauce down into his stomach. It was one small bite for a man, and one giant bite for mankind.

### Space Fact:

You use fifty  
different muscles every  
time you swallow!”