

		
<p style="text-align: center;">VRIJE ASO.SCHOOL</p>		
<h2 style="text-align: center;">See you in space</h2>		
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SCHOOL / CLASS:	MARKS:        /...	
<h3 style="text-align: center;">EXPERIMENT: BIOLOGY – skeleton</h3>		

#### RESEARCH QUESTION

Astronauts are more likely to develop osteoporosis than others. Why?

Because they are sometimes in space. When they come back their bones have to adapt.

#### HYPOTHESIS (Indicate the correct answer.)

The bones adapt to the amount of weight they have to carry. In space, because of the lack of gravity, the weight they have to carry is negligible. The bone mass *increases* (=toenemen)/**decreases** (=afnemen). This is called osteoporosis.

Astronauts lose an average of more than 1% bone mass per month spent in space.

When astronauts arrive back on earth it takes a while for the bones to recuperate. During that time the bones are *less*/**more** likely to break. Sometimes the loss of bone mass is irreversible.

#### OPERATION OF THE EXPERIMENT

- 1 Two chicken legs, one "normal" and one macerated overnight in diluted hydrochloric acid.  
Try to break both.
- 2 Two equal pieces of cardboard, one "normal" and one perforated with tiny holes.  
Try to rip both.

## THE RESULTS / OBSERVATIONS

Experiment 1

The "normal" chicken leg is more difficult to break than the other leg. That has overnight in diluted hydrochloric acid.

Experiment 2

The normal piece of cardboard is more difficult to rip than the perforated one.

## CONCLUSION

Watch the following clips:

<https://www.youtube.com/watch?v=nHbj7kqYoVk>  
<https://www.youtube.com/watch?v=NMZDhJiKw3k>

Combine this information with the results of the experiment.

Astronauts are more likely to develop osteoporosis than others. Why?

The bone mass decreases in space faster than on earth. Because of the lack of gravity, the weight they have to carry is negligible. Because in space their bone mass changes. If you are in space and you come back from space and their bones have to change again so the bones are more flexible and it's not as tight as normal bone because of the change from space-earth.

## REFLECTION

Did you expect this answer?

No, we thought that the bone mass wouldn't change in space. Because we thought that bones couldn't change if you are grown-up.

Compare your results with the results in the other school. Did you make the same conclusion?

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