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| <h2>Mars, here we come ...</h2> | | |
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| EXPERIMENT: BIOLOGY – skeleton | | |

RESEARCH QUESTION

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

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

A bone soaked in acid breaks much easier than the normal bone.

Experiment 2

The cardboard with holes rips much easier than the cardboard without holes.

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?

Bone is a living tissue, the bones in our body are continually renewed by the activity of bone cells. When the bones don't burden e.g. During a stay in the space under weightlessness, the bone mass is increases dramatically by the fact that there osteoporosis. There is then less bone tissue so they are more fragile and break a lot easier. (The paper with holes has less ' tissue ' so it easily rips. The same when the bone is soaked in acid because calcium dissolves in acid.)

REFLECTION

Did you expect this answer?

Yes, because if you don't use your bones adequately as in space they weaken, and they are therefore more fragile. This is the same for people who have been in a wheelchair for a long time.

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

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