Mission

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YOUR BODY IN SPACE

Space has tremendous effects on the human body! As we prepare for journeys to make more distant destinations like Mars, humankind must take these risks to ensure safe travel for our modern explorers. The impact of microgravity mirror aging and the complications of a sedentary lifestyle. By studying astronauts' health, we also help people on Earth. (Credit: Canadian Space Agency)

EXPERIMENT:

Use books and sponges to represent a human spine and understand why astronauts grow taller in space, where gravity is much weaker.

You will need:

- 4 large books (to represent vertebrae)
- 3 large flexible sponges (to represent the spongy tissue)
- 1 large rubber band or 1 rope (to represent gravity)
- Measuring tape

Stack books and sponges alternately to represent a human spine.

EXPERIMENT

YOUR BODY IN SPACE

THINK ABOUT IT:

Why are astronauts TALLER in space?

How to see the effect gravity has on your spine:

1. Stack the books and sponges alternately.
2. Press down on the stack of books and sponges to compress it.
3. Stretch the rubber band (or tighten the rope) around the stack to hold it in that position.
4. Measure the height of the stack.
5. Remove the rubber band (or the rope) while keeping the stack upright.
6. Once again, measure the height of the stack.
7. You will notice that the stack measures more without the rubber band (or the rope).

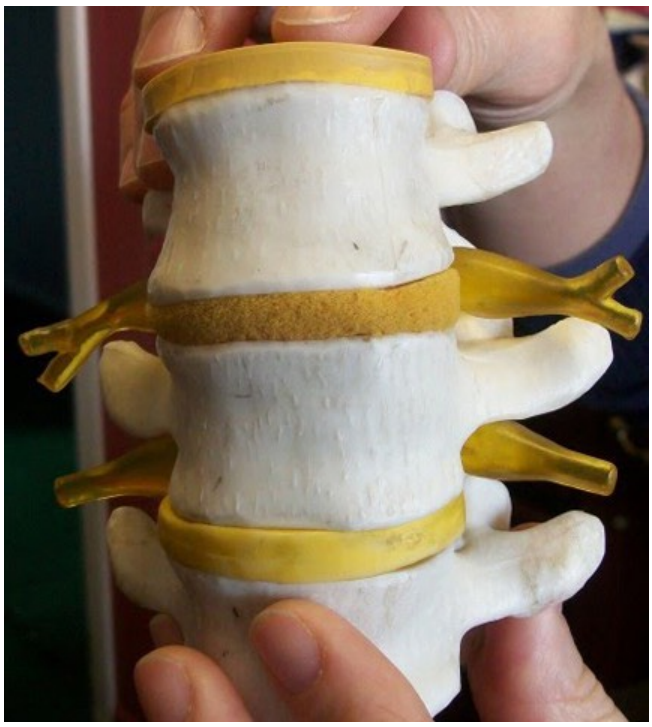
Height of book stack with NO compression: _____cm

Height of book stack while compressed: _____cm

What it means:

In this exercise, the books represent your vertebrae, the sponges represent the spongy tissue between your vertebrae, and the combination of the two represents your spine. The rubber band (or tightened rope) represents the force of gravity.

As you have seen, the force of gravity compresses the discs in the spinal column. When that force disappears, our spine stretches and we grow taller. That is why astronauts become taller when they are in space, where gravity is much weaker than on Earth.



Model represents segments of a human spinal cord.

Source:
http://www.asc-csa.gc.ca/eng/activities/fun-experiments/astronauts-taller-in-space.asp

HOW DOES SPACE AFFECT THE HUMAN BODY?

Space has tremendous effects on the human body! As we prepare for journeys to more distant destinations like Mars, humankind must tackle these risks to ensure safe travel for our modern explorers.

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BRAIN

Astronauts' sense of perception and orientation can become confused. They sometimes misinterpret the direction and speed of their movements. Some even experience "space sickness."

HEART & BLOOD VESSELS

Blood vessels stiffen and age faster, and astronauts can develop insulin resistance, which may lead to Type 2 diabetes. These factors increase the risk of cardiovascular disease.

MUSCLES & NERVOUS SYSTEM

Muscles lose mass and strength. Reflexes slow down and exercise tends to be less effective in space.

BONES

When they don't bear weight, bones lose density and strength. While adults past age 50 typically lose about 1% each year, astronauts in space can lose up to 1.5% of their bone mass each month.

BLOOD

Blood cell production in the bone marrow is affected. Reduced red blood cells can cause anemia. Low white blood cell count leaves the body vulnerable to infection and is also linked with increased sensitivity to radiation.

RADIATION

Radiation doses are much higher. Overexposure can cause cataracts in the eyes, damage DNA, and increase the risk of cancer.

Canadian Space Agency | Agence spatiale canadienne

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