



# THE STORY BEHIND OUR GAME

# ASTRO-SHAPE

LEARNING ABOUT MICROGRAVITY AND  
ASTRONAUT HEALTH

NULL-POINTER TEAM





# What is Microgravity?

- Microgravity is an environment where astronauts appear to float because they are in a state of free fall.
- Although there is some gravity in low Earth orbit, it is not enough to create the same sensation as on Earth.
- The effects of microgravity on the human body are profound and impact:
  - The muscular system
  - The skeletal system
  - The cardiovascular system

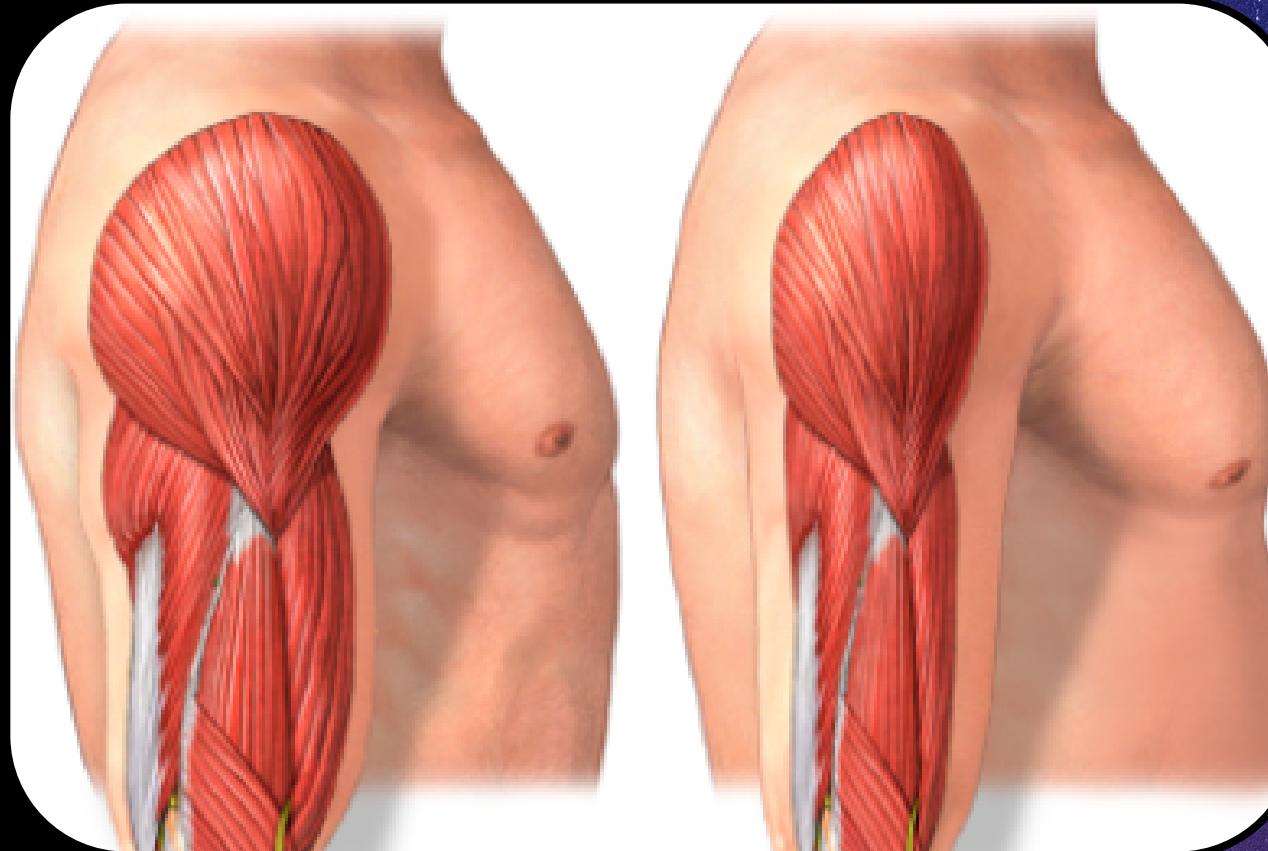
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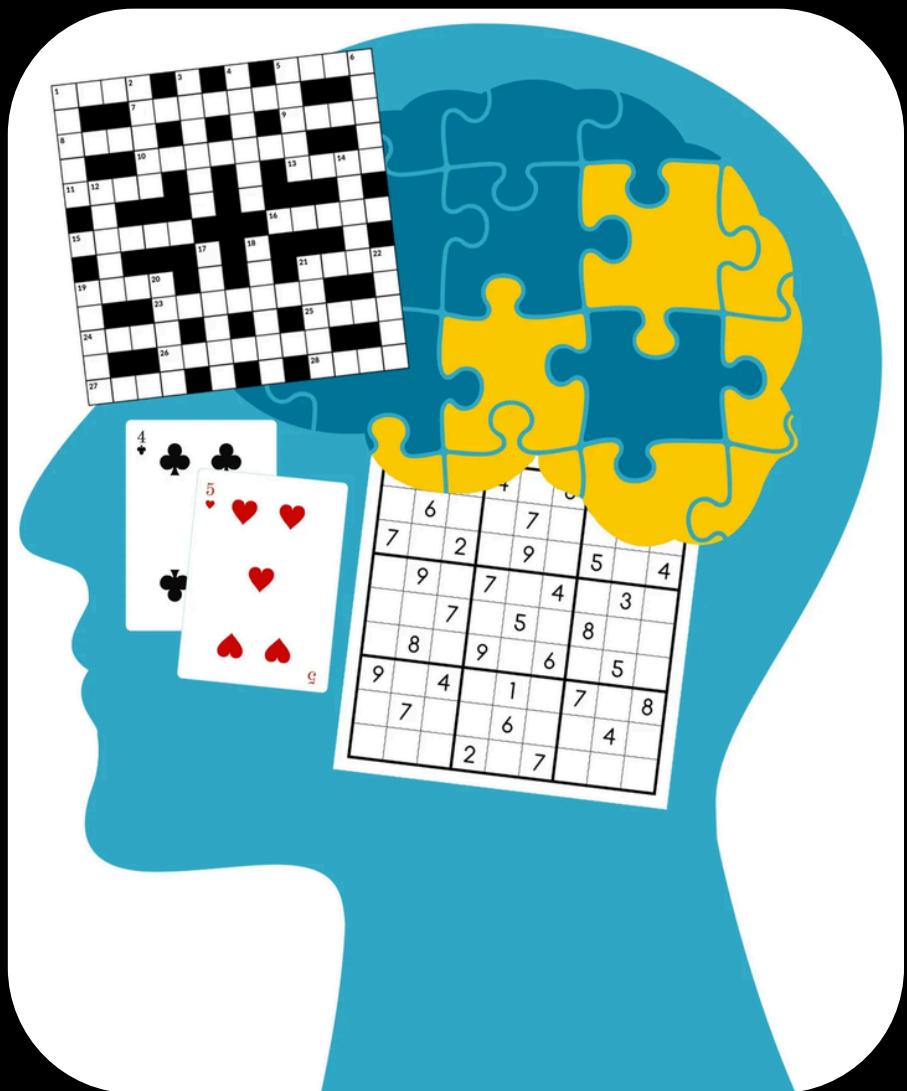
# Physical Impacts on the Body

**Muscle and Bone Loss:** Astronauts lose muscle and bone mass quickly if they do not exercise regularly.

**Sensorimotor Alterations:** Disorientation, dizziness, and difficulties adapting to changes in gravity.

- **Cardiovascular Health:** Arterial stiffness increases in space, which can lead to heart problems.





# Mental and Cognitive Health in Long Missions

- **Fluid Accumulation:** Fluids that accumulate in the head can affect cognitive ability.
- **Brain Structure Changes:** Changes in brain structure and spatial perception can impact astronauts' operational capabilities.
- **Prolonged Confinement:** Extended confinement and lack of stimuli in the space environment can lead to mental health issues such as stress and fatigue.



# CIPHER: Exploring Space with Science

CIPHER aims to understand how the human body responds to space, ensuring that astronauts maintain their health and well-being during future missions.

## KEY OBJECTIVES

- **Physiological Health:** Analyze the loss of bone and muscle density in microgravity.
- **Brain and Behavior:** Study changes in brain structure and cognitive abilities.
- **Cardiovascular Health:** Evaluate the effects of microgravity on the cardiovascular system.
- **Physical Exercise:** Determine how exercise mitigates the loss of muscle and bone mass.



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## Exercise as a Vital Necessity

- To prevent the loss of muscle and bone mass, astronauts must engage in at least 2 hours of exercise each day.
- Exercise is not only physical but also helps maintain mental stability.



# Innovative Solutions



Missions like Artemis require new technologies that mitigate the effects of microgravity.

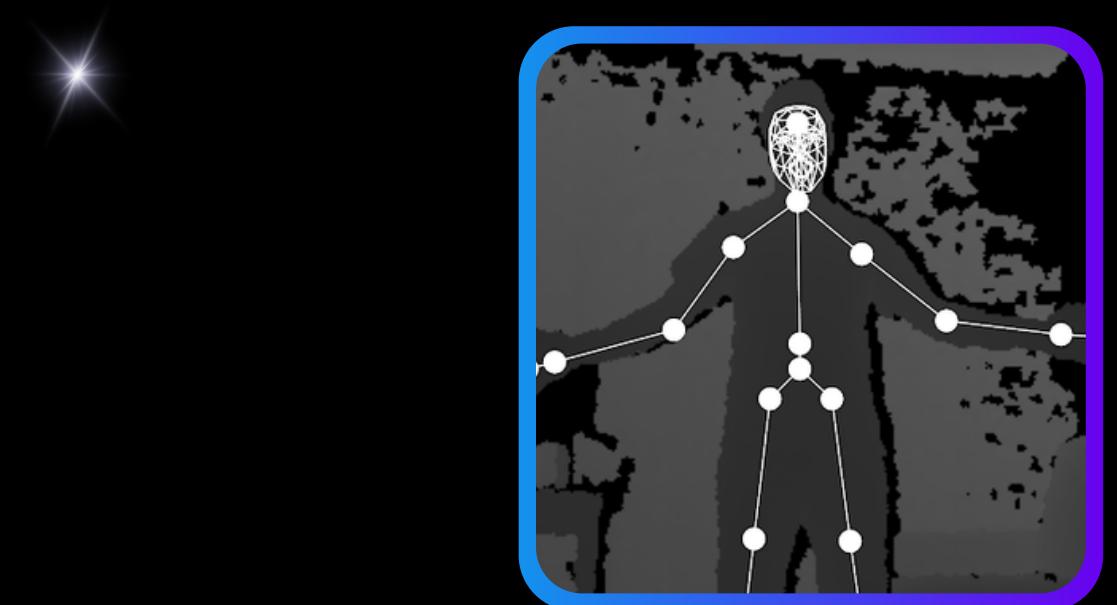


Research in microgravity helps to better understand how to keep astronauts healthy both physically and mentally during long missions.



Games that combine physical exercise with cognitive stimulation, like our pose estimation project, ASTRO-SHAPE, could be an innovative solution to this challenge.

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# References

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