

FIRST Lego League 2018 Challenge Space Resources

Travel: 3D printing, life support systems (water and energy), spacecraft, disposal and recycling

Space Travel - https://www.nasa.gov/topics/technology/space-travel/index.html

Deep Space Habitat - https://www.nasa.gov/deep-space-habitation/overview

What is Microgravity? - https://www.nasa.gov/centers/glenn/shuttlestation/station/microgex.html

Microgravity - https://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-microgravity-58.html

Life support systems - https://www.nasa.gov/content/life-support-systems

Life support systems background information -

http://tomatosphere.letstalkscience.ca/Resources/library/ArticleId/4751/life-support-in-space-closed-systems.aspx

Trash - https://www.nasa.gov/feature/nasa-seeks-new-ways-to-handle-trash-for-deep-space-missions

Recycling - https://www.nasa.gov/audience/foreducators/k-4/features/F_Recycling_for_Moon.html

Repurposing Space Station Trash for Power - <u>https://www.nasa.gov/content/repurposing-space-station-trash-for-power-and-water/</u>

Temperature on the ISS - https://science.nasa.gov/science-news/science-at-nasa/2001/ast21mar_1

NASA Space Tech - https://www.nasa.gov/topics/technology/manufacturing-materials-3d/index.html

3-D Printing in Zero-G - https://www.nasa.gov/mission_pages/station/research/experiments/1115.html

3-D Printer on ISS - https://www.nasa.gov/mission_pages/station/research/news/3D in_space

3-D Printer creates first object on ISS - <u>https://www.nasa.gov/content/open-for-business-3-d-printer-creates-first-object-in-space-on-international-space-station</u>

3-D printed rocket part - <u>https://www.nasa.gov/exploration/systems/sls/nasa-tests-3-d-printed-rocket-part-to-reduce-future-sls-engine-costs</u>

Social: isolation, confinement, communication to Earth

Journals on the ISS - https://www.nasa.gov/mission_pages/station/research/experiments/991.html

Behavioral Health - https://www.nasa.gov/content/behavioral-health

Emotions - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4850672/

Simulating Confinement - https://www.nasa.gov/analogs/hera

Long duration psychology - https://history.nasa.gov/SP-4225/long-duration/long.htm

Isolation - <u>https://www.nasa.gov/feature/conquering-the-challenge-of-isolation-in-space-nasa-s-human-research-program-director</u>

Isolation - https://www.nasa.gov/feature/hi-seas-team-completes-8-month-isolation-mission

Physical: food, exercise, radiation

Human Research Program - https://www.nasa.gov/hrp

Eating in Space - https://www.nasa.gov/audience/foreducators/stem-on-station/ditl eating

ISS: Vegetable Production System (Veggie) -

https://www.nasa.gov/mission_pages/station/research/experiments/383.html

Space Garden - https://www.nasa.gov/feature/how-does-your-space-garden-grow

Exercising in Space - https://www.nasa.gov/audience/foreducators/stem-on-station/ditl exercising

Space Radiation - https://www.nasa.gov/analogs/nsrl/why-space-radiation-matters

Body in Space - https://www.smithsonianmag.com/science-nature/what-happens-human-body-space-180958259/

Bone loss - https://www.nasa.gov/mission_pages/station/research/benefits/bone_loss.html

Breathing - https://science.nasa.gov/science-news/science-at-nasa/2000/ast13nov_1

Sickness - https://www.nasa.gov/audience/forstudents/k-4/home/F Sick Astronauts.html

Sickness -

https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/What_do_Astronauts_do_if_They_Get_Sick.ht ml

Comprehensive resources: on two or more of the topics above

NASA's Eyes: Experience Earth and Our Solar System, the universe and the spacecraft exploring them - <u>https://eyes.nasa.gov/</u>

International Space Station Virtual Tour (360 VR) - https://www.youtube.com/watch?v=Lgy_SmVFi78

Living in Space - http://www.esa.int/Our_Activities/Human_Spaceflight/Astronauts/Living_in_space

Human Research Program - https://www.nasa.gov/1ym

Body in space - https://www.nasa.gov/hrp/bodyinspace

Physical and Emotional Survival - https://www.nasa.gov/analogs

Hazards of Spaceflight - https://www.nasa.gov/feature/5-hazards-of-human-spaceflight

Spacesuits - https://www.nasa.gov/audience/foreducators/spacesuits/facts/index.html

Spacesuits - https://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-a-spacesuit-58.html