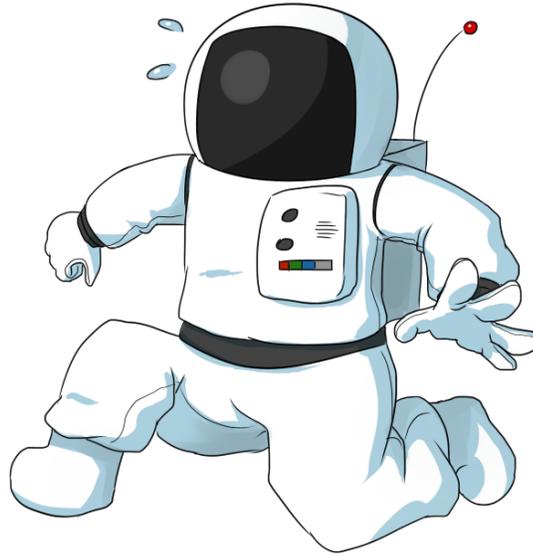


SLIDES 4-6

6. LIFE IN SPACE - read the websites and watch the videos. On the astronaut below, draw & label items and events to represent the different factors that will impact people on extended voyages in space.



7. How DO YOU THINK these factors would impact the body's ability to maintain homeostasis? Choose one specific example and offer a prediction about how an astronaut's body could be impacted by their time in space.

8. How could you test your prediction? Explain how scientists could design an experiment to test your hypothesis. Use a sketch to help describe the process.

SLIDE 7

9. Read about the NASA ONE YEAR MISSION (<https://www.nasa.gov/1ym/about>) and the NASA TWINS STUDY <https://www.nasa.gov/twins-study>. Explain how scientists actually tested the impact of space flight on the human body.

10. Compare your answer to #5 with NASA's work in #6. How accurate were you in your own experimental design? Is the Twins Study a better plan? How? In what ways would your idea be better?

SLIDE 8

THE RESULTS

11. The image on the right and on the Nearpod represents the mission patch for the Twins Study. Carefully examine the many images it contains. Explain how it represents the nature of the mission.

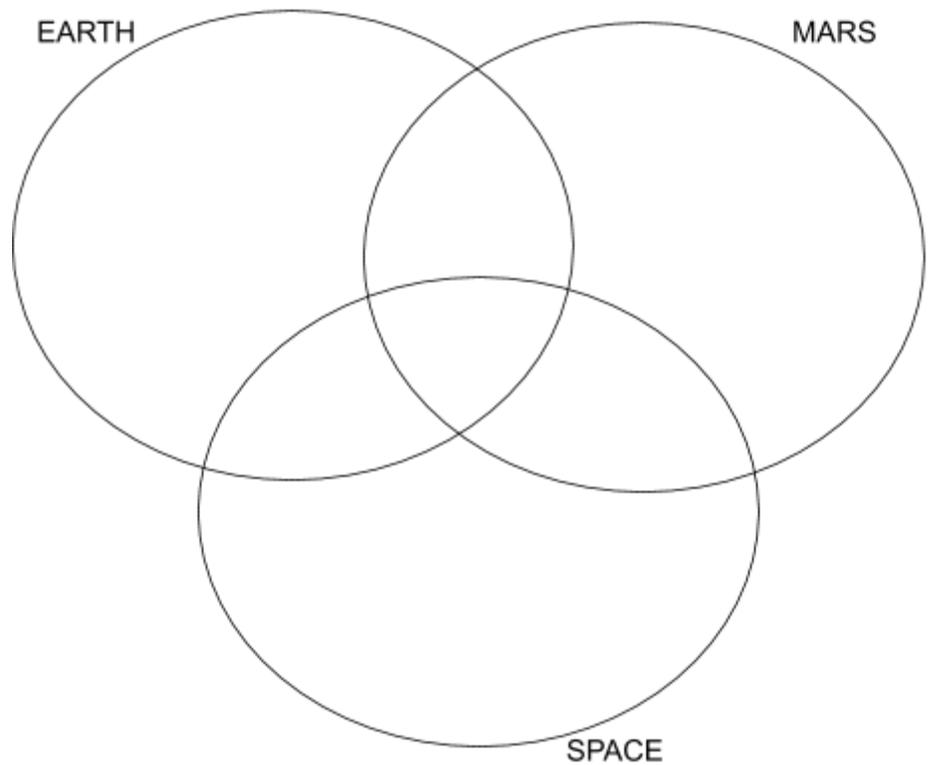


12. Summarize the major findings of the Twins Study as they pertain to astronaut survival on longer space flights. Include references to the basic LIFE PROCESSES.

13. Read “Mars: Inside the High-Risk, High-Stakes Race to the Red Planet” from *National Geographic*, then answer these questions in the space below.

- Sketch a possible flight plan for a mission to Mars and explain why the voyage will take so long.

- Complete the Venn Diagram based on living on Earth, Mars and in Space.



- Would you want to go to Mars? Why or why not?

14. Explain how the results of the TWINS STUDY will help NASA plan for future extended trips to the Moon and Mars.

PROJECT: MISSION TO MARS

Based on the findings we have outlined here, design a MISSION TO MARS that will lessen the impacts of Space Travel on the Human Body. Your Mission needs the following:

- LENGTH OF MISSION
- SPACE CRAFT
- BASIC PLAN
- HOUSING ON MARS
- SPECIFIC WAYS LIFE PROCESSES WILL BE MET AND DANGERS OF SPACE TRAVEL WILL BE ADDRESSED -INCLUDE VALUES ESTIMATING THE IMPACT BASED ON THE RESULTS OF THE TWINS STUDY (For Example - amount of radiation received, etc)

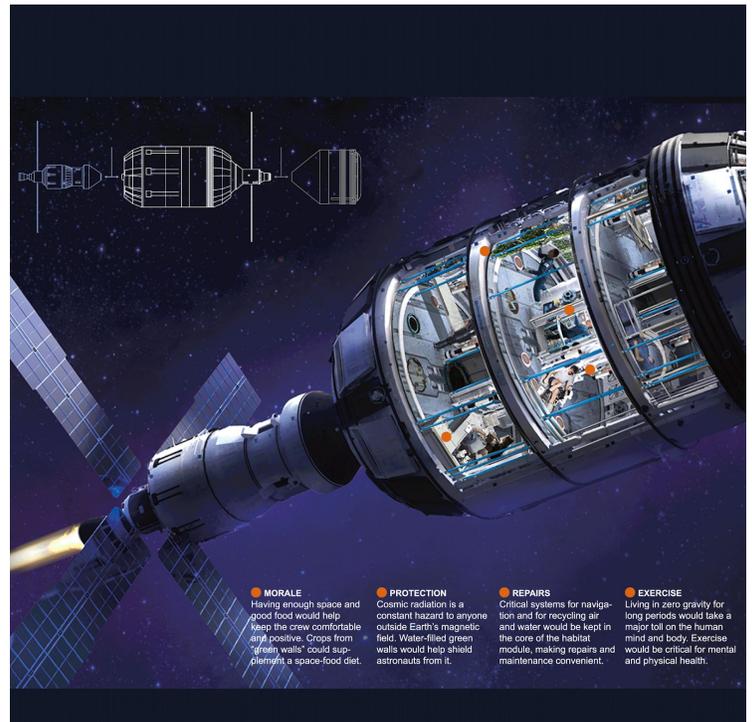
**NOTE ANY SPECIAL CONSIDERATIONS YOU IMPLEMENTED BASED ON THE TWINS STUDY

Each of the may be addressed in a paragraph narrative, or a visual diagram with added written information.

Your group may produce a poster, a slide show or another presentation method of your choosing.

<https://www.nationalgeographic.com/magazine/2016/11/spacex-elon-musk-exploring-mars-planets-space-science/>

JASON TREAT, NGM STAFF; TONY SCHICK. ART: STEPHAN MARTINIÈRE
SOURCES: JAMES B. GARVIN, NASA GODDARD SPACE FLIGHT CENTER; JASON C. CRUSAN, NASA HUMAN EXPLORATION AND OPERATIONS MISSION DIRECTORATE; BRET G. DRAKE, THE AEROSPACE CORPORATION; MARIA BANKS, PLANETARY SCIENCE INSTITUTE



MISSION TO MARS RUBRIC

<https://www.digitaltrends.com/cool-tech/future-mars-missions/2/>

	4 pt	3pt	2pt	0
MISSION LENGTH & BASIC PLAN (x4) 16pts max	Describes -Length of mission -Basic outline of time spent in space vs on Mars (what will the astronauts be doing?) -How long exposed to space radiation vs Mars radiation -Factors return trip	Describes -Length of mission -Basic outline of time spent in space vs on Mars (what will the astronauts be doing?) -Factors return trip	Describes -Length of mission -Basic outline of time spent in space vs on Mars	Does not meet requirements for 2pt
SPACE CRAFT DESIGN + HOUSING ON MARS (x5) 20pts max	Includes -Basic model or drawing produced -Details provided about general layout -special features are explained	Includes -Basic model or drawing produced -Details provided about general layout	Includes -Basic model or drawing produced	
LIFE PROCESSES & DANGERS OF SPACE TRAVEL (x6) 24pts max	Provides details explaining how astronauts needs will be met in space and on Mars in regards to -Nutrition -Excretion -Respiration -Radiation -Lack of gravity ALSO -Exercise -Psychological considerations -Recreation AND explains how the TWINS STUDY influences your choices	Provides details explaining how astronauts needs will be met in space and on Mars for -Nutrition -Excretion -Respiration -Radiation AND explains how the TWINS STUDY influences your choices	Provides details explaining how astronauts needs will be met in space and on Mars for -Nutrition -Excretion -Respiration -Radiation	
Profession- Alism (x2) 8pts max	<ul style="list-style-type: none"> Minimal spelling errors (<3) Work is organized Names included Layout & presentation indicates advanced 	<ul style="list-style-type: none"> Some spelling errors (3-10) Work is mostly organized Names included Layout & presentation indicates advanced 	<ul style="list-style-type: none"> Many spelling errors (10-20) Work is somewhat organized Names included Layout & presentation 	

	planning	planning	indicates little planning	
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