



Space Station Systems Design WebQuest

Background:

You are a member of a NASA space station design team. Your job is to design a space station for a crew of six people to live and work on. A space station is a closed environmental system modeled after the Earth. Its life support systems are based on those of Earth. Everything necessary to support life must be included, monitored, and maintained or the crew may not survive. A lot of planning will need to happen if this environment is to be safe and healthy for its human occupants.

Task:

Your task is to research and design a space station environment in which humans can live and work. You will need to determine what types of life support systems will need to be included. The systems you design need to be interrelated; they need to be able to work together. Humans can only survive in environments where their basic needs are met.

Resources:

<http://www.msfc.nasa.gov/NEWMsFC/eclss.html>

http://science.nasa.gov/headlines/y2001/ast13nov_1.htm

<http://spaceflight.nasa.gov/gallery/vtour>

<http://www.iaaa.org>

Procedure:

1. Your team needs to decide what basic needs must be met in order for humans to survive on a space station. For example, all humans need water. How much water is needed for a crew of 6 people? How will the water be stored? How will microgravity conditions affect the water storage and dispersal? Can water be recycled in space?
2. What types of systems (e.g., electrical, food processing, air filtration) are necessary to support the health and safety of the crew?
3. Keep in mind the following factors for your design:
 - a. Microgravity
 - b. Heat/cold when the space station is in the sunlight or in the shade
 - c. Living in a confined space
 - d. Keeping the weight of the system as light as possible
 - e. Reasonable costs
 - f. Simplicity of design

4. Be sure to include a laboratory for research and experimentation.
5. Use the *Steps of the Engineering Design Process* to draw a floor plan showing the locations of the various systems onboard the space station.

Learning Advice:

The health and safety of the crew are the primary responsibilities of the design team. In addition, the space station design must be able to support the scientific mission of the crew. It will be important to keep these concepts in mind in the design of your space station.

Audience:

NASA