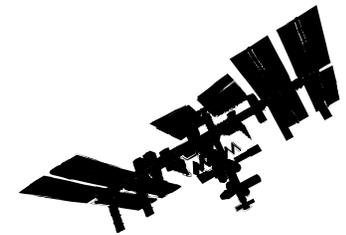




Designer Space Station



DESIGNER SPACE STATION

THE CHALLENGE

Imagine the following. With precision movements, a crane swings a huge building block into position. Workers climb onto the structure and use power tools to bolt the pieces together. It is a workday scene that could be found in any city, but this construction site is 400 kilometres above Earth, in space, where conditions alternate hourly between freezing cold and searing heat. In this case, the construction workers are astronauts, the cranes are a new generation of space robotics and the skyscraper taking shape is the International Space Station (ISS).

The ISS has several core components, without which it could not function. These include:

- Cylindrical modules, which are the main building blocks of the station (i.e. habitat module, laboratory or scientific modules).

- A bridge-like linear structure called a truss that acts as the attachment point to various modules. These include the Canadian Mobile Servicing System, the photovoltaic arrays (provides electricity) and radiators (used to control the temperatures of the ISS).
- Nodes, which are the connections between the modules of the ISS.

Cubs Scouts will explore the decision-making process required to build a space station like the International Space Station by participating in a team effort to design a model space station.

PLAN

Part 1: Design the space station

The Pack Scouters and Sixers will:

- Photocopy the Space Station Parts from the manual. The Pack needs one set of all the parts for each group of 3-4.
- Distribute one empty file folder to each group of 3-4 Cubs.
- Inform Cubs that they are going to design a blueprint for a space station.

Part 2: Build the space station

The Pack Scouters and Sixers will:

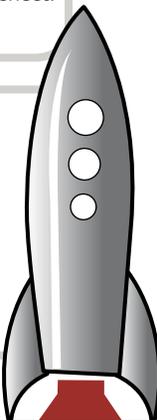
- Designate an area in the hall as the Space Station Parts Store. Lay out all of the various building materials on a table in this area.
- Photocopy and cut the Space Dollars.
- Photocopy the Materials Price List Worksheet and the Design a Space Station Budget Worksheet.
- Divide Cubs into working groups of 3-4.

DO

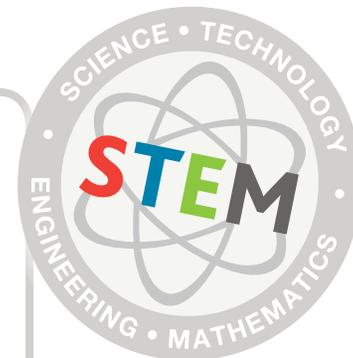
Part 1: Design the space station

- Cubs begin cutting out the various space station elements from the Space Station Parts sheets.
- As they cut out the parts, Cubs begin placing them onto their open file folder. The goal is to slide and place the parts around on the folder to make a complete space station (i.e. each space station must have at least one of each element).

- Cubs' models must pass "inspection" before they are given a glue stick to permanently glue their space stations in place.



Designer Space Station



Part 2: Build the space station

- The Pack discusses the challenge at hand: teams will not have unlimited access to building material because space station components are costly. As in the case of NASA and the ISS Partner Nations, Cubs must think carefully how to plan and construct an efficiently-built space station within a given budget.
- Pack Scouters will allocate 1500 Space Dollars to each team of Cubs, along with one copy of the Materials Price List and one copy of the Design a Space Station Budget Worksheet.
- Cubs work from the Materials Price List to select materials with which to construct their space station. They cannot use more than the 1500 Space Dollars they've been given.
- Cubs draw a design and plan their budget using the Design a Space Station Budget Worksheet.
- Before construction can begin, budgets must be approved by Pack Scouters. Upon approval, Cub teams may proceed to the Space Station Store to purchase their parts and begin construction of their space station.

REVIEW

- What was the most challenging part about building the model Space Station?
- Were you able to keep your construction on or under budget?
- Did you use many low cost materials? Or few high cost materials?

| ACTIVITY | TIME |
|---|------------|
| Set up time | 10 minutes |
| Presenting the problem and the material | 5 minutes |
| Designing the space station | 15 minutes |
| Building the space station | 35 minutes |
| Review | 10 minutes |

MATERIALS NEEDED:

Part 1: Design the space station

- Space Station Parts template
- Legal sized file folders
- Space Station Function Challenge cards
- Pencil
- Glue sticks
- Scissors

Part 2: Build the space station

- Bowls
- Clothes pins
- Cups
- Elastic bands
- Masking tape
- Paper clips
- Paper plates
- Styrofoam trays
- Pipe cleaners
- Popsicle sticks
- String
- Tinfoil
- Toothpicks
- Straws
- Egg cartons
- Toilet paper
- Rollers
- Scissors
- Space Dollars
- Materials Price List worksheet
- Design a Space Station Budget worksheet.

