

Cubesat Structure

Grade Level	4	Workable grades	4, 5, 6
Recommended Time	1 hour		
Curriculum Alignment	<p>Math SHAPE AND SPACE 4</p> <p>General Outcome: Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.</p> <p>Specific Outcomes: 4. Describe and construct right rectangular and right triangular prisms.</p>		

Background Information (Science required for the lesson) :

CubeSats are made up of 10x10x10 Cubes. Each Cube represents 1U. Ex Alta-1 is a 3U CubeSat and is 30x10x10. CubeSats can be between 1U and 12U in size.

Components that all satellites need to be operational:

- 'Payload' refers to the technologies and systems aboard a spacecraft tasked with delivering mission objectives
- Magnetometer and Magnetorquer which allow the satellite to detect and change its orientation along the magnetic field lines of the earth
- Solar panels to power all its systems
- Communication system (radio antennas) to transmit and receive information with earth
- On-board computer to control all on board systems and power distribution, and to use the antennas for communication

Explanation of Activity:	Notes:
<p>A step-by-step guide for your activity:</p> <ol style="list-style-type: none"> 1. Students may work alone or in pairs 2. Hand out attached worksheets for 1U, 2U, or 3U CubeSats 3. Have the students cut the outline out and fold it to create a 3D-model. Tape or glue the model so it stays together. 4. Tell students that their designs must include an antenna, a GPS, a radio, a payload (an experiment), an onboard 	<ol style="list-style-type: none"> 1. Students sometimes have trouble thinking up payloads. Encourage them to be creative and offer some suggestions such as: a magnetometer, a plant, a camera, their favourite food, favourite toy etc. Ask the students to think about and/or write down what they would like to study/learn about if they went to space.

<p>computer, and solar panels. Write these requirements on the board.</p> <ol style="list-style-type: none">5. Presenters should walk around to answer questions and encourage students.6. When students have finished designing their models, have some students volunteer to present their work as if you work for the CSA. Ensure they have included each of the required components for a satellite.	<ol style="list-style-type: none">2. Potential Assessment: Have Students compare the similarities and differences between their design and that of a real satellite. This could be done in point-form, full sentences, or using a graphic organizer. This could be combined with the above extension activity.3. If a teacher wants, the class could cut, fold and glue the CubeSats ahead of the session.
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Materials Required (INCLUDE ALL MATERIALS NEEDED EVEN PEN AND PAPER)

- Pens/Pencils
- Scissors
- Markers or similar (optional)
- Worksheet
- Fun craft materials (Pipe cleaners, stickers, etc.)
- Tape and/or glue sticks

Changes to the activity for COVID-19

Make sure teachers have required material since due to COVID AlbertaSAT members can't be there