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Build a Satellite

What would a satellite need to observe our planet?

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Build a Satellite

You are going to build a model of a satellite that will collect information about earth. So first you have some things to think about…

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What is a satellite?

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What is a satellite?

- A satellite orbits a star or a planet. Artificial satellites take pictures and collect different data that help us to work out the weather and other things happening on earth.
- Some take pictures of other parts of the universe and help us to understand it better while others are used for communications and beam TV and phone signals. Global Positioning Satellites (GPS) help us to navigate.

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What could a satellite measure on earth?

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What could a satellite measure on earth?

- These are only a few things that earth satellites measure as well as taking pictures that are better than a telescope:

aerosol gases	sea height	air temperature
ocean colour	fires (burning plants/trees)	surface temperature
greenhouse gases	plant fluorescence (shows plant health)	sea temperature
clouds	animal movements (walruses!)	Ocean depth

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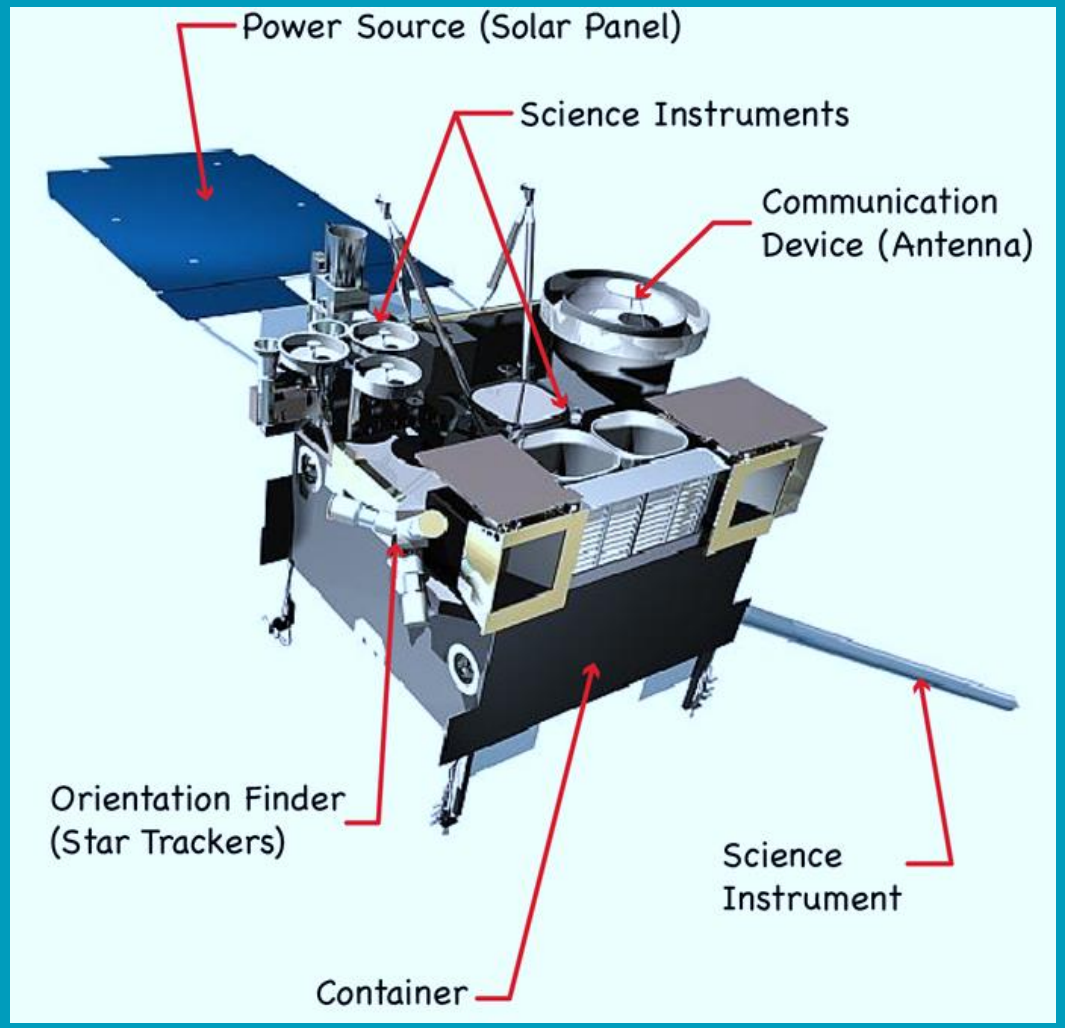
Parts of a satellite



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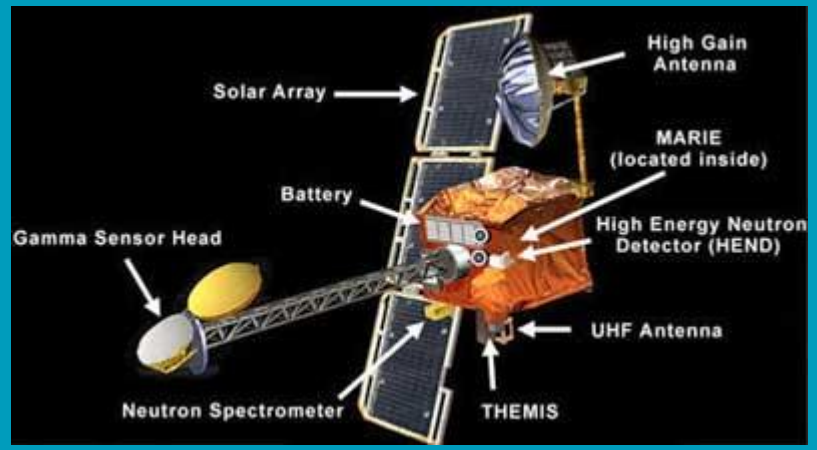
Examples of satellites



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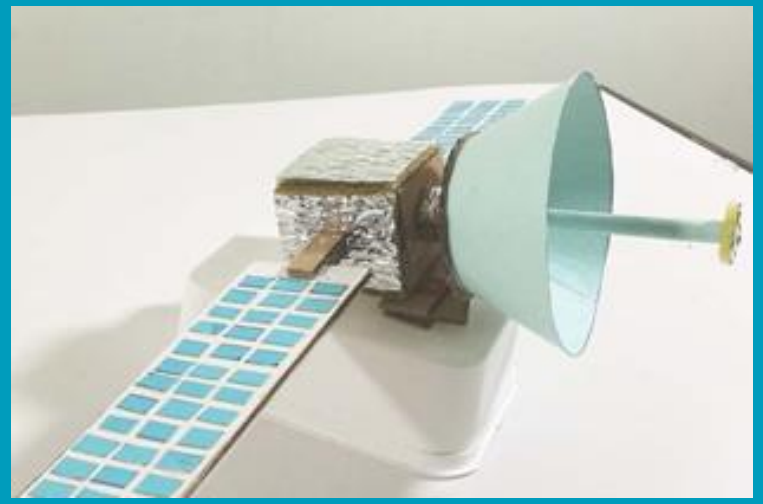
Satellite Models



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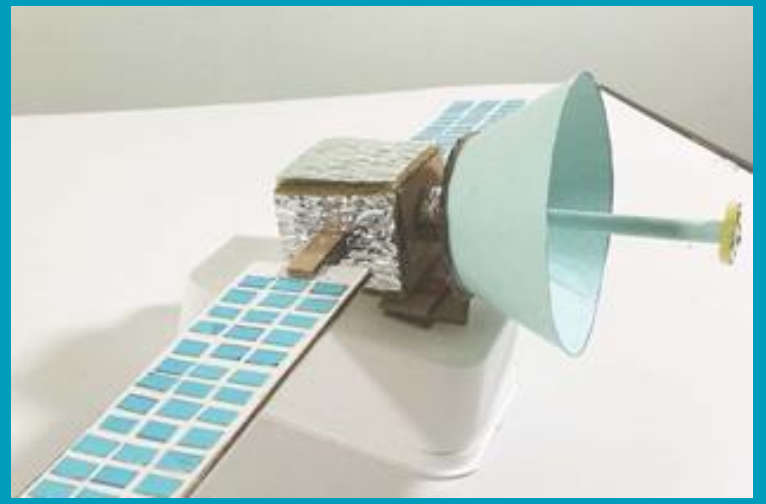
My Satellite Model



You will need to decide what your satellite will measure and what you want to include in your design.

You will also need to think about what materials you could use from your own or the school recycling bins

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What should I include?

You must include

1. The main bus (body of the satellite)
2. Solar panels for power

You will also need to think about how to attach your microbit

You could include

3. instruments/sensors - think about what they will measure
4. an antenna (low gain antennas look like flagpoles and high gain antennas look like dishes)
5. Removeable heat shield to protect the instruments
6. Anything else you want to include!

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Materials

You can use “found” materials

cereal boxes

lolly sticks

boxes

yoghurt pots

string

cardboard tubes

cards

egg boxes

plasticine

margarine tubs

buttons

playdoh

bottle lids

dowel

plastic bottles

… any recycling you want!

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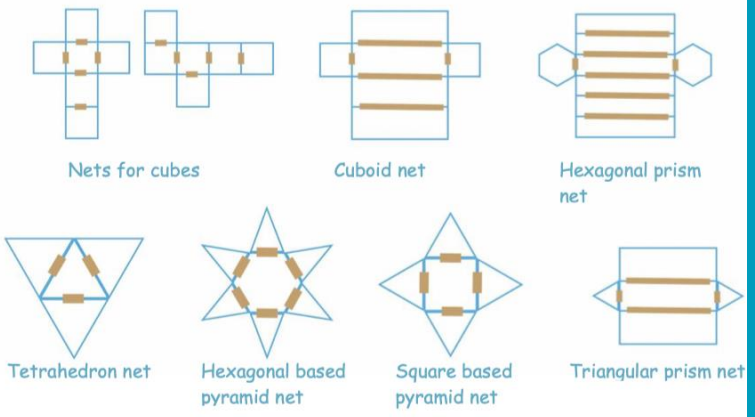
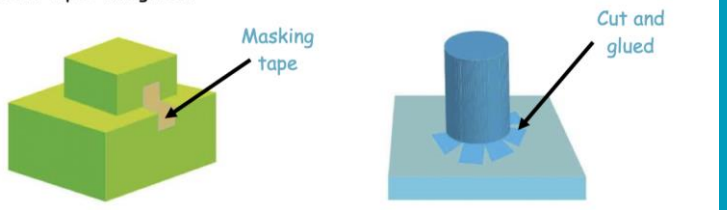
Some D.T. joining techniques

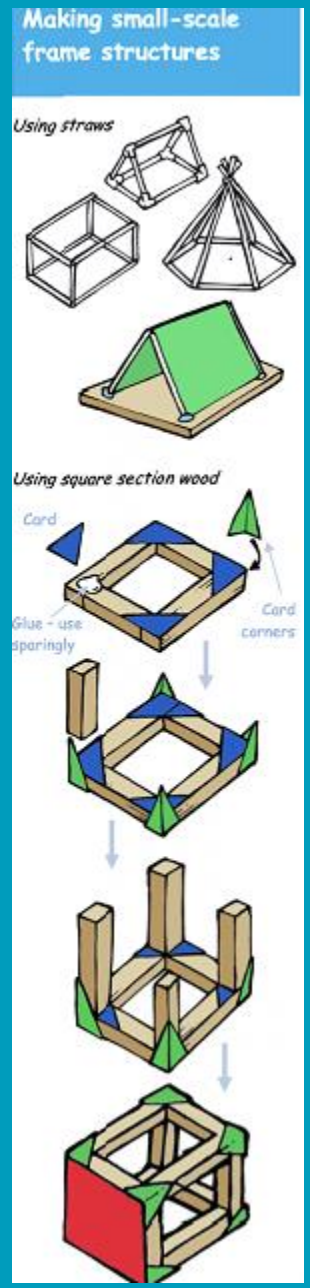
Assemble and evaluate 3-D shapes using standard sized card squares, rectangles, equilateral triangles, isosceles triangles and hexagons, joined with masking tape.



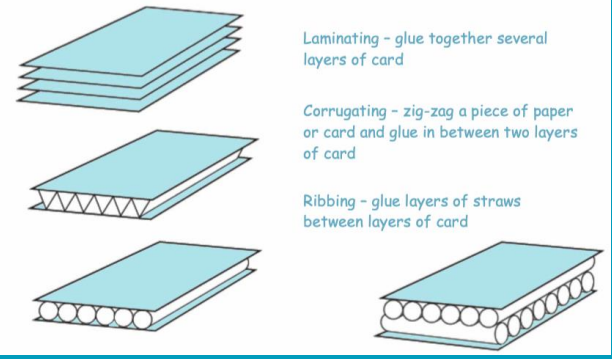
Creating the net for the product you are designing and making without using computer-aided design:

Show children how to join sheet materials and reclaimed boxes together using different tapes and glues.





Stiffening and strengthening sheet materials:



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My Satellite Ideas

You will use this mind map to collect your ideas

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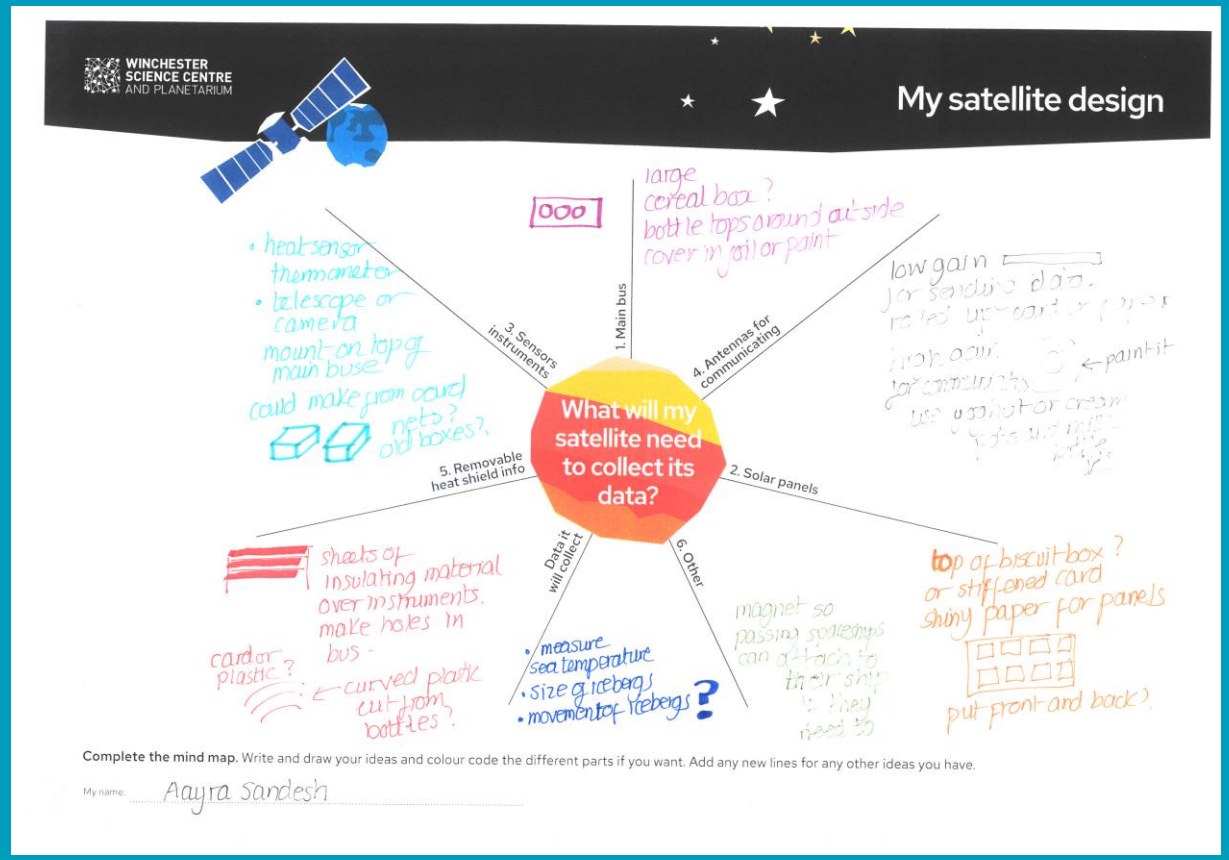
My Satellite Ideas

My mind map could look something like this



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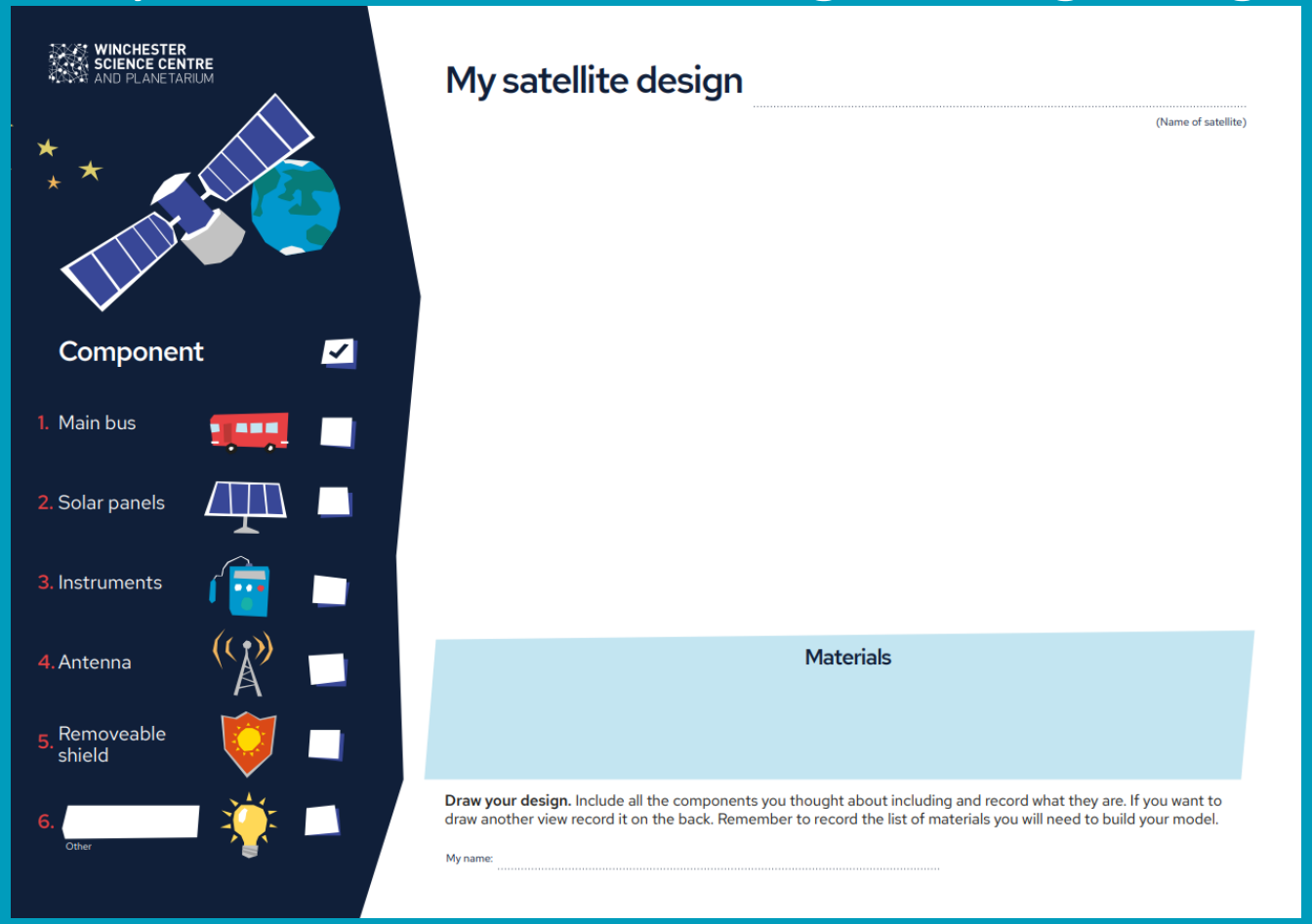
Design

You will sketch your satellite on the Engineering Design Sheet



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Component

1. Main bus
2. Solar panels
3. Instruments
4. Antenna
5. Removeable shield
6. Other

My satellite design .....

(Name of satellite)

Materials

Draw your design. Include all the components you thought about including and record what they are. If you want to draw another view record it on the back. Remember to record the list of materials you will need to build your model.

My name: .....

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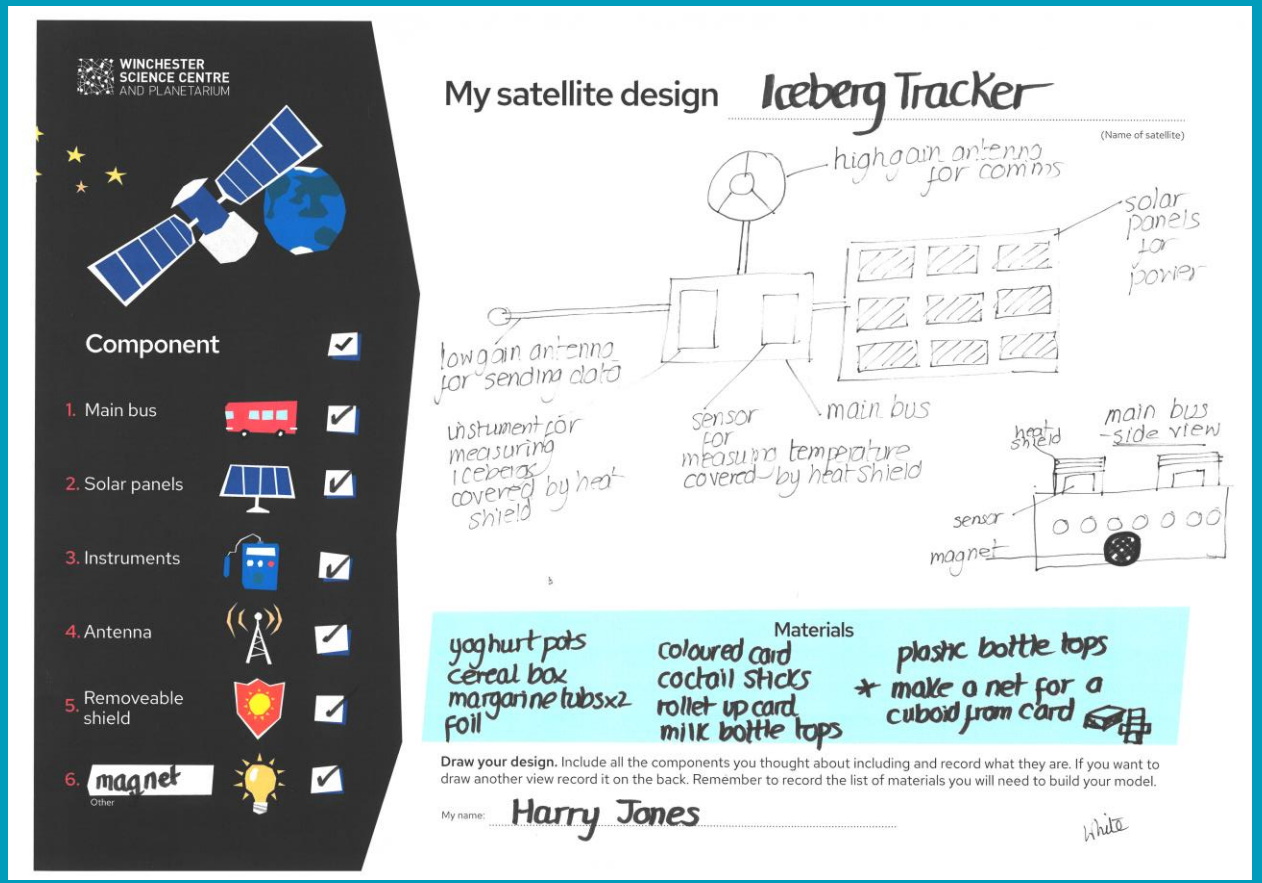
Design

It could look something like this



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Evaluation

When you have completed you design and construction it will be evaluated using specialist equipment. This will be done by running the following investigations.

1. Shake test – to make sure that your satellite structure will stay in one piece when it is being blown by solar winds!
2. Sensor/instrument shake test (this will be programmed in a separate Microbits workshop) which make sure that the sensor stays attached to the main bus and still works.
3. Heat shield test - if you didn't make a heat shield for your satellite you will be given the chance to make one on evaluation day and then check if it protects your sensor

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Celebration Day

The final event will be a celebration day at your school. This will be a science fair format. You will create a poster board using your design sheets and display your satellite to your classmates and a STEM Ambassador.

The STEM Ambassador will look at your display and satellite and choose a winner!