



International Space Farm - Teacher's Notes

Lack of food security has been identified as an increasing problem in the modern world. Food security is defined by the Food and Agriculture Organisation of the United Nations as:

"... when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life."

Source: <http://www.fao.org/economic/ess/ess-fs/en/>

A decrease in food security can often be caused by natural disasters either destroying food sources or stopping people gaining access to these sources.



A project that is likely to spark a lot of interest and creative ideas in students is one based on the idea of an international collaborative space farm (ISF). This idea was formed when working with a teacher from a



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school in WA's northwest who was lamenting the lack of availability of fresh vegetables when their town was cut off due to flooding from cyclones. This led to an expanded discussion on international food security in areas suffering drought, flood or famine or those struck by disasters such as earthquakes, volcanic eruptions, landslides and tsunamis. This discussion resulted in what at first seemed like a pretty far-fetched idea to start a farm on an international space station or even on another planet.

There are several reasons why this idea is perhaps not so far-fetched:

- Natural disasters often wipe out crops and these can take months or even years to recover and people still need to be fed in the meantime.
- Global warming and climate change are leading to reduced crop yields in some areas and a change in the ability to grow crops in others.
- Soil quality is in decline due to past activities, like over-farming and grazing, and this leads to a decrease in farmable land.
- As well as destroying food crops, natural disasters may cut access to areas by road so usual deliveries of fresh supplies are not possible.
- In underdeveloped countries, people may already not have access to sufficient fresh food and natural disasters can compound this issue.

There are some interesting teaching resources available on the Global Education website on the issue of food security.

<http://www.globaleducation.edu.au/global-issues/gi-food-security.html>

If your school is part of the Sustainable Schools program, this project may even expand on and tie together some of the concepts you already cover.

There are also some good resources on the NASA website about experiments to grow vegetables on the International Space Station currently being undertaken.

<https://www.nasa.gov/feature/how-does-your-space-garden-grow>

https://www.nasa.gov/mission_pages/station/research/news/flowers



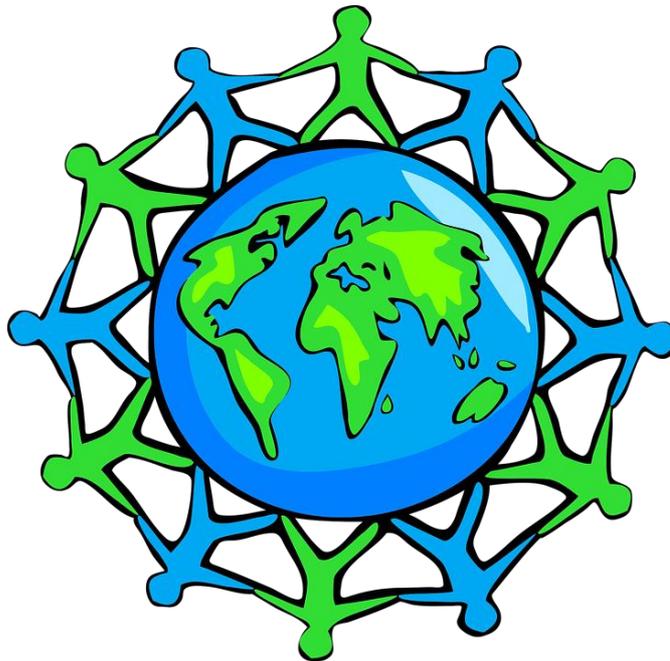
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The idea of a global cooperative farm in space has many advantages. Here are a few:

- Crops can be grown in carefully managed conditions to ensure optimal yields.
- Disease and pest control would not be needed with strict quarantine procedures leading to lower costs and the use of less chemicals.
- Crops are not affected by weather conditions or natural disasters.
- The crops grown at the farm could be distributed according to the most urgent area of need globally.
- Cooperative research can be done on crops - most effective growing conditions, soils, high yield species, nutritional content etc.



There are many directions you might like to take this project on, here are some suggested prompting questions and statements and some activity ideas to get you started:



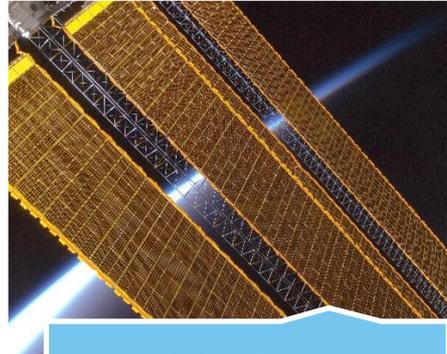
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How big should the ISF be?



How will the ISF get power
and water?



Should the ISF be a satellite
of Earth or be made on the
moon/another planet?



Which crop types will grow
best?



How will the crop products
be transported back to
Earth?



Will there need to be people
there or can it be run by
robots?





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What conditions will be needed to grow crops/veggies in space?



Which crops will provide the most nutrition for the least area taken up?



Would plants be grown from seed or would seedlings be transported from Earth?



What quarantine conditions would ensure the ISF remains pest and disease free?



Bees are needed to pollinate crops. Would they survive on the ISF? How else could crops be pollinated?



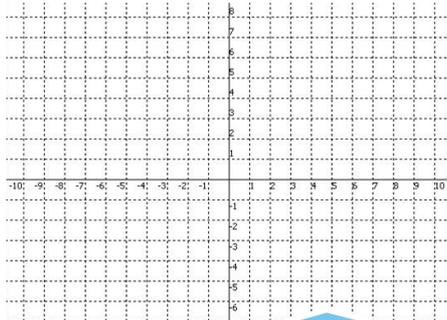
Will the crops be grown in soil, water (hydroponics) or some other method?

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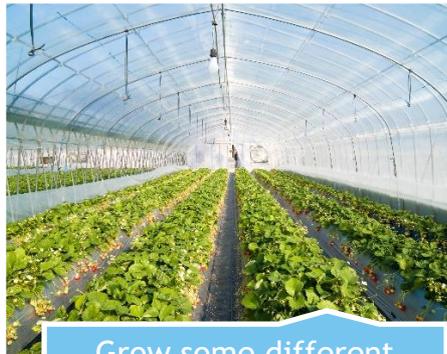
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Draw a cartesian map of the layout of the farm to maximise space



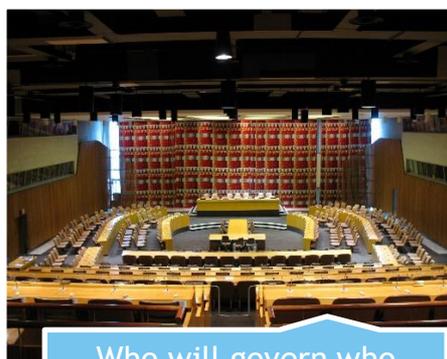
Build a model of the ISF from your plan



Grow some different crops in a greenhouse to test growing conditions



Creative writing task - persuasive text on why we need/don't need an ISF



Who will govern who receives what amount of food?

