Space Station Interactions

New Mexico
Supercomputing Challenge
Final report
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Executive summary:

We are studying the design of a space station to have balanced ammounts of oxygen, carbon dioxide, food and waste. We are using Star Logo TNG to create a model of how the different organisms survive and create and use different materials. We are also studying how to use StarLogo TNG for our project, and how to create ways to live longer on the space station for longer periods of time.

Problem statement:

Human danger can happen when people run out of recourses. We are using StarLogo TNG to create a smaller model of a space station to show how the balance of recources is important. The hardest thing about making this was how to balance out the oxygen and carbon dioxide. We designed our project to make this as easy as possible.

Description of method:

We are using StarLogo TNG to create our project by creating all of the organisms and having them interacting with each other and oxygen and carbon dioxide. We used collisions to create the effect of how people take in oxygen and give off carbon dioxide while plants take in carbon dioxide and give off oxygen. Also we are using food and waste to represent the food cycle on the space station.

Model Verification:

And we used StarLogo TNG to program our project. The space station we built is similar to the BioDome, but with a simpler system. Using StarLogo TNG was useful to create a model to show how to balance the levels of oxygen and carbon dioxide. We found that an unbalanced systems crash faster, just as the BioDome did in Tuscon.

Results of* study*:

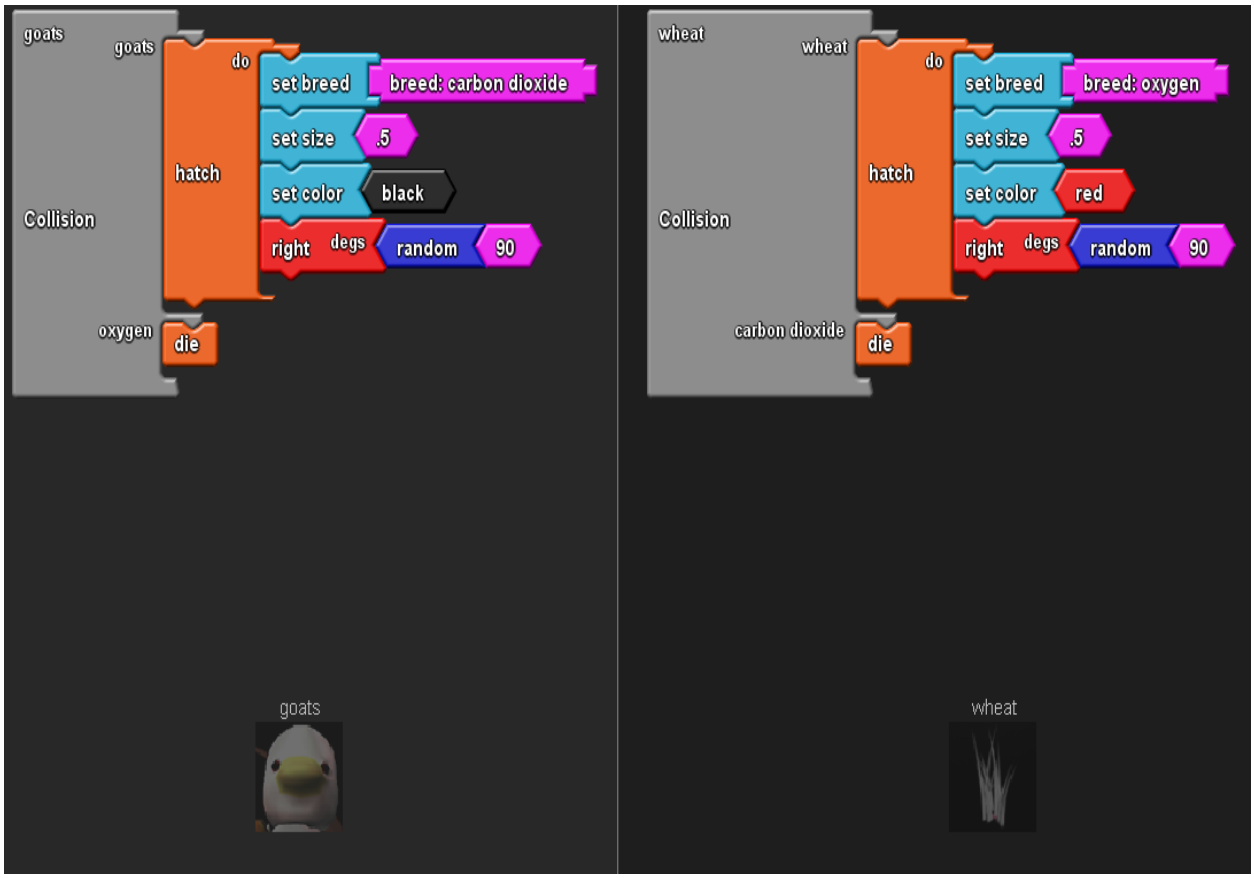
We have selected organisms for the space station based on their needs and products they create. People, wheat, grapes, soy beans, goats, chickens, and catfish. We have a diagram that shows what each organism brings in and puts out. We will show how to model the processed materials. We have also researched information about how space stations are constructed.

***Conclusion*:**

We concluded that we needed to create the right number of organisms to balance the amounts of oxygen and carbon dioxide. If people don't have enough oxygen they would die so we need to balance them out.

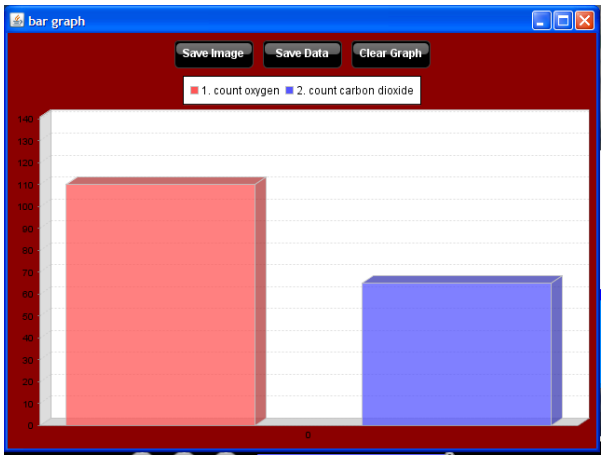
Products of work:

This is some of the code in the programming that we used.



This is the number of oxygen and carbon dioxide in the beginning.

And this is when it has been running for 10000 seconds.



Significant achievements:

Found out that the program can work, but we are still figuring out the bugs. We figured that in the near future that astronauts might be able to live on a space station for longer than currently possible. This program could help in some way to show how an average day on the space station might appear.

Acknowledgements:

Thank you to all that helped in our project.