

*Virtual worlds and computational modelling engage students in inquiry activities in high school classrooms*

**Charlotte Taylor**

School of Biological Sciences



This project is funded by the Australian Research Council Discovery program #DP1093170.

# Inquiry and the National Science Curriculum

- › Curriculum Emphasis on overarching ideas: eg Patterns, order, and organization, Form and function, Stability and change, Scale and measurement, Systems, and Energy

- › Years 7-10

- › Biology: ecosystems, evolution, and diversity of life

## Science inquiry skills

- questions or hypotheses
- design and conduct science experiments
- gather and organize data
- analyze and test models based on the evidence available
- Explain, and summarize

Digital technologies such as *simulations* and *online data for scientific analysis*

# Virtual Worlds for Learning Science Project

- › Design a virtual world in which students can solve problems in complex biological systems.
- › Bring the field to the classroom while students learn key ecological concepts
- › Scaffold the process of inquiry using the scientific method
- › Use computational modelling programs to test hypotheses

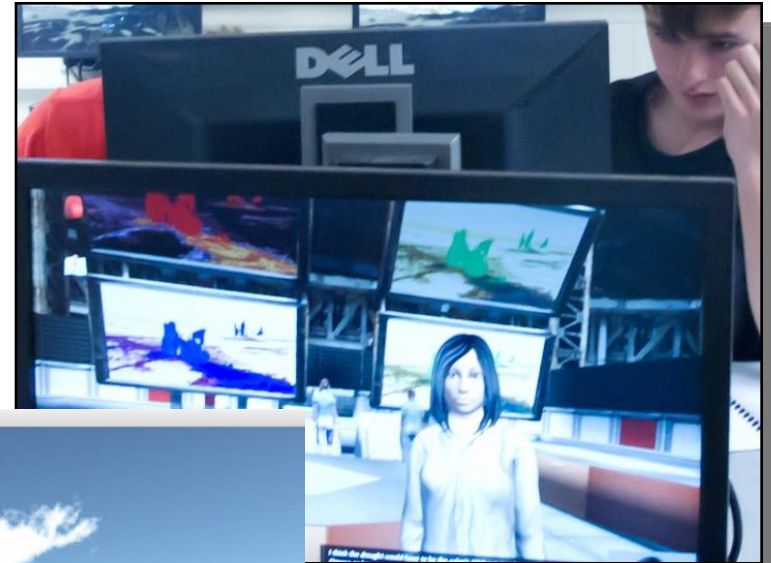


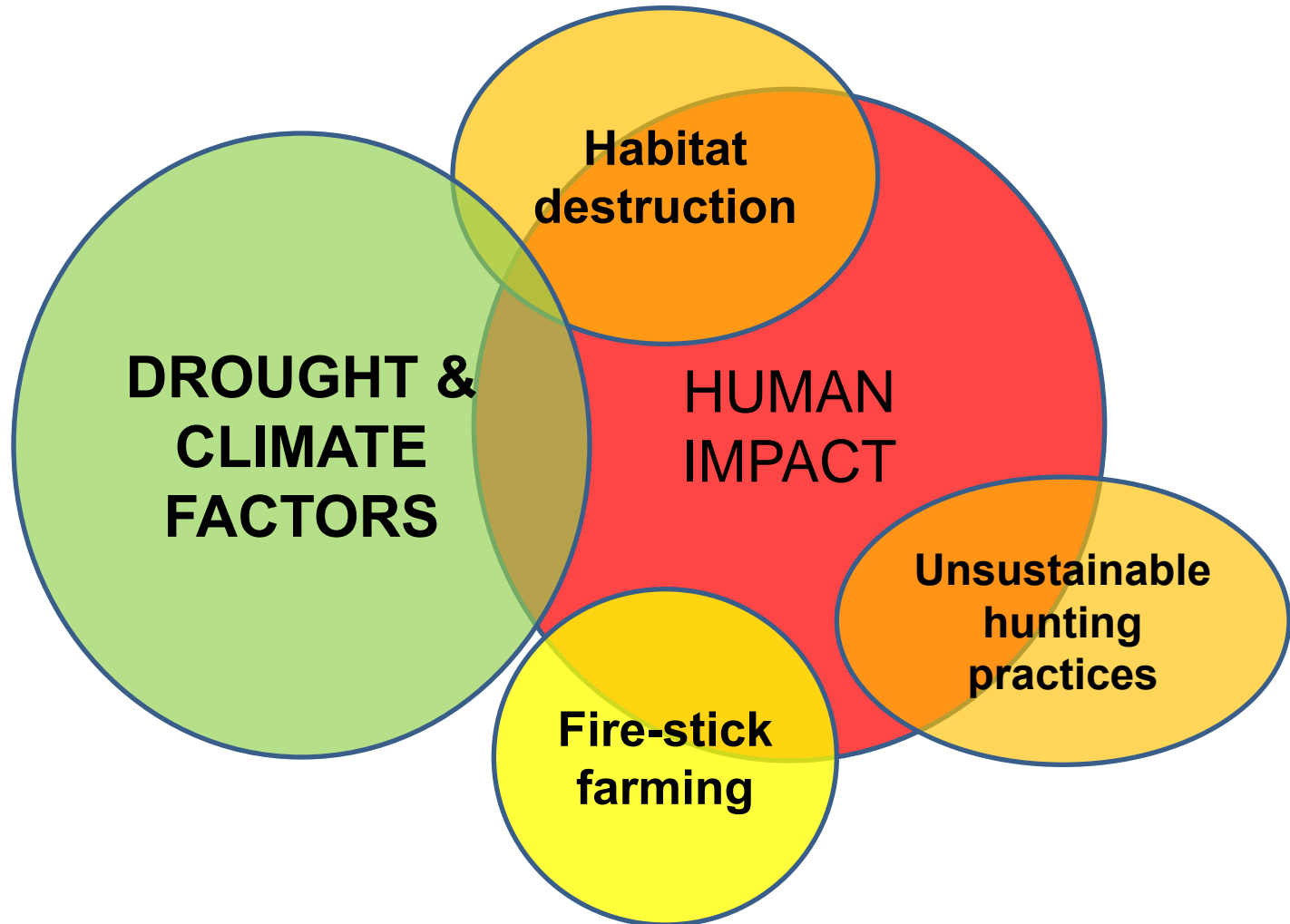
# Omosa Virtual World: Virtual Biology Field Experience





Your team's main job is to use your scientific knowledge and inquiry skills to conduct investigations into possible reasons for the decline in animal populations on Omosa

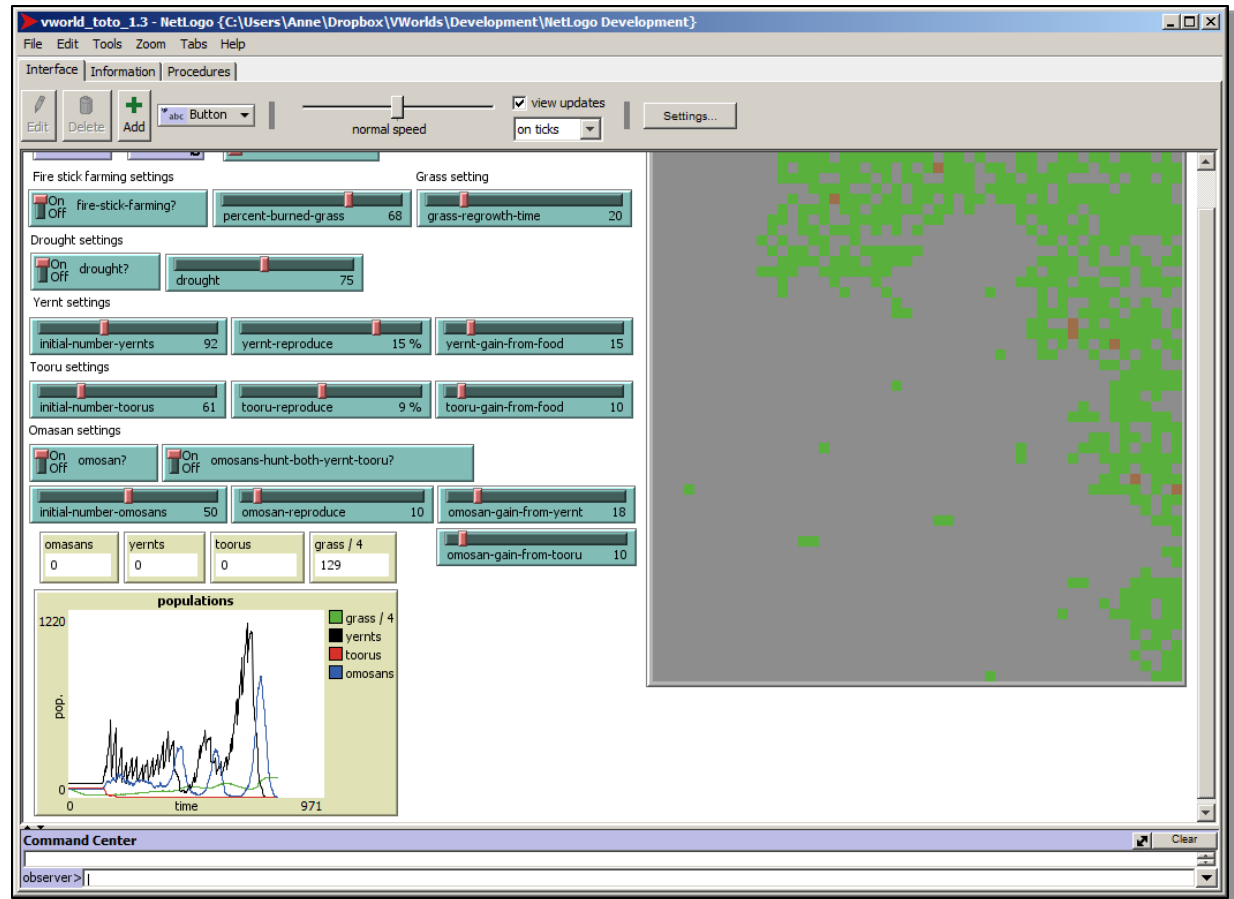




Come up with 3 to 5 ideas for experiments that you could run in Omosa.

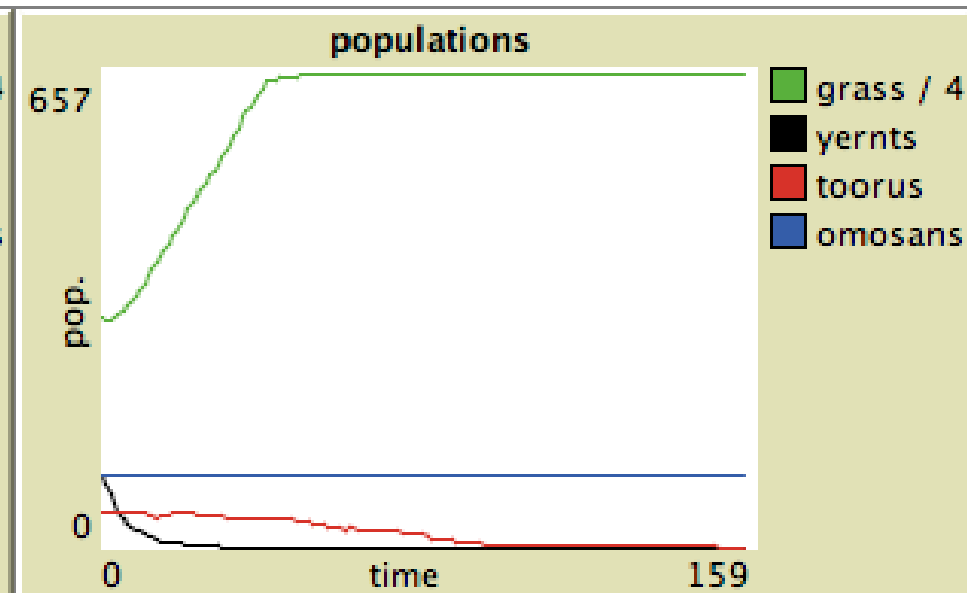
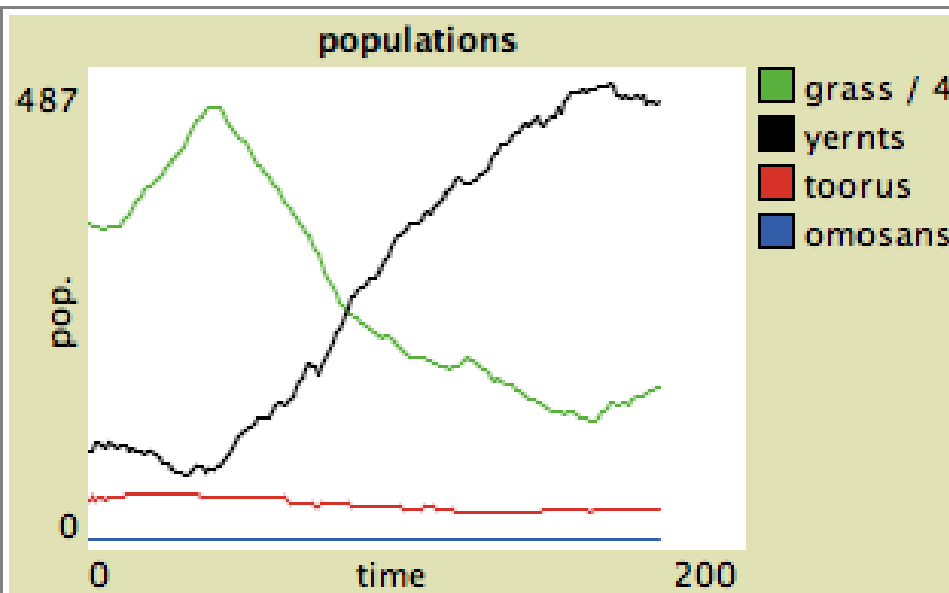
Pick the experiment that you find most promising and write your experimental design.

Use NetLogo to run your experiment, and change the variables



# RESULTS

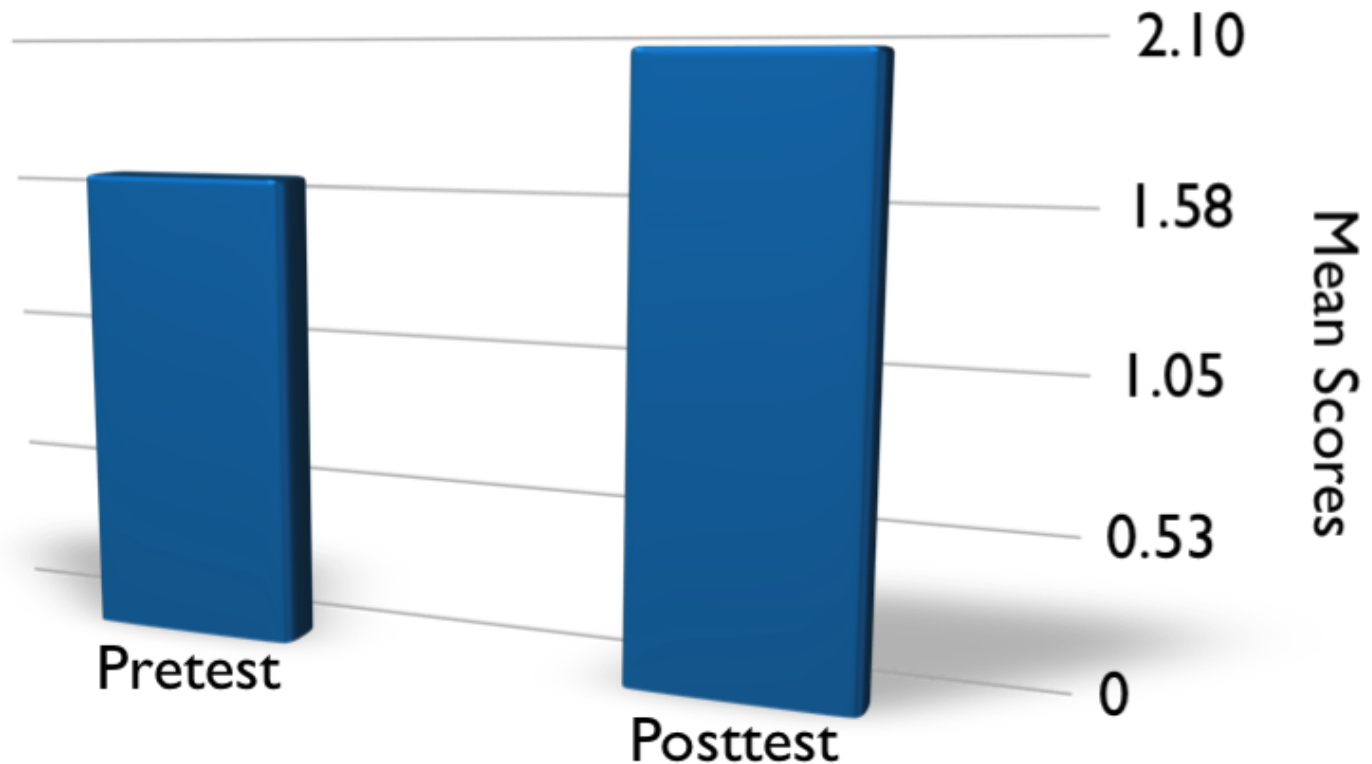
The tests and experiments showed that the more Omosans we introduced, the faster the Yernt died out.





## Quantitative Findings

- › Main finding: Significantly higher mean scores on the post-test for the multiple choice items measuring students' ability to identify variables in a experimental design:  $F(1,25)=3.66$ ,  $p=0.034$  (1 tail)



- › Learning about scientific design and ecosystems.
  - “I learnt about hypothesis and testing it out using different programs.”
  - “I learned more about how ecosystems work.”
  
- › Netlogo simulations and exploring Omosa Virtual World.
  - “You learnt more from Netlogo but Omosa World was more enjoyable”
  - “I learnt that you can do different things to solve problems. For example, modelling on NetLogo.”
  - “The Omosa world was fun because it wasn't like every other experiment done at school so it lets us do things we normally don't. Such as run around and communicate through a virtual world”