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Don't Break the Chain

The simulation that we created in Agent Sheets entitled Don't Break the Chain is a multi-faceted tool for any classroom. It covers a variety of topics in Biology including ecosystems, food chains, invasive species, habitat destruction, and population growth. Students can better understand how living things in nature are connected and how human's actions can affect the environment.

One of our goals was to provide students something to look at that enabled them to see how different species rely on each other for survival. We also wanted students to be able to manipulate different factors that could change the balance in the system. By having the students introduce variables related to human impact they will better understand topics such as extinction, endangered species and endangered species.

Don't Break the Chain could be used in a classroom anywhere from a demonstration to a virtual lab. Teachers can actively engage students because it allows them the opportunity to make predictions, test their predictions, and think critically. It can be used in tandem with an online invasive species simulation to extend on the topic.

There are several New York State Standards that our simulation covers and they are the following:

- 1.1d The interdependence of organisms in an established ecosystem often results in approximate stability over hundreds and thousands of years. For example, as one population increases, it is held in check by one or more environmental factors or another species.
- 1.1f Every population is linked, directly or indirectly, with many others in an ecosystem. Disruptions in the numbers and types of species and environmental changes can upset ecosystem stability.
- 3.1a Interpretation of data leads to development of additional hypotheses, the formulation of generalizations, or explanations of natural phenomena.
- 1.1c In all environments, organisms compete for vital resources. The linked and changing interactions of populations and the environment compose the total ecosystem.
- 1.1e Ecosystems, like many other complex systems, tend to show cyclic changes around a state of approximate equilibrium.

Our main goal was to create something that could be used in more than one way to help students better understand a variety of topics in Biology. By creating this "Don't Break the Chain" simulation we believe that we reached our goal. Hopefully it will become a tool used by students all over the country.

Name \_\_\_\_\_

List as many factors as you can that would alter an ecosystem.

Predict what will happen to the Snake population if 20 houses are added and explain why.

Using Agent Sheets add 20 houses and explain what happens to each of the species and use excel to provide a graphical answer.

Why did this happen?

Explain the relationship that you can see between all of the species.

What happens to the eagle after it dies and why does that make sense? (look closely)

Explore agent sheets using the hunter and invasive species and explain what is happening.

How would a draught effect the eagles?

What are factors that can restrict growth of a population?

If an ecosystem originally has 10 eagles and a hunter comes in, how many eagles can the hunter shoot before it throws off the ecosystem? Do you think there should be laws as to how many of a certain species each hunter is allowed to shoot?

Go to <http://www.sims.scienceinstruction.org/invasive/simulation.html> and answer the questions below that are on the page. (Questions start on step 4)

1.

2.

3.

4.