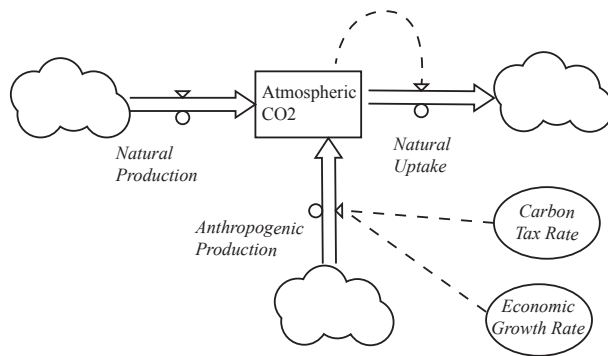## Sweeping Two Parameters

FIND YOUR NAME on the list of today's studio groups, find your
partner(s), seat yourselves comfortably, and please read through the
rest of this document.

Today's Agenda

Today we'll work work on stock and flow diagrams, review material
from Chapter 13, including sweeping two parameters and visualizing
the results.

Stock and Flow Diagrams

The diagram below shows a possible abstraction of the carbon cy-
cle: atmospheric CO_2 is produced both by natural processes and by
anthropogenic processes (due to human activity), and is diminished
by various natural uptake processes. The diagram suggests that the
amount of CO_2 produced does NOT depend on how much CO_2 is in
the atmosphere, while the amount that is taken up does.

What are the stocks in this model?

What are the flows?

What are the links?

What are the exogenous factors?

Wolves and Elk

Suppose we want to model the interaction between wolves and elk.

Model #1: Simulates changes in the population of wolves, using elk populations estimated from observations. The population of elk influences birth and death rates for wolves.

Draw a stock and flow diagram for this model.

Model #2: Simulates changes in wolf and elk populations. The population of elk influences the birth and death rates for wolves. The population of wolves influences the death rate for elk. Humans can introduce or remove wolves.

Draw a stock and flow diagram for this model.

The Phillips HIV Model

Review the HIV model we distributed in class, and write the differential equations that describe the model. Which variables represent stocks? Which variables represent parameters?

Draw a stock and flow diagram for this model.

Space for Notes on Chapter 13

Reflection Question

What can we learn from sweeping the parameters in our plague model?

Next Steps

Before class on Monday, please do the following things:

☐ Write your name here: _____

☐ Write your name(s) of your studio partner(s) here: _____

☐ By tonight: Scan this worksheet and submit it on Canvas.

☐ By Sunday night: Read Chapter 14 and complete the reading quiz.
   Read and run the Chapter 14 notebook.

☐ Meet in the studios on Monday.