System Dynamics
System Dynamics

Stocks store stuff

Flows carry stuff in and out of stocks

Variables can be constants or equations

Links transfer information among the other three
Food-Limited Population

Model 1
Ecosystem example (from FS1)

- **Time**
- **Ecosystem Biomass**

**Ecosystem Carrying Capacity**

- **S-curve**
  - Reproduction-limited Domain
  - Midpoint
  - Resource-limited Domain
  - Succession Species
  - Pioneer Species
Food-Limited Population

The graph illustrates the dynamics of population growth, births, and deaths over time in a food-limited population. The population size increases due to births, which are initially low but rise as the population grows. Deaths remain relatively constant throughout. The graph shows a characteristic S-shaped curve, indicating a period of rapid growth followed by stabilization when resource limitations become more pronounced.
Home Heating
Home Heating
1 – \([\text{Population}] / [\text{Available Food}]\)
$1 + \frac{\text{Population}}{\text{Available Food}}$
Home Heating

time lags
Home Heating

too hot

just right

too cold

tipping points
Tipping Points
Do you think marriages between same-sex couples should or should not be recognized by the law as valid, with the same rights as traditional marriages?

State law changes:

- 1
- 1
- 2
- 1
- 2
- 5
- 18
Tipping Points