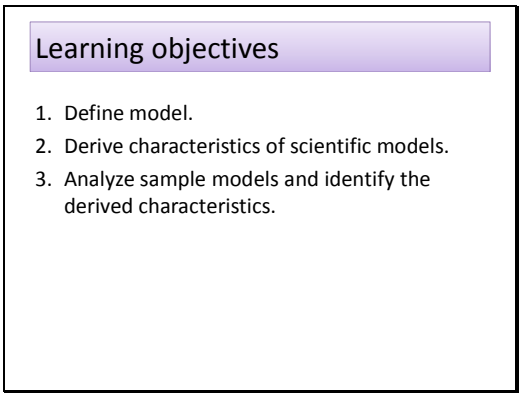
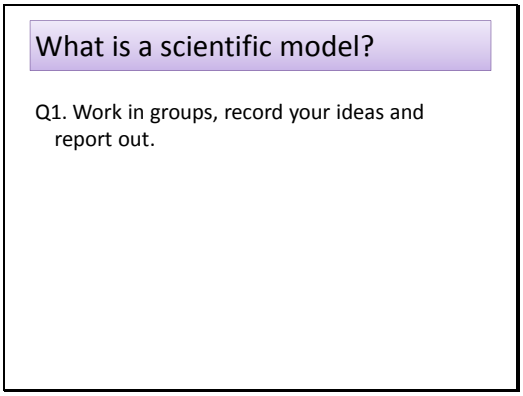
Slide 1



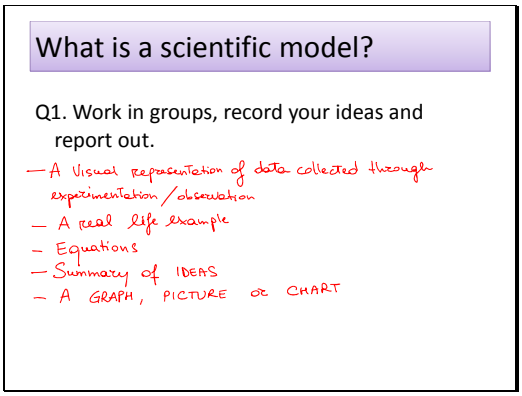
This class occurs on the second meeting of the semester and sets the tone for the semester. Students actively derive ideas about models and they apply those ideas to models, some of which are a little less-traditional than others.

Slide 2



Groups work for 2 minutes, brainstorming ideas. Instructor circulates, listening to group talk.

Slide 2, inked

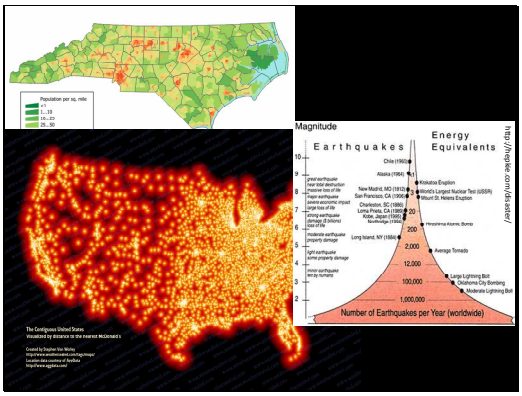


Instructor leads a full-class discussion. Groups call out ideas, instructor summarizes and writes answers.

Slide 3

Based on the class ideas, is this a model? You can formalize this with a clicker question or you can simply have students raise their hands.

Slide 4

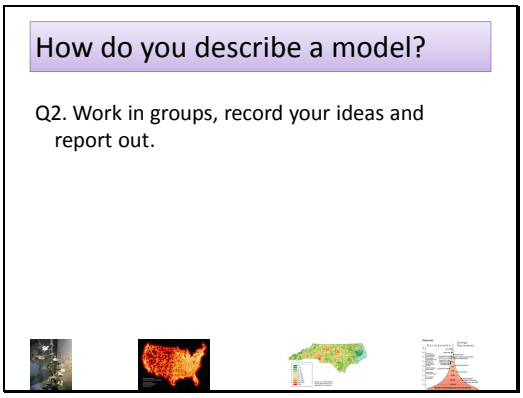


Each figure appears separately – but are they each models?

- Map of population density in North Carolina (you can find one for your state with a quick Google search).
- Map of McDonalds density in the US
- Graph of number of earthquakes by magnitude. This figure was chosen to relate to the recent earthquakes in Haiti and Chile.

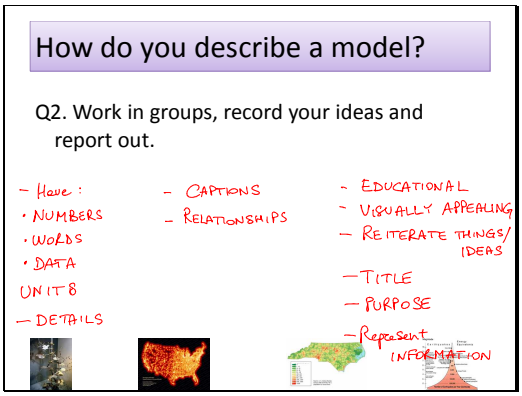
Students generally agree that these are all models.

Slide 5



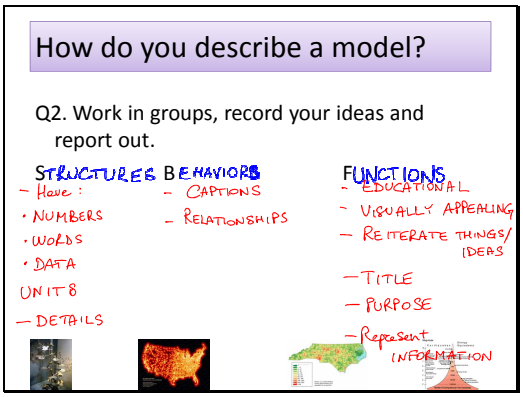
Groups work for 5 minutes. Instructor circulates, listens to groups and steps in where appropriate to engage students, guide their thinking and listen for challenges/difficulties.

Slide 5, inked



Students report out and we record their answers in three very deliberate columns. We then ask the students to think about why we have three columns. What characteristics does each column share?

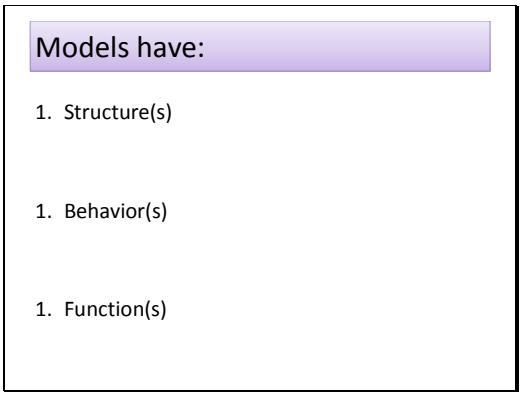
Slide 5, inked again



We then ask students to report out.

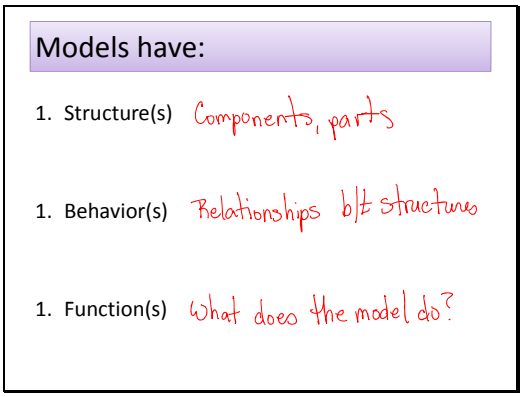
- What is the common characteristic of the column on the far left? These are all structures – or elements that make up a model.
- What is the common characteristic of the center column? These are behaviors or processes – the relationship between structures.
- What is the common characteristic of the column on the far right? These are functions – what the model does.

Slide 6



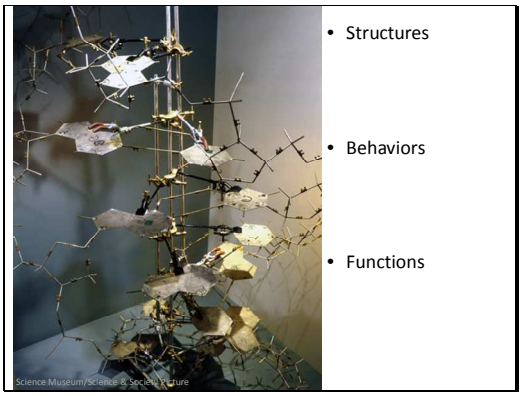
We then summarize – all models have structures, behaviors and functions.

Slide 6, inked



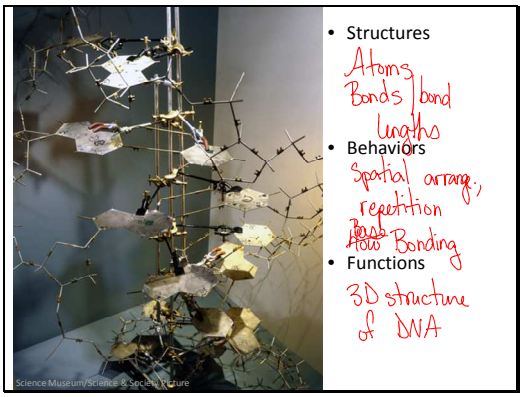
We then formalize the definitions.

Slide 7



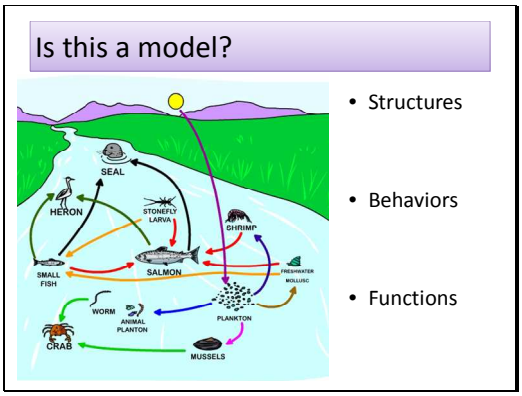
We then return to the model we began with. Students work in their groups to identify the structures, behaviors and functions of this model.

Slide 7, inked



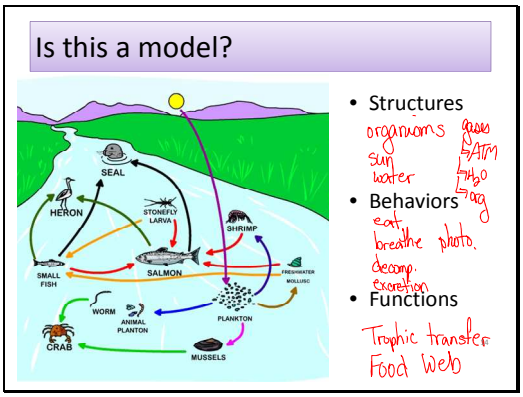
After a few minutes to brainstorm, groups report out and we record their answers.

Slide 8



Our course integrates SBF into most activities. Students will generate concept models using SBF as a guide. Here, we illustrate our approach to matter cycling, that begins with analyzing a model. Students work in groups to identify the structures, behaviors and functions of this model.

Slide 8, inked



The students report out. From here, instruction can go in many directions. We chose to focus on the movement of carbon (matter). As a result, we focused on the structures and behaviors that were missing from this model (decomposers, respiration) and worked with students to build a model that better represented the cycling of matter.