

Visualizing our Mental Models: Mind maps

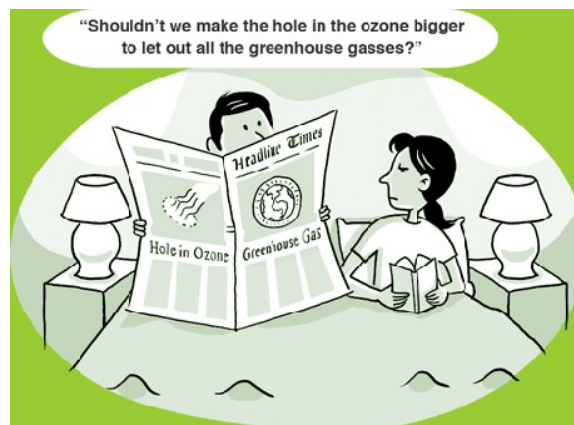


In the previous discussion of our mental models, we stressed several points:

- Good decision making depends on good mental models of a problem
- Models based on conventional thinking habits often do not capture the full context of a problem
- We tend not to examine our mental models critically because they are often unconscious, taken for granted as correct.

Maybe we need to bring our mental models out into the light of day to inspect them. In this lecture we will start learning ways to build visible diagrams of our mental models. These pictures allow us to:

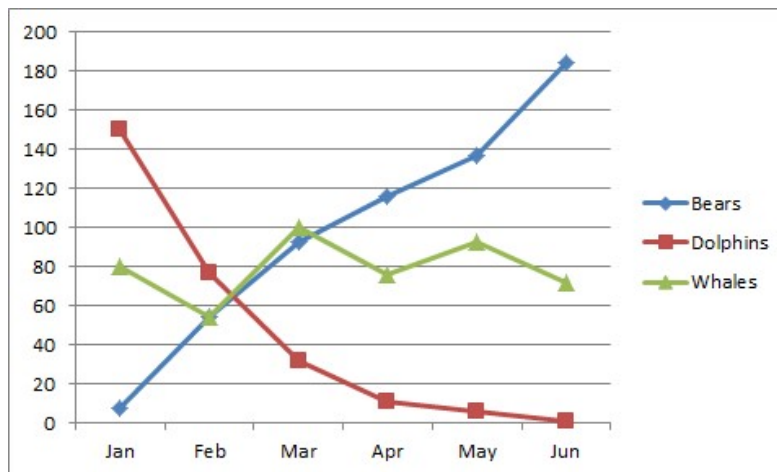
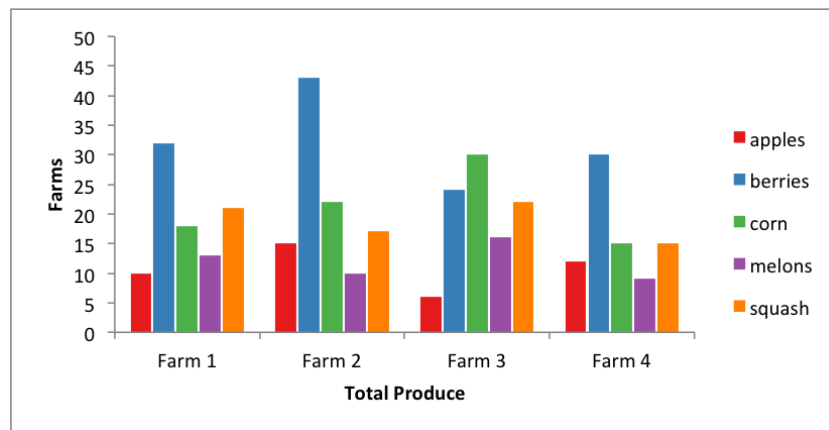
- Look critically at the components in our mental model and ask: Does it include all the *key variables* that are necessary to understanding a problem? Are we seeing a big enough picture?
- Draw and inspect the *connections* between elements and ask: Is this really how things are related? Are they interdependent? If so, how are they causally related?
- Share our mental models with others, to improve discussion of a problem and facilitate constructive criticism.



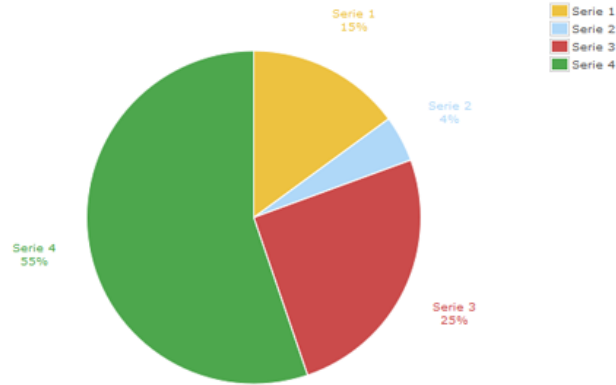
Mind Maps

We can write a description of an event, process or situation that we experience, but a mind map is a simple way to capture our understanding of the experience in a single picture, which explains it better than linear text. Mind maps are an important tool of systems thinking because they show how we see relationships among parts of a complex reality. Many types of mind maps are familiar to you: charts that display elements connected in some relationship, and flow charts that provide more information about relationships, for example.

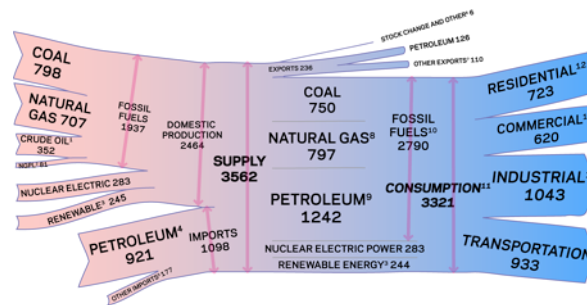
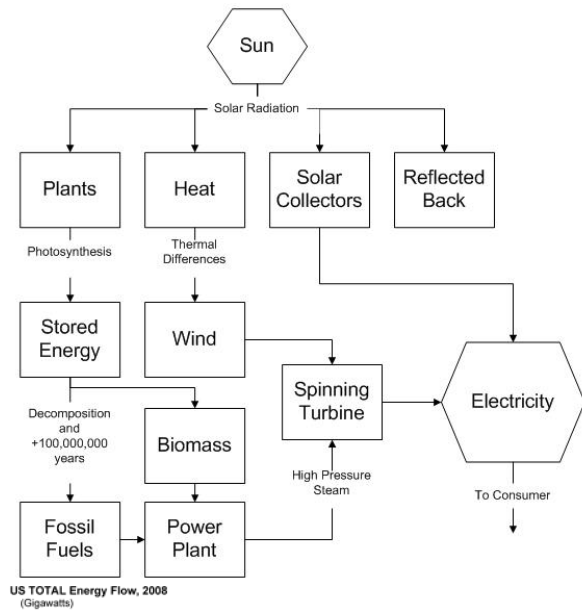
Some types of **charts**



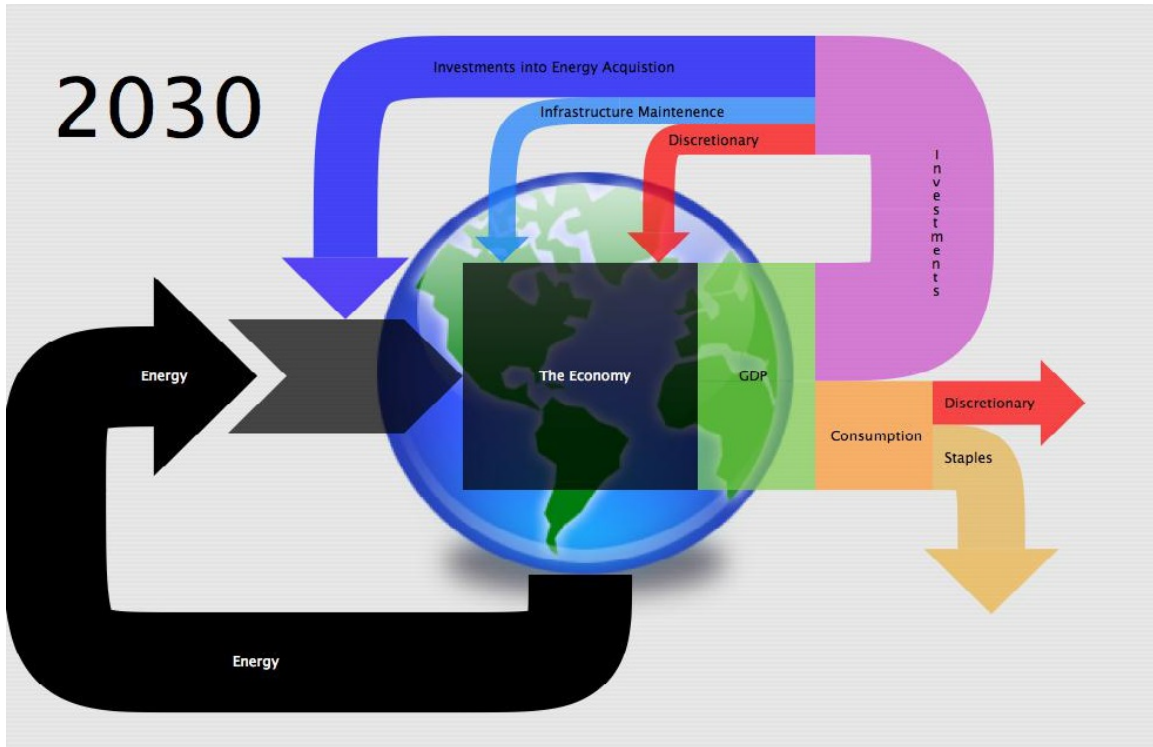
A Pie Chart



Some examples of **flow charts**

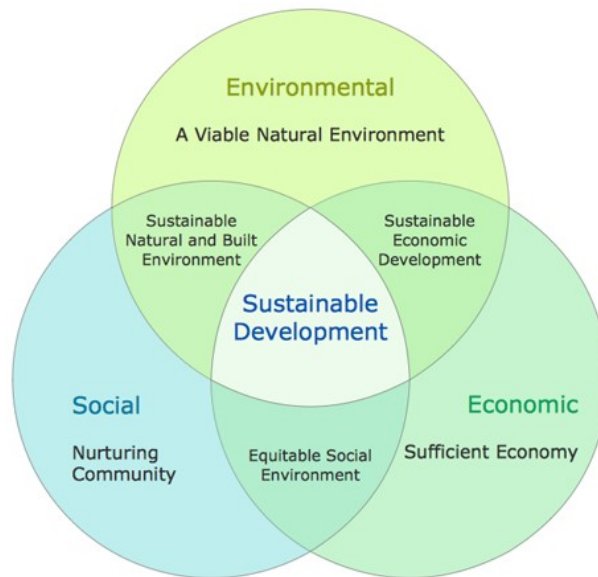


Here is a flow chart showing how energy consumption might be divided up in the future, as access to energy becomes more difficult and more of it must be diverted from consumption just to produce the net energy available to run the economy.

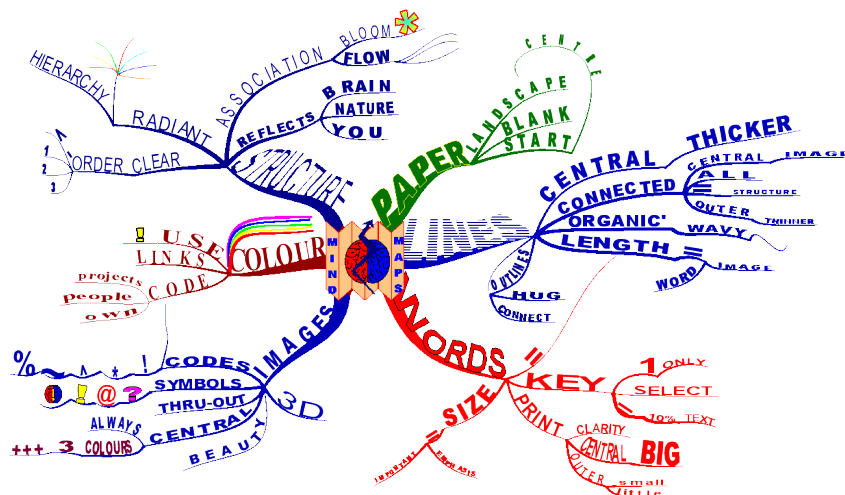
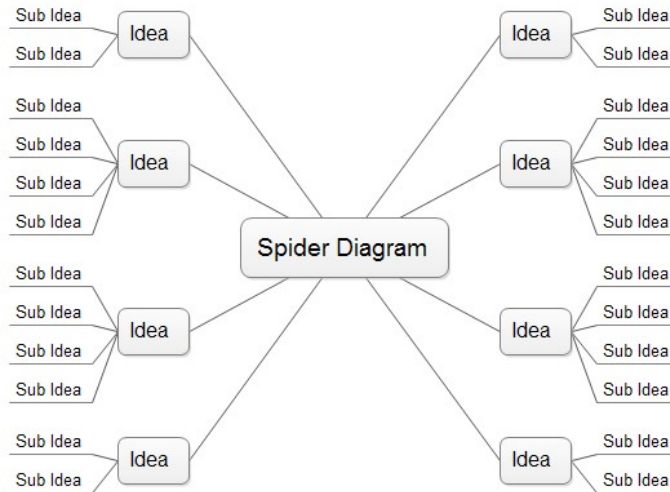


Source: Charles Hall

This is a **Venn diagram**, which uses overlapping circles.

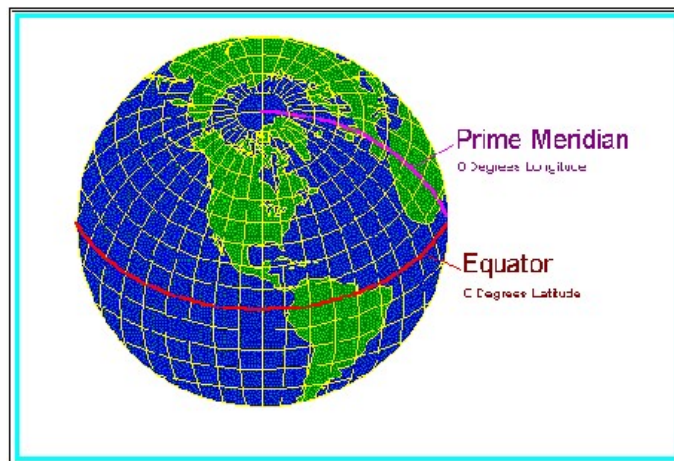
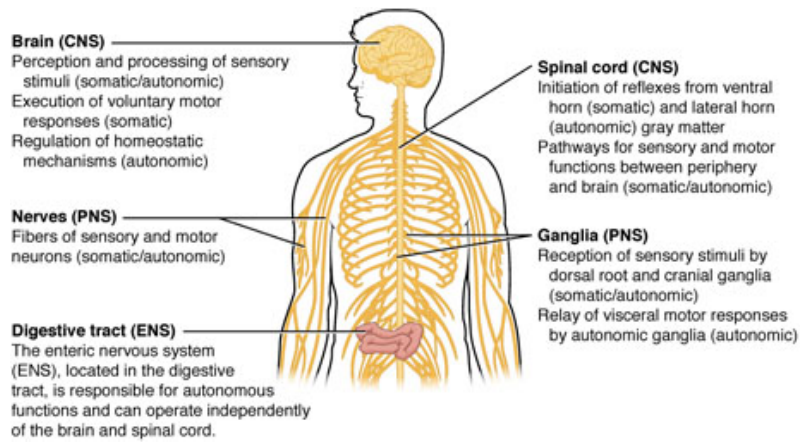


This type of mind map is called a **spray diagram** or **spider map**.

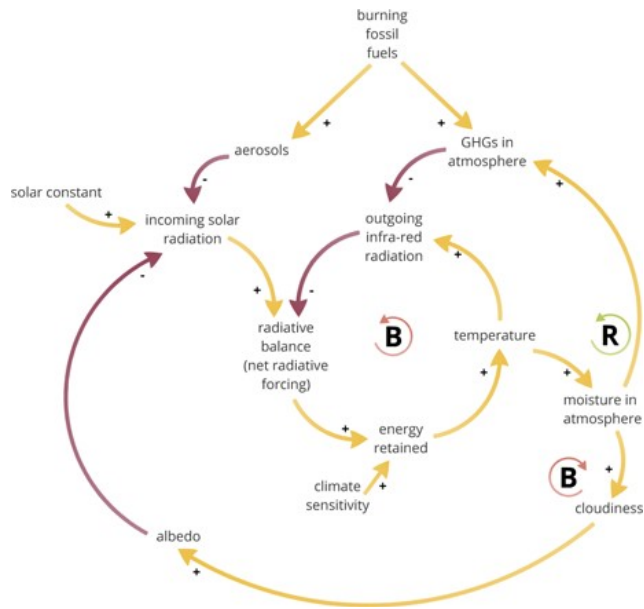


Another way of mind mapping is through the use of rich pictures.

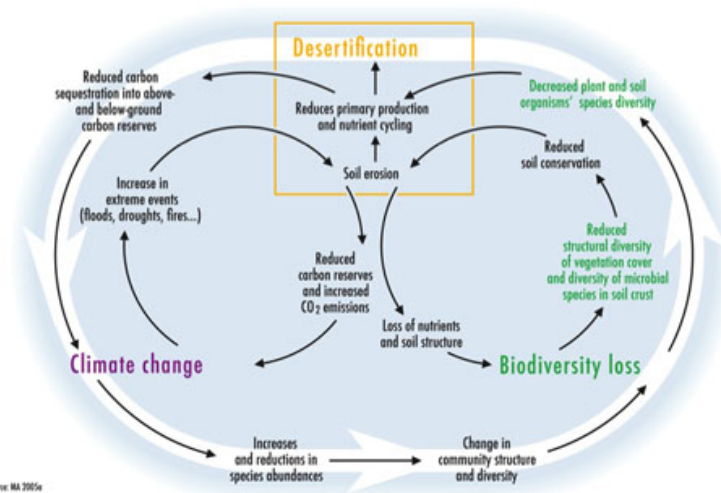
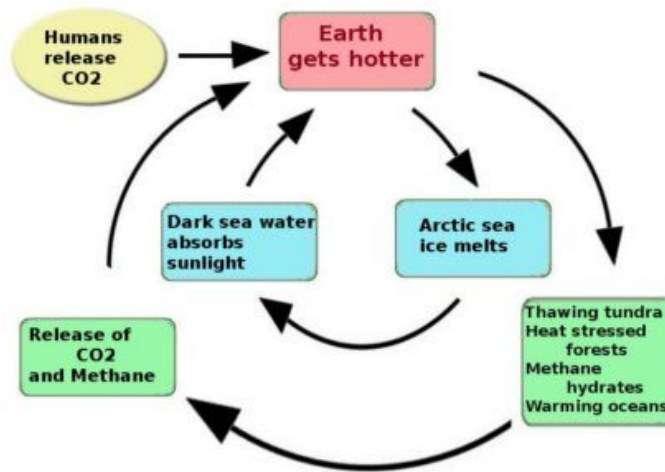
Here are examples of a **systems map**. Systems maps show the structure of a system of interest as a hierarchy of groupings.



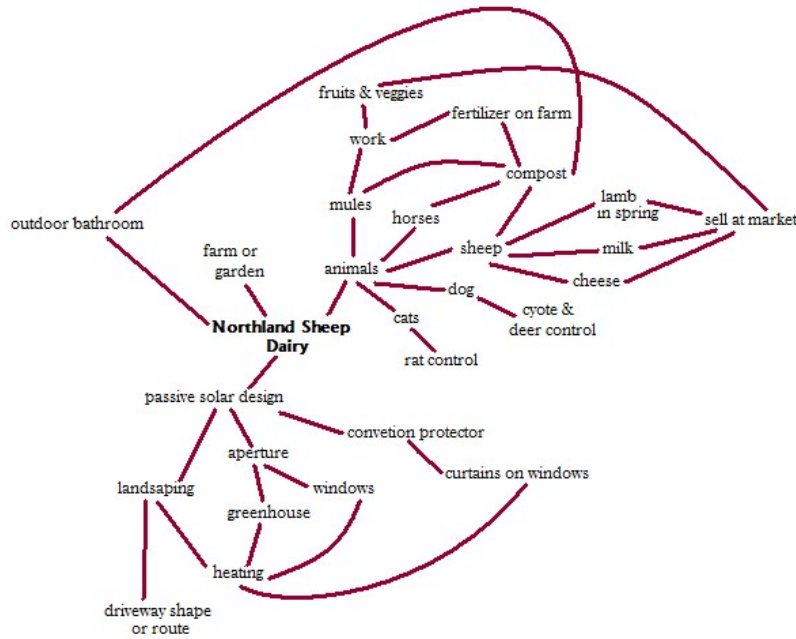
And here are some examples of an **influence diagram** that show **feedback loops** - these will be covered in detail later in the course.



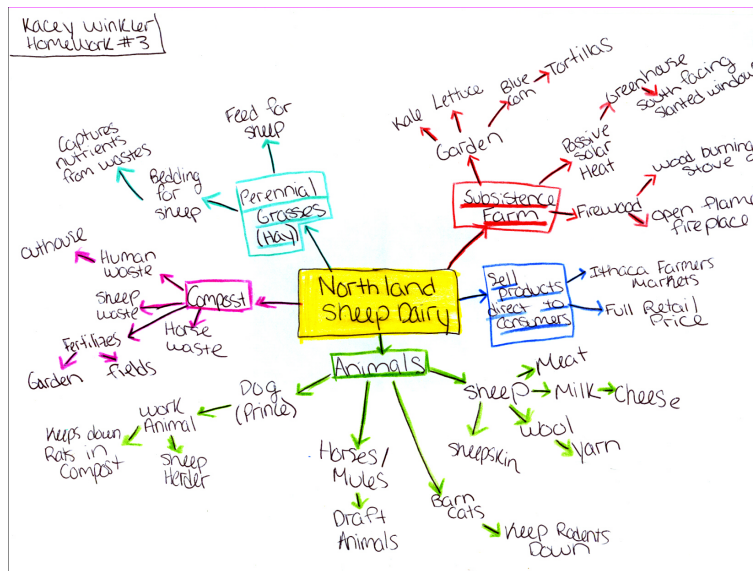
Climate Feedbacks



To demonstrate not only different types of mind mapping, but also how different people/minds mapped the same experience, here are some created by a group of students who visited a farm to study how it works as a complex system. This student's diagram showed static physical relationships.

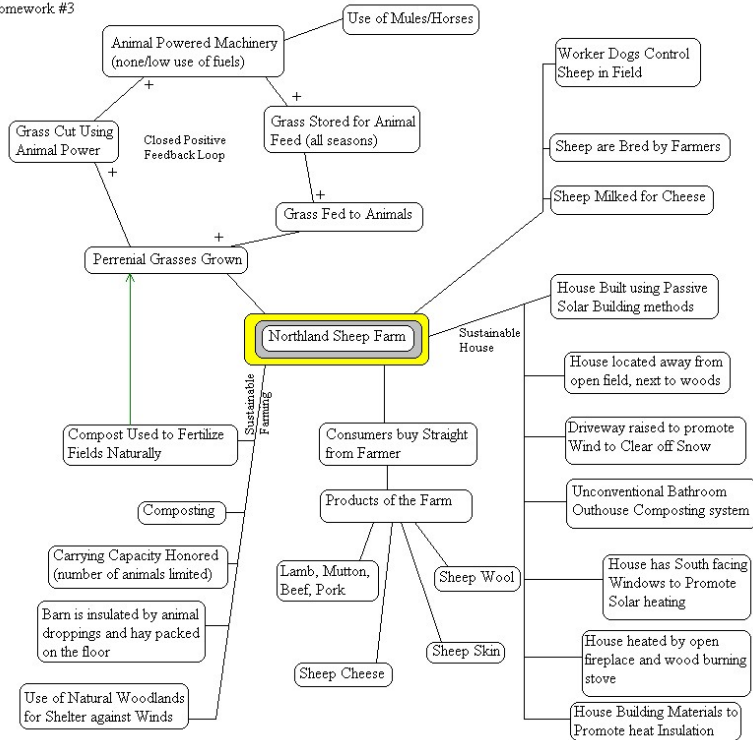


Another student's diagram used color coding to show groupings of parts of the experience as she saw them.



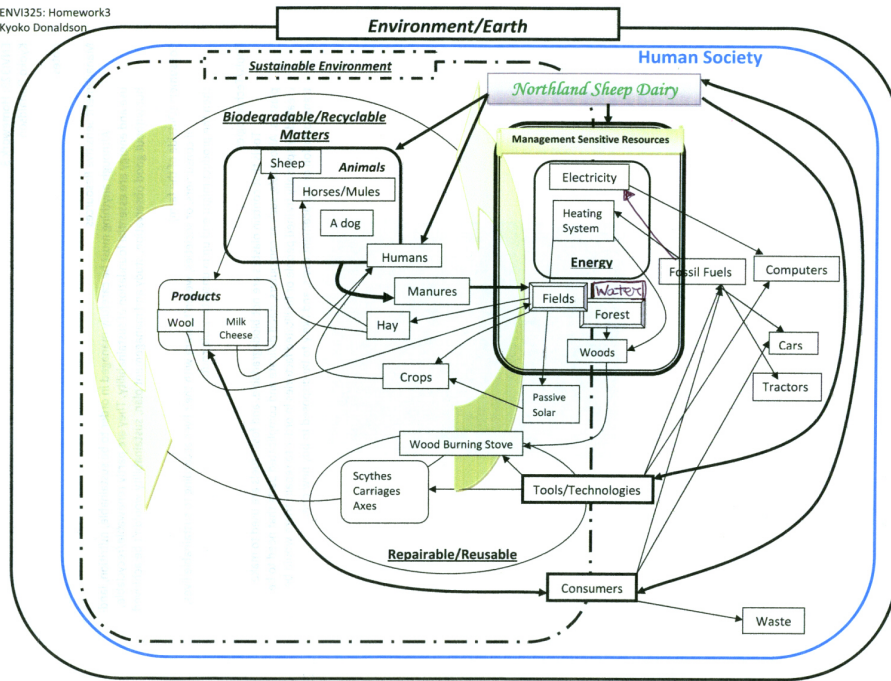
One student's mental model connected some elements in a feedback loop.

Erigitta Berze
Homework #3



Another added explanatory information derived from the experience by setting boundaries around groups and showing directions of influence in the relationships that she saw.

ENVI325: Homework3
Kyoko Donaldson

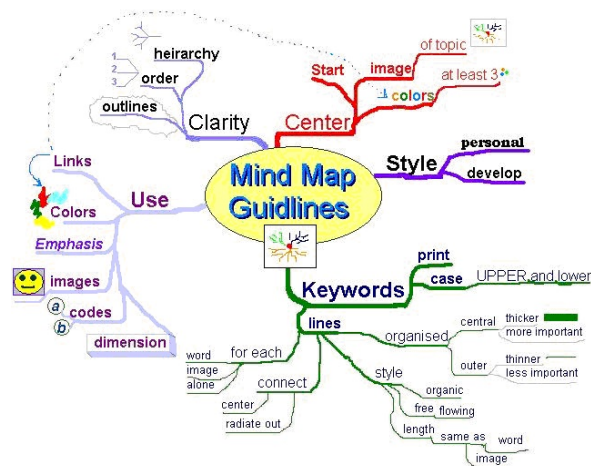


Sharing of mental models via pictures can powerfully stimulate and expand understanding to encompass a bigger picture of a given situation. Students saw some of the experience in similar ways, but when the mind maps were shared, were surprised at the differences in mental models that the maps revealed. Another way to share mental models is brainstorming, in which individuals in a group contribute ideas and create an visual record of their collective mental model in an evolving mind map.



The assignment this week will provide instruction and practice in creating simple mind maps. This practice will lay a foundation for learning to represent causal relationships in a more precise way in diagrams.

1. View [Systems Thinking Practice: Diagramming](#). Study this mind map of guidelines for making mind maps:



Practice: Mind map three personal experiences, one as a spray diagram, one using rich pictures, and one as a systems map. Influence diagrams will be covered in detail later in the course.