

Lesson #2: Sharing Mental Models

Stage 1 – Desired Results	
<p>Established Goals: GLO A</p> <p>1. Examine mental models and their influence on guiding decisions about how to TAKE resources, MAKE material goods from those resources and deal with the WASTE.</p> <p>2. Contrast the linear nature of mental models humans sometimes use to produce synthetic goods (fibers, rubbers, plastics) to the cyclic nature of mental models used to produce goods directly from natural resources</p>	
<p>Understandings: Students will understand that...</p> <p>1. SLO B2: We are generally not informed about where our material goods originate (TAKEN from), how they are made (MAKE) and what is done with them after we are done with them (WASTE)</p> <p>2. SLO C5: There are differences in mental models among people and between people and nature</p> <p>3. SLO C1: It is important that mental models are shared (decision-making)</p>	<p>Essential Questions: SLO A3: How do history and culture (mental models) influence creation and use of technology (how we TAKE-MAKE-WASTE goods)?</p>
<p>Knowledge 1. What a mental model is (including examples)</p> <p>2. SLO B3: We are generally not informed about where our material goods originate (TAKEN from), how they are made (MAKE) and what is done with them after we are done with them (WASTE)</p> <p>3. There are differences in mental models</p> <p>4. SLO A5: Origins of their favourite thing</p>	<p>Skills</p> <p>1. SLO C5: Work cooperatively with others and value their ideas and contributions</p> <p>2. Apply the idea of mental models to their experiences</p>
Stage 2- Assessment Evidence	
<p>Knowledge: Assess understanding of what a mental model is – give examples and non-examples Assess research done on what their favorite thing is made of using rubric designed by teacher and class</p>	<p>Skills: Assess ability to contribute in class or small group discussion:</p> <p>1. How do you think your mental model is the same as/different from others in the world? In the class?</p> <p>2. How important is it to have SHARED mental models?</p> <p>Assess</p> <p>3. Responses to the handout “My Mental Model” (by comparing it to a later similar assignment to see whether their level of analysis about mental models has become deeper (this assignment could be given again later for this purpose)</p>
Materials Required	
<p>Powerpoint Presentation “Examining Our Mental Models” (slides #3-12) (includes images from Arthus-Bertrand, Y. (2001). Earth From Above, 365 Days. New York: Harry N. Abrams, Inc.)</p> <p>Toy cars and traffic lights etc.</p> <p>Class sets of student handout: My Favorite Thing My Mental Model</p>	
Stage 3 – Learning Plan	
<p>Learning Activities:</p> <p>1. Slide 3 DISCUSS: What is a mental model?</p> <p>a) USE toy cars and traffic lights to give the example of mental models behind driving a car – certain basic assumptions that you will make – certain understandings you understand and operate within – everyone SHARES the mental model</p> <p>b) PROMPT What would happen if we decided that we would drive on the opposite side of the road? Ever been to London?</p> <p>c) PROMPT learners to offer examples of mental models</p> <p>d) EMPHASIZE how important it is that everyone agree on the fundamental core ideas of driving a car (ie the mental model must become a <u>shared</u> mental model before it really “works”)</p>	

2. **Slide 4** INTRODUCE important points:
 - *to realize what our mental models are
 - *to realize the importance of having SHARED mental models
 - *to realize how our mental models influence our understandings and our actions
3. **Slide 5** – INTRODUCE Activity: My Favorite Thing
4. STUDENT HANDOUT: My Favorite Thing
 - Individually complete questions #1,2,3 under heading “Description of My Favorite Thing”
5. In partners or in SMALL GROUP DISCUSSION share responses and look for similarities In WHY you chose these particular items
6. **Slide 6** In large group, TYPE some of the responses that were similar among group members (avoid singling out specific people) **TYPE ANSWERS DIRECTLY ON THE SLIDE FOR LATER REFERENCE**
7. **Slides 7-11** Highlight the need to take a global perspective when asking questions about mental models. How might the choice of “favorite thing” change for different people globally?
 - *Emphasize that not all cultures have access to plastics, rubbers, and other SYNTHETICS as we do
 - *Cultures who are not dependent on natural environment (ie non-subsistence cultures) “lose touch” with what things are made of and how things are made
8. **Slide 12:** TYPE responses to the question “What do our collective responses show about our mental models about the TAKE-MAKE-WASTE of what we consume?” **TYPE ANSWERS DIRECTLY ON THE SLIDE FOR LATER REFERENCE**
9. DISCUSS difficulty level of question #3 if you chose something produced by society rather than a “naturally made” product like a food. Are we disconnected from the origins of what we consume?
10. INTRODUCE the difference between natural raw materials and synthetically produced materials (briefly, operationally)
11. Returning the HANDOUT: My Favorite Thing, DIRECT students to RESEARCH what their most useful thing is made of to help them answer questions #1 and #2 under heading “Origins of My Favorite Thing” (At minimum to the level of natural or synthetic)
12. HANDOUT: My Mental Model. You may choose to share the last item in which students give specific examples of experiences where mental models were shared or not shared. Some students might feel quite private about their mental models (or may not yet be fully aware of their mental model). Students may not be accustomed to thinking this way and so small groups might help here.

Homework Learning Activities

INDIVIDUAL ASSIGNMENT: Would you “buy” differently if you knew that you had to return everything back to where it was originally made from?

Extension Learning Activities

Notes For Educator

Be aware that not all students will hold similar mental models. Encourage all to share their mental models and encourage respect for all mental models

My Favorite Thing

Description of My Favorite Thing

1. My favorite thing(s):
2. Why I chose it:
3. A list of what it is made of:

Analyzing The Origins of My Favorite Thing

1. Classify each item in your list in #3 above as natural (ask "was it made from an animal, plant, or earth process? Could you find it as a raw material in nature?") or synthetic (made by people from natural raw materials). Ignore the column titled "origin" for now. Leave 4 blank lines between the items you list.

Natural

Origin
(name the
organism)

Synthetic

Origin
(name the raw materials, physical processes,
chemical processes)

2. Now we will complete the columns titled "origin". For each item you listed, describe the origin of that item. For items in the "natural" column for instance, describe how nature provides that item (ie the organisms involved: silk is made from a worm). For items in the "synthetic" column, describe what raw materials we need to make the materials and name physical and chemical processes humans use to make these items (ie soap is made from boiling oils or solid fats with solutions of either sodium hydroxide or potassium hydroxide) Some research may be involved here. If you need to research where some of the items come from,

(follow your teachers instructions)

My Mental Model

Recall what is meant by a “mental model”:

“Deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action. Very often we are not consciously aware of our mental models or the effects that they have on our behavior.”
(Senge, 1990)

1. What is your mental model about how to make “stuff”? You might find it easier to describe your mental model using a numbered list of important things that need to be considered when making “stuff”.
2. How is your mental model is the same as/different from others in the world? In the class?
3. Since “nature” makes a great deal of “stuff”, how would it describe its mental model about how it “thinks” “stuff” could be made? It may help to pretend that nature could “talk”. Again, you might want to describe it as a numbered list of important things that need to be considered when making stuff.
4. How do you think your model is different than/similar to mental models of nature?
5. What happens when we do not have SHARED mental models? It might help to imagine that we refused to share a mental model on how to drive vehicles or some other everyday activity.
6. From your experience or things you have heard about through other people and through the news or by traveling or just in everyday life, give at least one good example of
 - a) a group of people showing that they have one shared a mental model about something
What were the consequences of having a shared mental model?
 - b) a group of people showing that their mental models are different.

What were the consequences of having different mental models?
7. Do you feel like people worldwide have a shared mental model about how to make “stuff” such as the products that you chose for your organization?
8. Name at least 5 factors that influence your mental models about how you will make your product. Look at your advertisement and motto that you have designed.
9. Ask another person to look at your groups’ advertisement and motto and tell you what they think your “mental model” is.