Our First MEL: Wetlands

Philadelphia & NJ's Wetlands

Awbury Arboretum

Southern Wetlands Park at the Delaware River Front

21% of NJ are wetlands

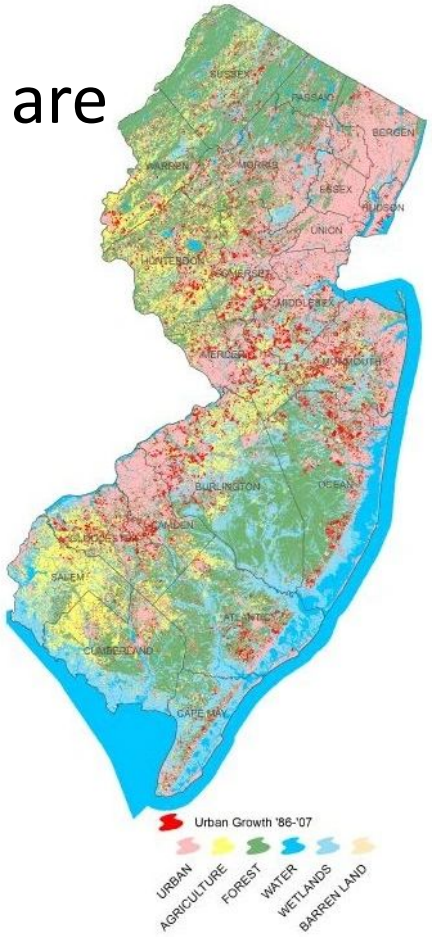


Figure 1.1 Land use and urbanization in New Jersey 1986 through 2007

NJ's Wetlands

Lacustrine System: includes wetlands and deepwater habitats with all of the characteristics situated in a topographic depression or a dammed river channel.

Riverine System: includes all wetlands and deepwater habitats contained within a channel. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

Palustrine System: includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt.

Estuarine System: Tidal wetlands in low-wave-energy environments where the salinity of the water is greater than 0.5 ppt and is variable owing to evaporation and the mixing of seawater and freshwater.

Marine System: Tidal wetlands that are exposed to waves and currents of the open ocean and to water having a salinity greater than 30 ppt.

What are the advantages and disadvantages of wetlands?

Recall...

What is *plausibility*?

What is *falsifiability*?

A. Plausibility Ranking Task

How do scientists change their plausibility judgments?

Name:	**Date:**
Teacher:	**Period:**
Group members, if any:	

Plausibility is a judgment we make about the potential truthfulness of one model compared to another. The judgment may be tentative (not certain). You do not have to be committed to that decision.

Scientists may change their plausibility judgments about scientific ideas. They do this by looking at the connections between evidence and the idea. Evidence may:

- *Support* an idea
- *Strongly* support an idea
- *Contradict* (oppose) an idea
- Have *nothing to do* with the idea

Which type of evidence do you think is most important to a scientist's plausibility judgment? Use numbers 1 to 4 to *rank* each evidence. (1 = most important and 4 = least important). Use each number only once.

Type of evidence	Your ranking
Evidence supports the idea	
Evidence strongly supports the idea	
Evidence contradicts (opposes) the idea	
Evidence has nothing to do with the idea	

When instructed, flip over to Page 2.

ADR: Accuracy Driven Reasoning Activity

Are wetlands relevant? Is the topic of wetlands important to you personally? Is the topic important to your community?

Please circle the choice below that best matches how you feel about the topic's relevance.

Wetlands are **not important** to me *and* are **not important** to my community.	Wetlands are **not important** to me, *but* are **important** to my community.
Wetlands are **important** to me, *but* are **not important** to my community.	Wetlands are **important** to me *and* are **important** to my community.

Introduce Model Plausibility Ratings

Model A: Wetlands provide ecosystem services that contribute to human welfare and help sustain the biosphere.

A person who supports this model makes the following argument:

Wetlands help humans and the environment by purifying water, providing flood protection, helping to keep shorelines stable, recharging groundwater, and maintaining valuable habitat for fish, birds, other animals, and plants.

Model B: Wetlands are a nuisance to humans and provide little overall environmental benefit.

A person who supports this model makes the following argument:

Wetlands create many problems for humans, including flooding at times of heavy rainfall, providing a breeding ground for mosquitos and other pests, and preventing development of commercial and residential areas.

Model A
Wetlands provide ecosystem services that contribute to human welfare and help sustain the biosphere.

Model B
Wetlands are a nuisance to humans and provide little overall environmental benefit.

THE LR MEL PROJECT

Model Plausibility Ratings

Individual Task

On the bottom of the sheet, rate the models from 1-10 on how plausible (reasonable or probable of truth) you feel they are.

- If you are pretty sure a model might be true, that means the plausibility is high—7, 8, or 9 on the scale.
- If you are pretty sure a model is false, that means the plausibility is low—1, 2, or 3.

Model A
Wetlands provide ecosystem services that contribute to human welfare and help sustain the biosphere.

Model B
Wetlands are a nuisance to humans and provide little overall environmental benefit.

Discuss:
Model Plausibility Ratings

Model A
Wetlands provide ecosystem services that contribute to human welfare and help sustain the biosphere.

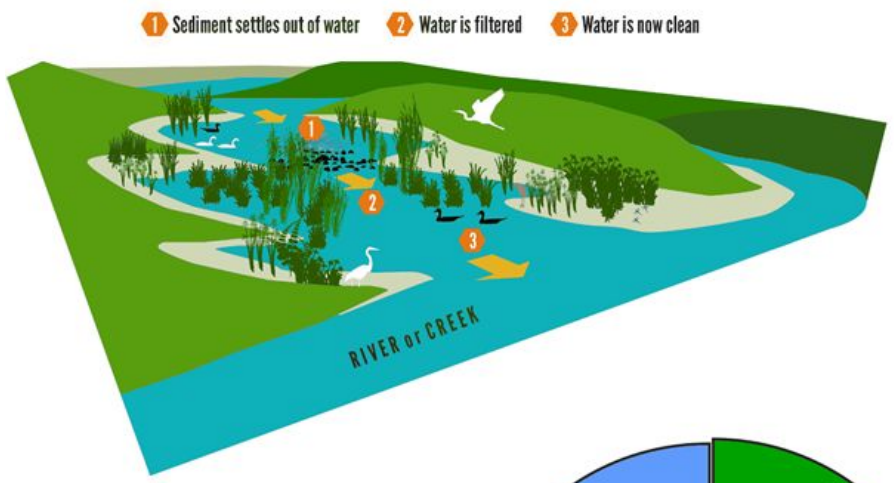
Model B
Wetlands are a nuisance to humans and provide little overall environmental benefit.

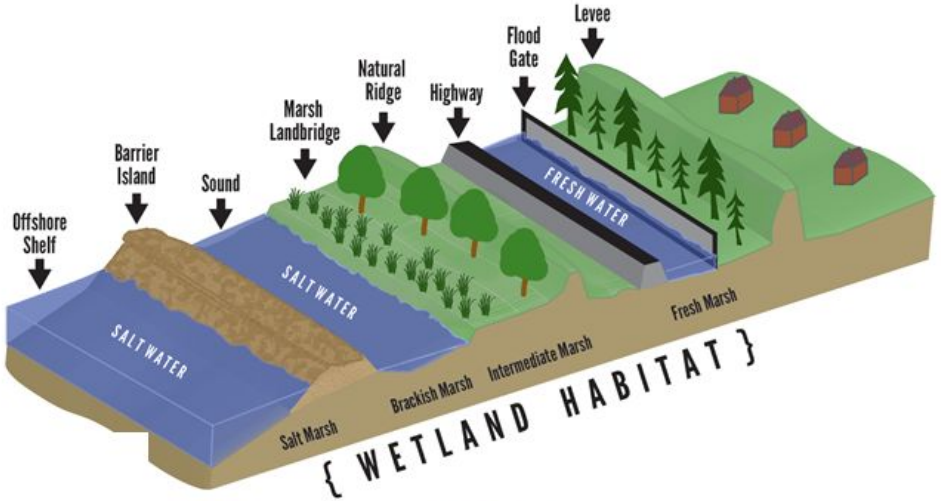
Circle the plausibility of each model. [Make two circles. One for each model.]

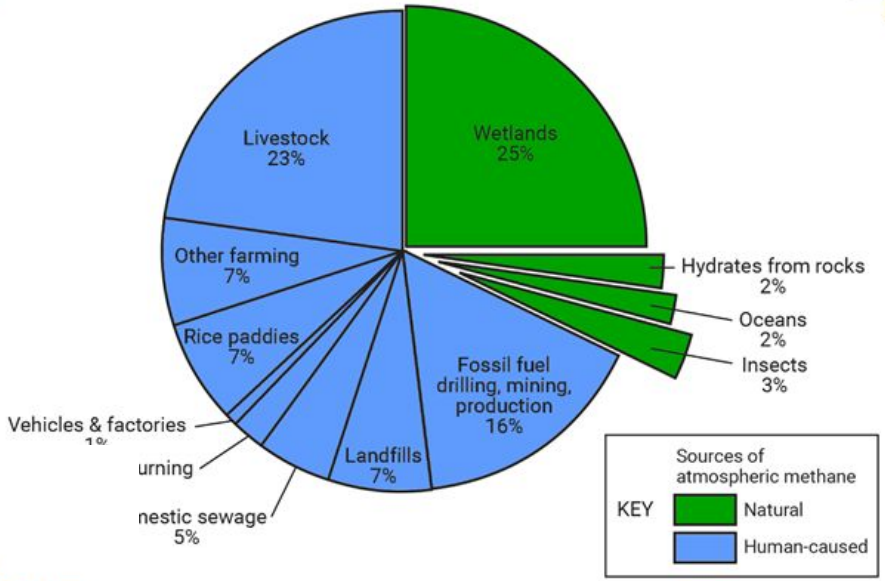
	Greatly implausible (or even impossible)									Highly Plausible
Model A	1	2	3	4	5	6	7	8	9	10
Model B	1	2	3	4	5	6	7	8	9	10

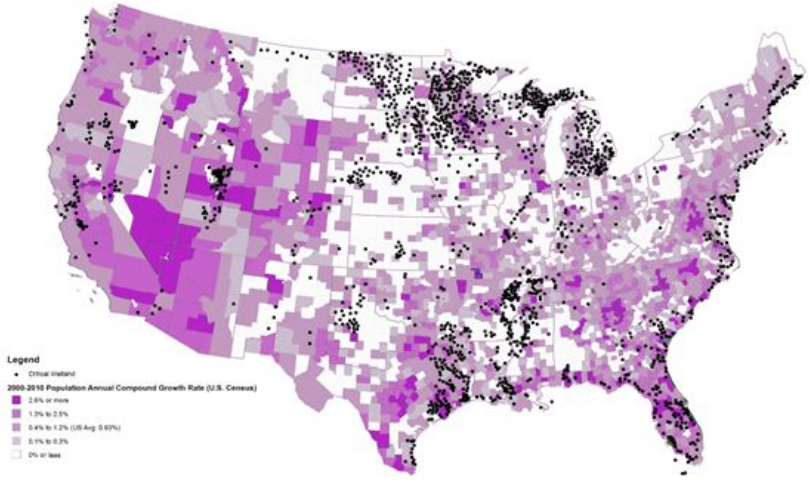
What are some factors that you considered when determining the plausibility of the models?

Evaluating Lines of Evidence: Read and Discuss









Why is it important to accurately evaluate connections?

1. **Before you build and complete your diagram, answer the following questions:**

Why is it important to accurately evaluate connections between evidence and models? Check all the boxes that you think apply.

- ☐ Accurately evaluating connections helps me check if models are supported by strong, relevant evidence.
- ☐ Accurately evaluating connections helps me make sure that models align with popular opinions and trends.
- ☐ Accurately evaluating connections helps me make scientific judgments about model truthfulness.
- ☐ Accurately evaluating connections helps me identify gaps or inconsistencies in the evidence supporting the model.

Explain why you selected your choices above. What was your reasoning for the selections you chose?

MEL Diagram: Wetlands and Land Use

Go through and carefully read each of the 4 lines of evidence. Think about each question as you read:

- Does the evidence support the model(s)?
- Does the evidence strongly support the model(s)?
- Does the evidence contradict the model(s)?
- Does the evidence have nothing to do with the model(s)?

Draw 2 arrows from each evidence box, one to each model (totaling 8 arrows).

Use the key to show how each evidence relates to the model.

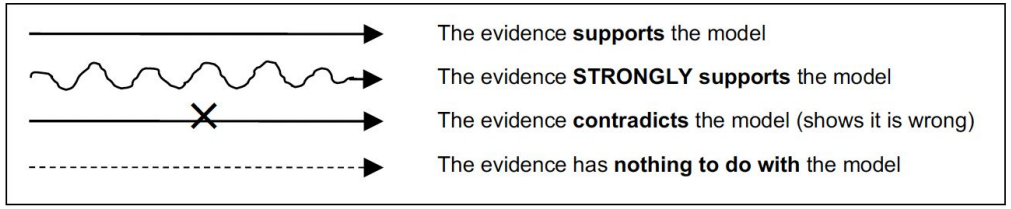
Name: **Date:**

Teacher: **Period:**

Group members, if any:

Directions: **Draw 2 arrows from each evidence box, one to each model. You will draw a total of 8 arrows.**

Key:



Evidence #1
Wetlands play a role in the global cycles of carbon, nitrogen, and sulfur. Wetlands change these nutrients into different forms necessary to continue their global cycles.

Model A
Wetlands provide ecosystem services that contribute to human welfare and help sustain the biosphere.

Evidence #3
Wetlands contribute 70 percent of global atmospheric methane from natural sources.

Evidence #2
Flooding is a natural occurrence in low-lying areas and wetlands are places where floodwaters can collect.

Model B
Wetlands are a nuisance to humans and provide little overall environmental benefit.

Evidence #4
Many wetlands are located in rapidly developing areas of the country.

Large Group Discussion

Let's Compare!

- Evidence 1 to Model A? Model B?
- Evidence 2 to Model A? Model B?
- Evidence 3 to Model A? Model B?
- Evidence 4 to Model A? Model B?

What process did you use?

What disagreements did you have?

Did you change your mind?

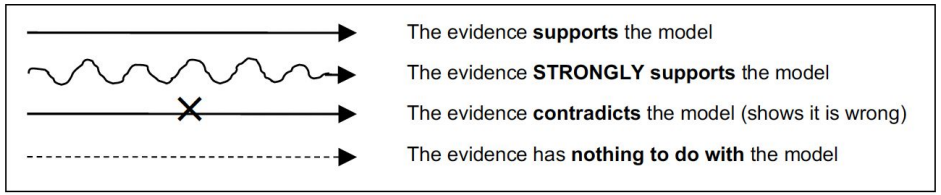
Name: **Date:**

Teacher: **Period:**

Group members, if any:

Directions: Draw 2 arrows from each evidence box, one to each model. You will draw a total of 8 arrows.

Key:



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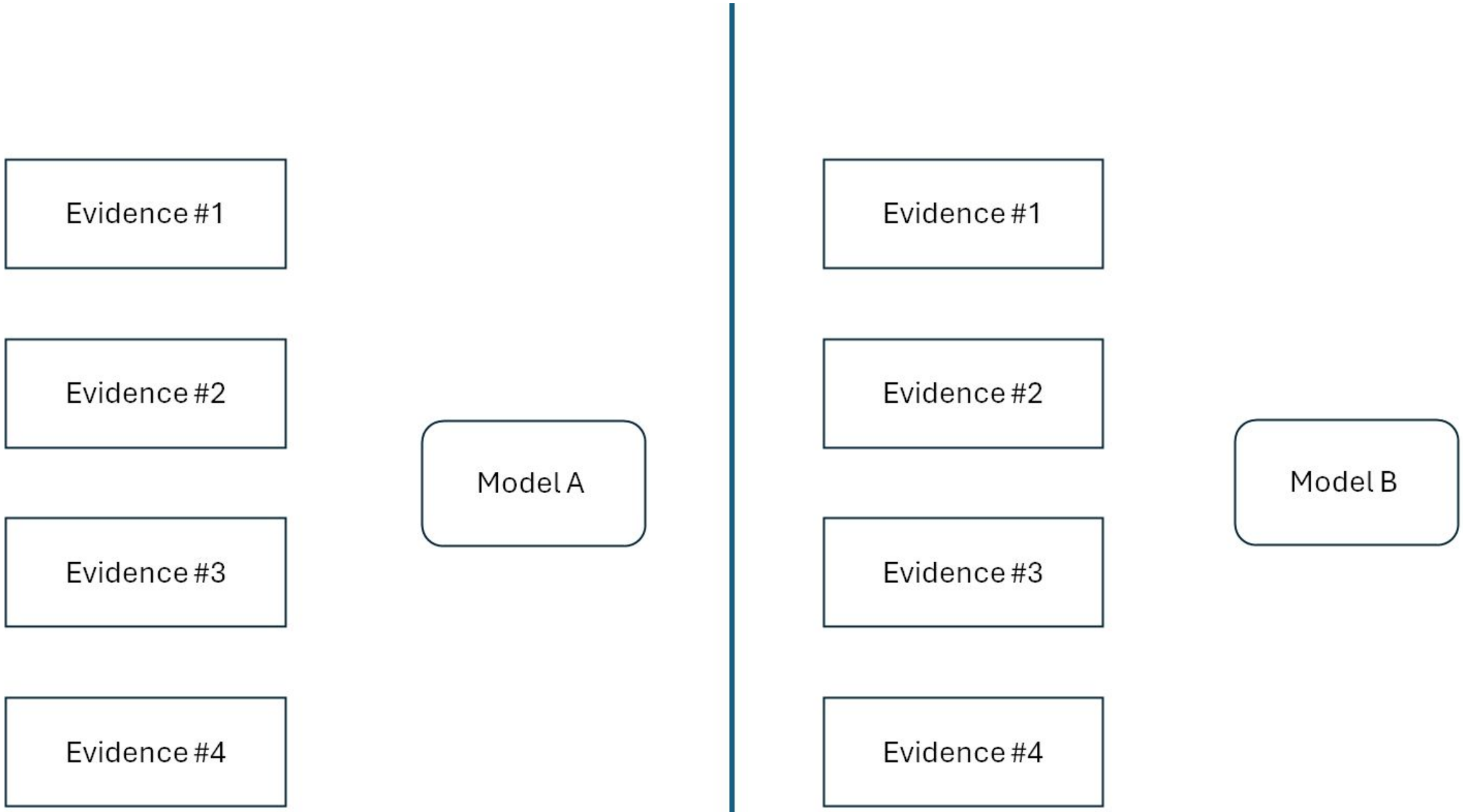
pcMEL Diagram (05/2023)


Evidence #1
Evidence #2
Evidence #3
Evidence #4
Model A
Evidence #1
Evidence #2
Evidence #3
Evidence #4
Model B

Generating Explanations

The final task is for you to revisit the plausibility of each model, and then choose two of your strongest links to discuss. Select the two most interesting or important arrows in considering the plausibility of the models.

Justify your reasoning for choosing the links between the evidence and model in the space provided on the sheet. This task is very important so please explain thoroughly.

Please work on this part <u>individually</u> after you complete your diagram.

1. Now that you have completed the diagram, reconsider the plausibility of Models A and B (and C, if there is one). Circle the plausibility of each model. [Make one circle for each model.]

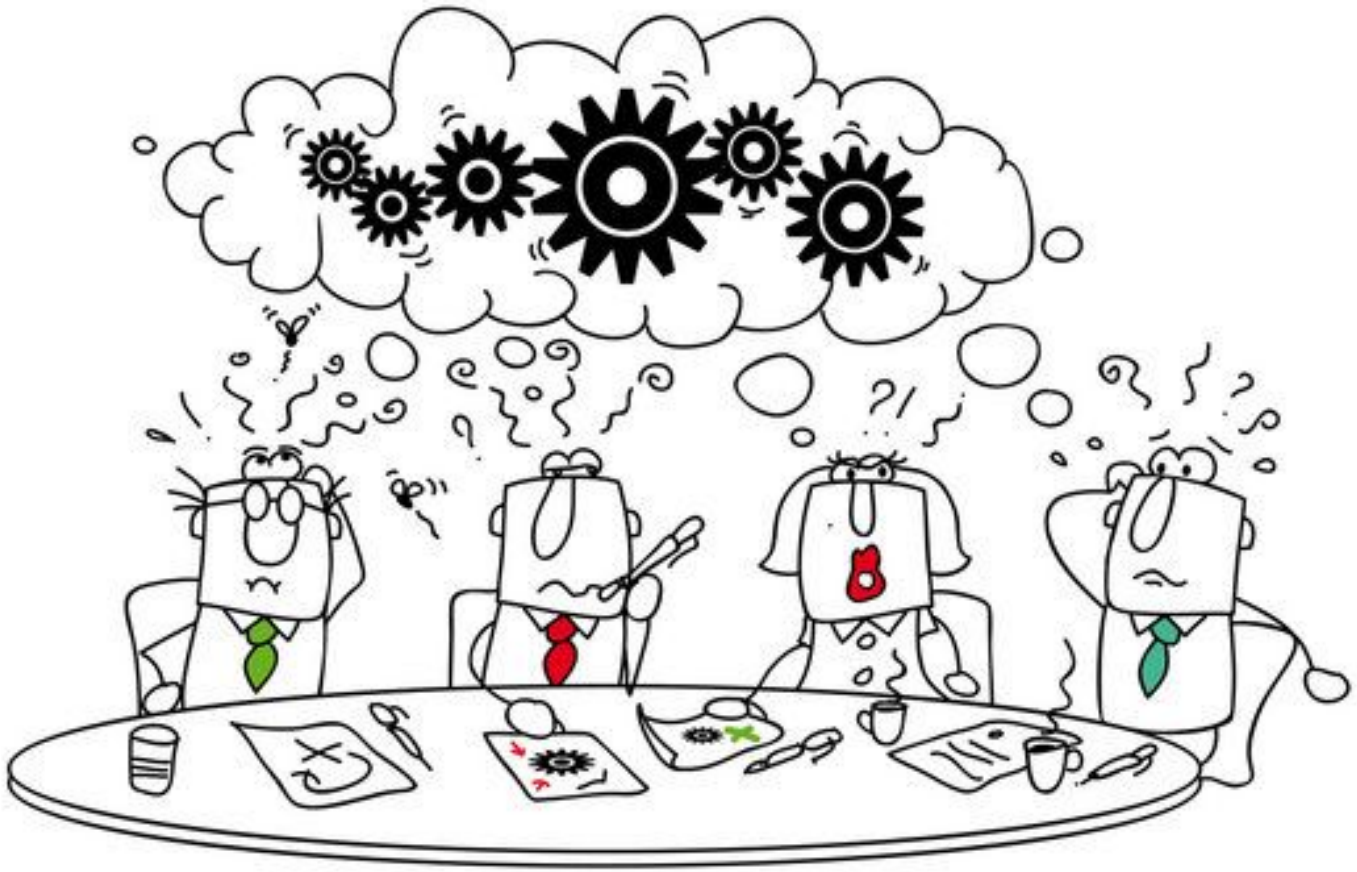
	Greatly implausible (or even impossible)									Highly plausible
Model A	1	2	3	4	5	6	7	8	9	10
Model B	1	2	3	4	5	6	7	8	9	10
Model C (if there is one)	1	2	3	4	5	6	7	8	9	10

2. For the model you selected as most plausible, explain why you think so.

3. Which arrows changed your plausibility judgments about the models? If your plausibility judgment did not change, which arrows supported your original plausibility judgments? Consider 2 lines of evidence. For each line, does it support, strongly support, or contradict one of the models? Why? When writing your explanation, consider the following:
   - Use the specific information from the evidence text and figures to support your response. Ex: when looking at graphs or figures, be sure to describe the patterns in the data.
   - Describe any cause-and-effect relationships found in the text.

Evidence #___ strongly supports | supports | contradicts | has nothing to do with Model____ *because*:

Debriefing



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