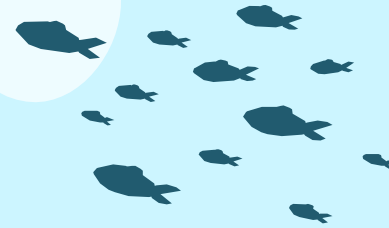
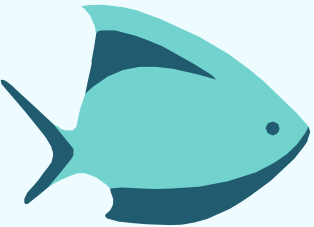
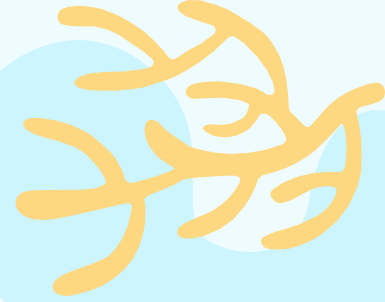


# Scientific Modeling



## Session 4

# What did we do last time?

1. Talked about how to respond to feedback
2. Updated models based on comments you received from your peers and Fresh Org.
3. Looked at two pieces of evidence in MEME.
4. Updated models based on the evidence.

# What will we do today?

1. Update from Fresh Perspectives- new evidence!
2. Use MEME to look at evidence and revise the model
3. Gallery walk - give feedback to other groups

# Evidence-Fish Autopsy Results

## Fish Autopsy Results

The scientists at Fresh Org decided to look into how some of the fish in Blue Pond died, to see if they could find any common patterns. They have put their results in the table below with predictions on how these fish most likely died:

Table: Autopsy results of ten fish taken from Blue Pond

Fish	Weight	Bones	Toxins	Blood oxygen	Likely cause of death
1	Normal	OK	Negative	Low	Suffocation
2	Normal	OK	Negative	Low	Suffocation
3	Normal	OK	Negative	Low	Suffocation
4	Normal	OK	Negative	Low	Suffocation
5	Normal	OK	Negative	Low	Suffocation
6	Normal	Broken	Negative	Low	Attacked by a turtle
7	Normal	OK	Negative	Low	Suffocation
8	Normal	OK	Negative	Low	Suffocation
9	Normal	OK	Negative	Low	Suffocation
10	Normal	OK	Negative	Low	Suffocation

# Share Out

- What did you learn from the evidence?
- Did you make model changes?

# Evidence-Algal Blooms and Deadzones



## Algal Blooms and Deadzones

Dead zones are areas of water bodies where aquatic life cannot survive because of low oxygen levels. Dead zones are generally caused by lots of nutrients washing into the water, and are primarily a problem for lakes and coastal waters since they receive excess nutrients from upstream sources, such as farms or factories.

Excess nutrients can cause an overgrowth of algae in a short period of time, also called algae blooms. The overgrowth of algae consumes a lot of oxygen and blocks sunlight from underwater plants. The lack of oxygen makes it impossible for aquatic life to survive. The largest dead zone in the United States is in the Gulf of Mexico and occurs every summer as a result of nutrient pollution from the Mississippi River.

# Share Out

- What did you learn from the evidence?
- Did you make model changes?

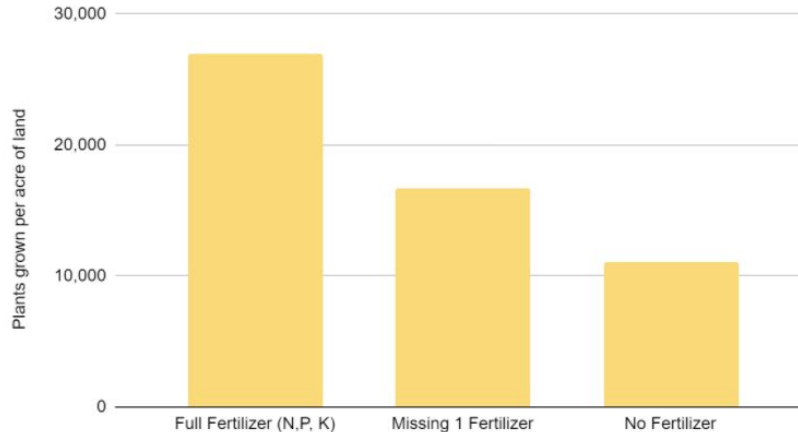
# Evidence-Fertilizer and Farms

## Fertilizer and Farms

### What happens to farms without fertilizer?

When plants grow, they take up minerals and nutrients from the soil. When we grow a lot of plants in the same area - especially 'heavy feeder' crops like corn, rice, tomatoes, and wheat - the plants tend to take up nutrients faster than they are naturally built up in the soil. In order to make enough food to feed people each year, modern farmers normally fertilize their fields with nitrogen (N), phosphorus (P), and potassium (K), the minerals that plants take up the fastest. If these fertilizers aren't added, there aren't enough nutrients to go around and fewer plants are able to mature and produce food.

Harvest based on Fertilizer Use

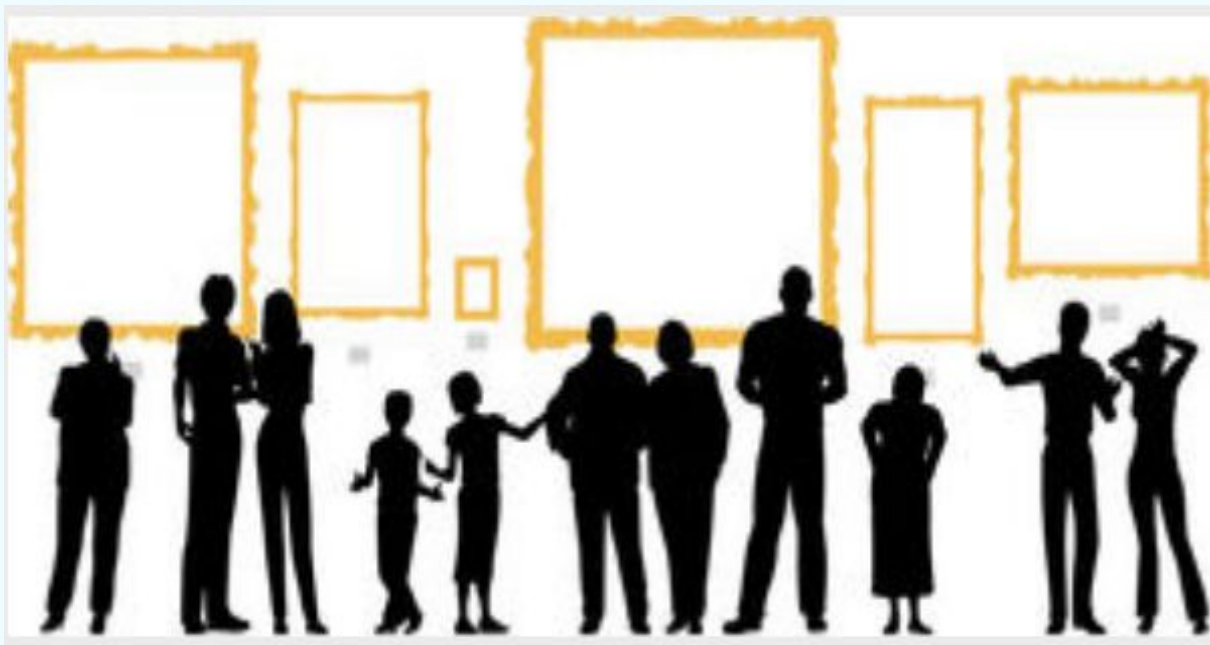




# Share Out

- What did you learn from the evidence?
- Did you make model changes?

# Gallery Walk

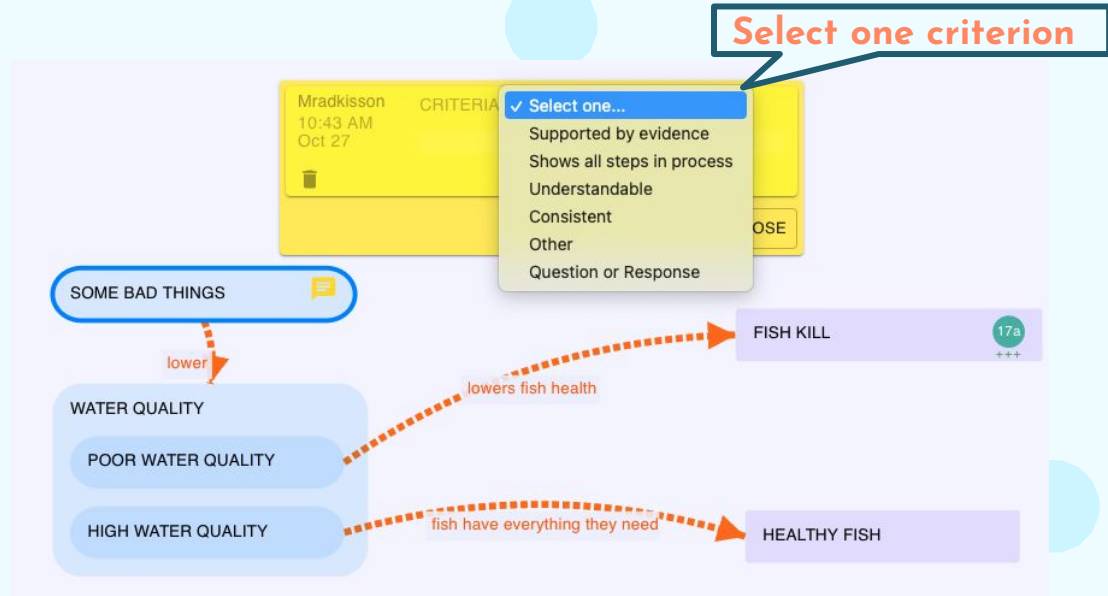


# Gallery Walk

You will evaluate other groups' models based on the criteria list.

## Criteria List

- a) Supported by evidence (no contradictory evidence)
- b) Shows all steps in process
- c) Understandable
- d) Consistent (doesn't contradict itself)



Do we need to make changes  
to the criteria list?

## Let's do the gallery walk!

- You can be helpful by leaving **positive** and **critical** comments on their model.
- This means we can learn and help each other learn also.

# Share Out

- What comments did you make to other groups?
- We need to update Fresh Perspectives on what we did today. What should we tell them?
- What else do you think we need to know?
- Is there any evidence you still want to see?



**See you next time!**

