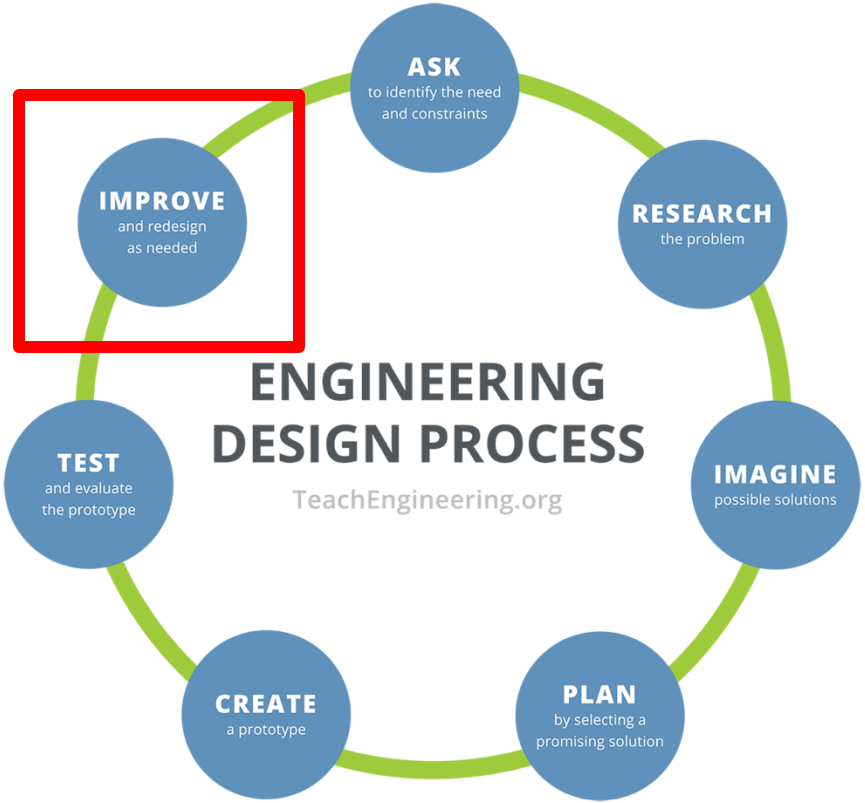
TeachEngineering

Mines to Mobiles: Aqueous Solutions and Environmental Chemistry

Day 5

DAY 5 (45 MINS)

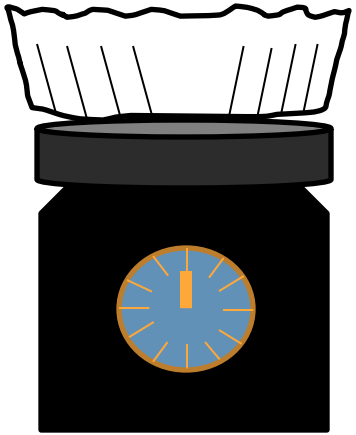


Teach Engineering

DO NOW

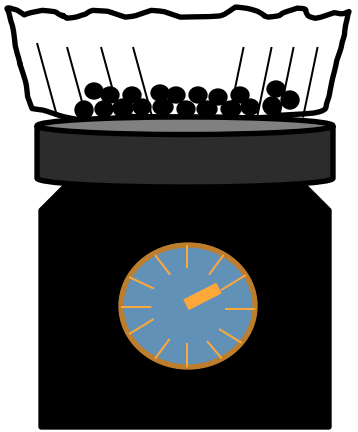
Go and weigh your pepper from yesterday!

Be sure to tare the scale with a fresh coffee filter before weighing your filtered pepper.



Pepper Weigh In

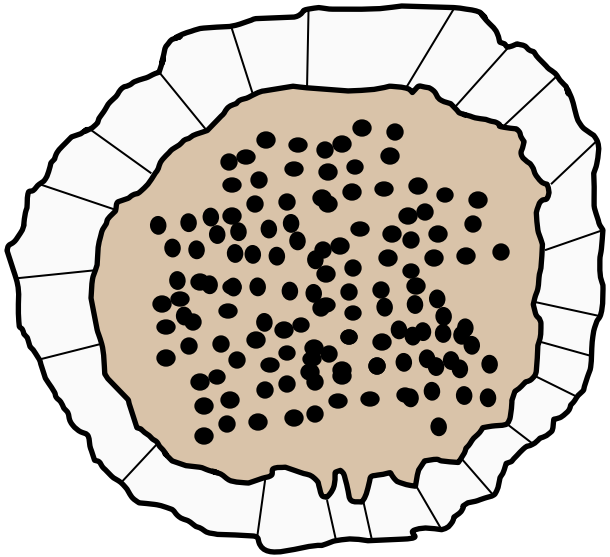
The most pepper you should get is 3 grams. If you have more than 3 grams, you have water in your sample that did not fully evaporate.



HOW WELL DID YOUR METHOD WORK?

On your "**Budget Form**," record the amount of pepper you purified.

Check that there are **no salt or sugar solutes** in your pepper that were not dissolved.



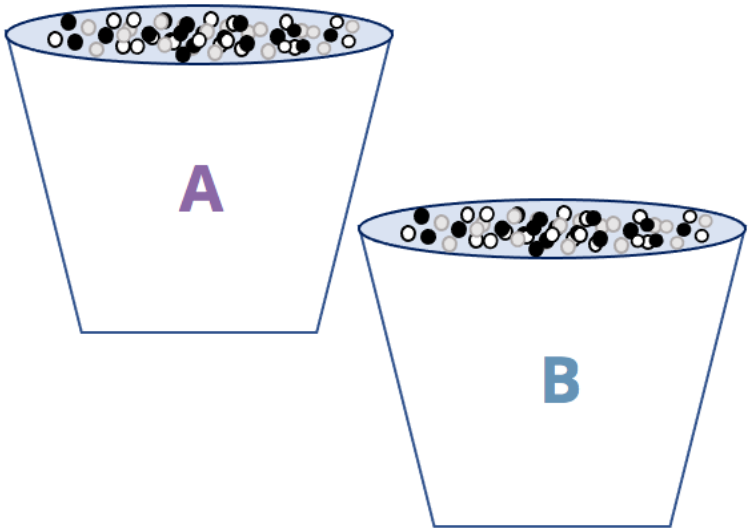
Dried Pepper in Coffee Filter

You should have gotten 3 grams of pepper (terbium).

COMPARE DATA

Find a group with the *same* shipment as you and compare procedures:

- **Star:** What is one thing that worked very well?
- **Wishes:** What are two things that you would change if you could do this method again today?
- **What did you learn about solutions?**

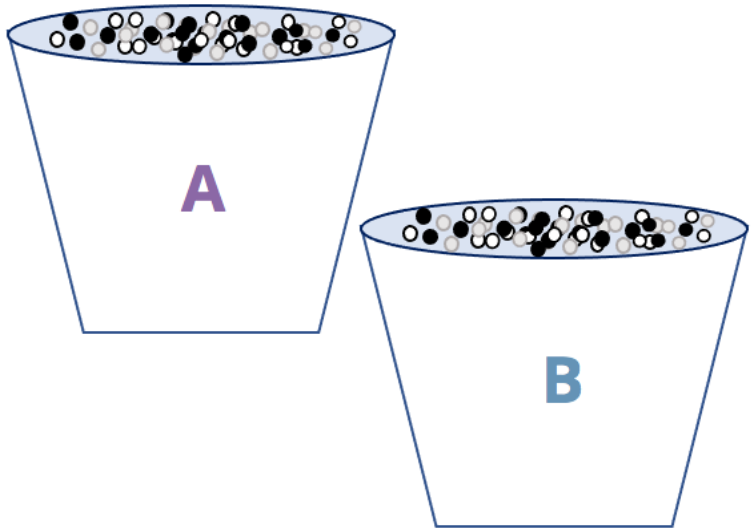


AB Shipments

COMPARE DATA

Find a group with the *opposite* shipment as you and compare procedures:

- **Star:** What is one thing that worked very well?
- **Wishes:** What are two things that you would change if you could do this method again today?
- **What did you learn about solutions?**

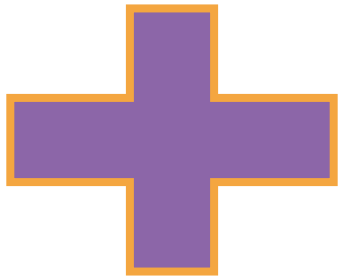


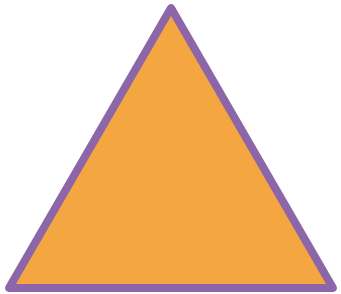
AB Shipments

PEPPER REFLECTIONS

Look back at ***the front of your Budget Form*** with your group where you wrote your “Acid Wash” procedure.

If you were to repeat this experiment today, **mark any changes** on your paper that would either expedite the process or help you extract more pepper solute at the cheapest cost.

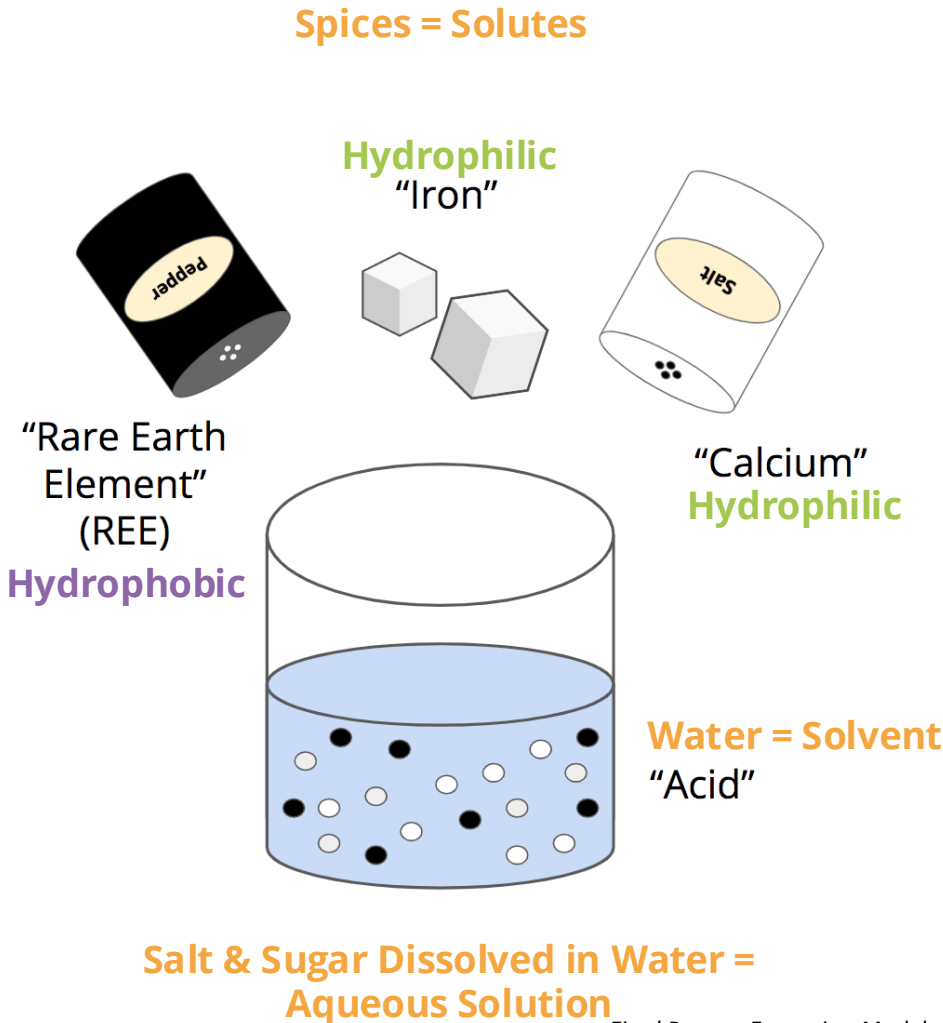




REVISITING OUR MODEL

Talk to a shoulder partner about the following:

1. What have you learned about dissolving solutes through this process?
2. Which is easier to dissolve, salt or sugar? Why?
3. Why is water such a good solvent?
4. What did this competition teach you about mining?

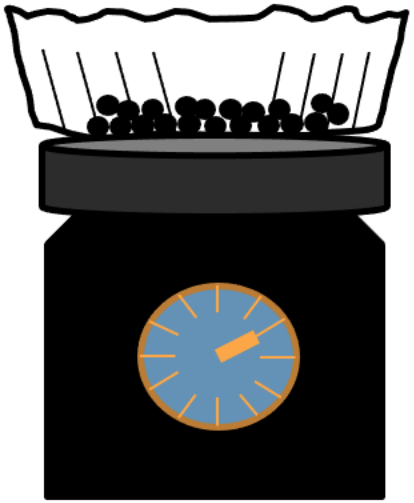


Final Pepper Extraction Model

WHO GOT 3 GRAMS OF PEPPER THE CHEAPEST?

Cost of Supplies and Labor				
Temperature	**Agitation**	**Container**	**Water**	**Mandatory Purchases**
Kettle Water - $10 for 25 mL	Straw - $4	250 mL beaker- $10	$5 for 25 mL	*Paper towel Per Clean Up - $1 per towel
Kettle Water - $20 for 50 mL	Coffee Stirrer/Popsicle Stick - $6	500 mL beaker- $20	$8 for 50 mL	*Shipment of “metals” - $3
Kettle Water - $40 for 100 mL	Spoon- $10	1000 mL beaker - $30	$12 for 100 mL	*Coffee Filter - $1

Cost of Supplies and Labor Orange

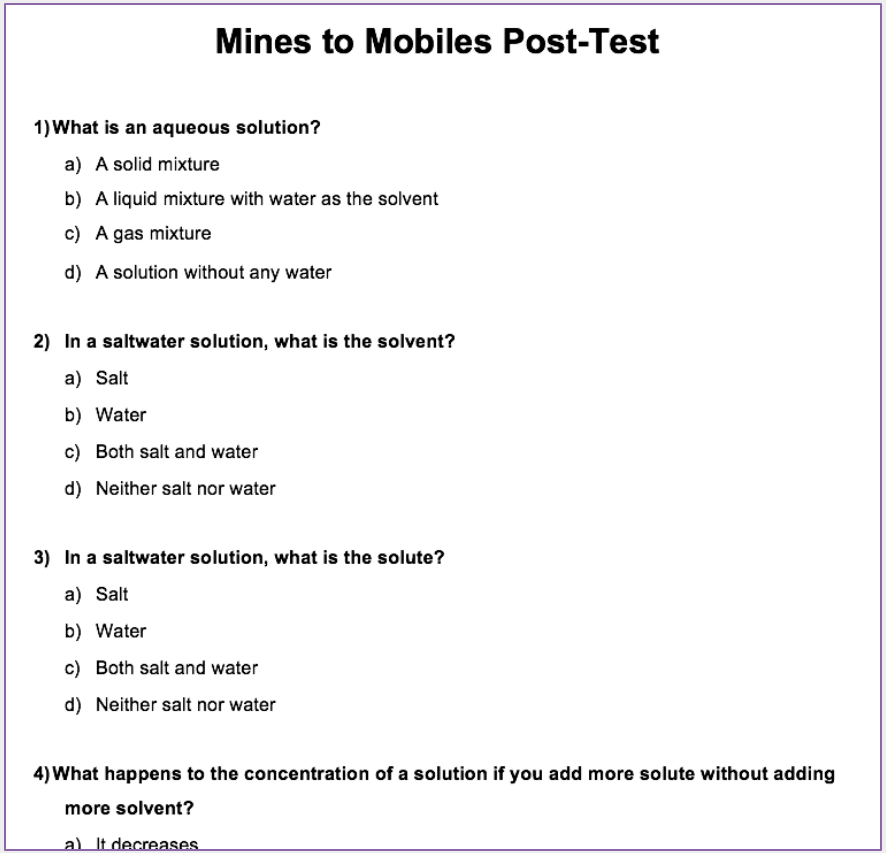


Final Pepper Mass

POST-TEST

Complete on your own.

Try your best, and use your knowledge from the last 5 classes!



Mines to Mobiles Post-Test

1) What is an aqueous solution?

a) A solid mixture
b) A liquid mixture with water as the solvent
c) A gas mixture
d) A solution without any water

2) In a saltwater solution, what is the solvent?

a) Salt
b) Water
c) Both salt and water
d) Neither salt nor water

3) In a saltwater solution, what is the solute?

a) Salt
b) Water
c) Both salt and water
d) Neither salt nor water

4) What happens to the concentration of a solution if you add more solute without adding more solvent?

a) It decreases

Mines to Mobiles Post-Test

END OF ACTIVITY

Citations

- Ademski, E. (2025). *Ab Shipments* [Diagram]. Teach Engineering.
- Ademski, E. (2025). *Cost of Supplies and Labor Orange* [Diagram]. Teach Engineering.
- Ademski, E. (2025). *Dried Pepper in Coffee Filter* [Diagram]. Teach Engineering.
- Ademski, E. (2025). *Final Pepper Extraction Model* [Diagram]. Teach Engineering.
- Ademski, E. (2025). *Final Pepper Mass Model* [Diagram]. Teach Engineering.
- Ademski, E. (2025). *Mines to Mobiles Post-Test* [Diagram]. Teach Engineering.
- Ademski, E. (2025). *Pepper Weigh In* [Diagram]. Teach Engineering.
- Teach Engineering. *NGSS Engineering Design Process* [Diagram].
- *TeachEngineering.Org*, https://www.teachengineering.org/populartopics/designprocess. Accessed 24 June 2025.