Creating a Solubility Curve

This addresses the following standard:

HS-PSC-3.3 Students who demonstrate understanding can: Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

Procedure

1. Label 4 test tubes with a Sharpie: 2g, 4g, 6g, 8g (Note: sharpie comes off with ethanol or isopropanol)

2. In the tube labelled 2g, put 2 grams of KNO_3.

3. In the tube labelled 4g, put 4 grams of KNO_3.

4. In the tube labelled 6g, put 6 grams of KNO_3.

5. In the tube labelled 8g, put 8 grams of KNO_3.

6. Add 5 ml of water to each test tube.

7. Put the test tubes in a beaker of water on a hot plate. Stir to dissolve the salt.

8. While you are waiting, set up a temperature probe.

    Open Vizeey on your phone or Chromebook

    Attach a temperature probe to a databot

    Choose Temperature

    When you are ready to measure the temperature, touch the “play” button.

9. When the salt in a tube has completely dissolved, remove it from the hot water.

10. Stir and watch the tubes until you see KNO_3 coming out of solution.

11. Record the temperatures at which this happens.

12. Since solubility curves are based on 100 mL of water, in your data table, there is also a column that has the KNO_3 mass multiplied by 20 because we only used 5 mL of water.

Grams of Salt Added	Temperature at which crystals begin to form	Grams of crystals added multiplied by 20

13. Open a Google Sheet.

14. Type the word Temperature at the top of column A.

15. Type the word solubility at the top of column B.

16. Type temperatures at which you saw crystals forming down column A.

17. Type the grams multiplied by 20 in column B.

18. Highlight all of the data in the spreadsheet and Insert a Chart.

19. Choose a Scatter plot. This is just dots, no line.

20. Click on the Customize tab.

21. Scroll down and check “trendline.”

22. It will probably default to linear. Check the other kinds of graphs to see if there is a better fit.

23. Change the label to "Use Equation."

24. Insert your graph here