

Visualizing ionic formulas using *Salts and Solubility* simulation from the PhET Activity 1

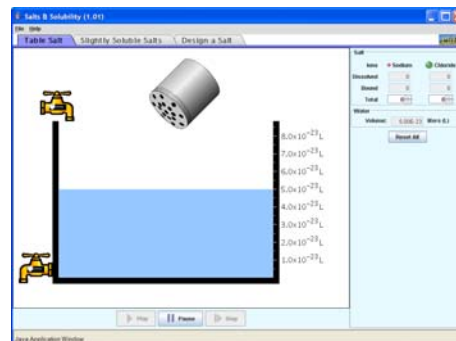
Learning Goals Students will be able to:

- Determine the chemical formula by observation of ionic ratios in solutions
- Relate the simulation scale to real lab equipment through illustration and calculations
- Predict the chemical formula of compounds with a variety of ion charge combinations

Directions Open the *Salts and Solubility* simulation at <http://phet.colorado.edu>

1. Shake some salt out and note the ratio of the sodium to chloride.

- a. Write a formula for sodium chloride using the periodic table to find the elements' symbols.
- b. Check with the instructor to see if your answer makes sense.



2. Go to the *Slightly Soluble Salts* tab.

- a. Determine the formulas of the other six salts. Make up symbols for Arsenate and Phosphate, they aren't elements, so you won't find their symbols on the periodic table.
- b. Check a common ions table or use other resources to see what the charge of each ion is and explain why your formulas make sense.
- c. Use resources to find the formulas for the six compounds. Cite the sources. Correct any of your formula and explain the changes you had to make.

4. Look at the volume scale on the Table Salt tab and talk about what the container would look like.

- a. Draw a picture that shows how big the container is compared to a 5 ml test tube.
- b. Show a calculation to support your reasoning.
- c. How would your drawing change for the salts on the *Slightly Soluble Salts* tab?
- d. Why do you think the volume had to change? Explain why the volume change makes sense.

5. Use the *Design a Salt* tab to make models of a variety of ionic combinations. Make a table like the one below. Determine the formula for all possible compounds for ions with charge of -3 to +3; give evidence by drawing a picture of the salt as it is represented in the simulation; explain why the formula makes sense.

Cation charge	Anion charge	Formula C_xA_y	Drawing	Reasoning