

# Soluble Salt and Electrical Conductivity

**Objective:** To explore toxicities that may occur in compost piles

**Introduction:** Compost piles that contain a higher concentration of plant nutrients will also have a higher “salt” level, or electrical conductivity (EC). EC is a measure of the soluble nutrients in the compost and can be measured with an EC meter. Although specific toxicities may occur due to a high concentration of certain minerals, soluble nutrients may reduce plant growth by osmotic effect.

## Curriculum Connections:

Unit B – 1.1-1.4k, 1.1-1.2sts

Unit C – 1.1-1.4k, 2.1-2.4k, 2.3s

## Supplies / Materials:

- Compost samples (classroom composter or local compost from a farm, compost facility or greenhouse)
- Magnifying glasses
- An EC meter (if you have access to one!)
- Science notebook or loose leaf paper
- Writing utensils
- Computers and/or handouts with chart an chemical equations



## SCIENCE FOCUS

### Lesson Subject

Chemistry 30

### Topic

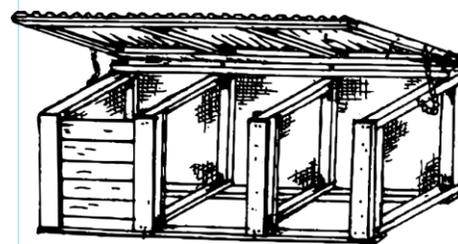
Compost Chemistry

### Location

Classroom

### Length

50 minutes



**Hook:** Give students compost samples to smell, feel and observe. How did we go from dead plant material to this? Provide students with magnifying glasses if possible to get a closer look at the sample.

**Intro activity:** As mentioned in the introduction, compost piles that contain a higher concentration of plant nutrients will also have a higher “salt” level, or electrical conductivity. Higher values of salt may be present with some compost that is high in food waste or animal waste content. Have students list and sketch out an example of food and animal waste that could potentially be found in a compost pile.

**Main Activity:**

$$SAR = Na / (\text{square root of } ([Ca + Mg]/2))$$

In this formula, sodium (Na), calcium (Ca) and magnesium (Mg) are expressed in milliequivalents per litre (meq/l) of soil solution. This is an expression of the concentration of each element in the solution.

Provide sample equations for your students,

- Solve for Mg
- Solve for Ca

**Extension Activity:**

If you have access to an EC meter, gather a variety of soil and compost samples, and test them with the meter. Have your students record results in chart form and discuss their findings. Just a reminder that soluble salt levels in compost can vary depending on the feed stock of your compost pile and how it is processed. Back yard compost may have leaves, food waste, yard waste, etc. A school vermicomposter will have mostly carbon and food waste, and soil from the playground is harder to predict.

Sample #	Type of Soil	EC Meter number
1	Back yard compost	
2	School vermicomposter	
3	Soil from playground	

- What surprised you about your findings?
- Why would your samples have different results?

## Conclusion / Review:

An SAR below 10 is acceptable and does not significantly impact soil properties, while an SAR above 25 has a severe negative impact on soil properties and will affect your potential to sell your compost product.

**Homework:** Have your students write a homework reflection on what they have learned about composting and the importance of checking your soil samples for or electrical conductivity. Although it may not seem important at first, quality soil in the middle of the spectrum is idea for use in personal or market gardening.

## Resources:

1. The Molecules that Make Plant Cells Different:  
[http://www.bio.miami.edu/dana/226/226F08\\_2print.html](http://www.bio.miami.edu/dana/226/226F08_2print.html)
2. Compost Gardener – the Nitrogen Cycle: <http://www.the-compost-gardener.com/nitrogen-cycle.html#bacteria>
3. **Compost Facility Operator Manual:** a compost facility operator training course reference and guide. John Paul and Dieter Geesing.