

# SALT II SOLUTIONS!

## PART 2

### OVERVIEW

In part 1 of this activity students see that salt dissolves in water. Students explore with magnets to get the idea that like forces repel and opposite forces attract. This idea is applied to the salt ions and water molecules to explain how the salt ions are separated in the water.

### GOAL

Students learn that salt ions separate in water according to charges.

### SPECIFIC OUTCOMES

- Students explore magnetic forces
- Students learn table salt is made of positively charged sodium ions and negatively charged chloride ions.
- Students learn water molecules have a positive charge on 1 end and a negative charge on the other end.
- Students learn that charges act like magnetic forces in that like charges repel and opposite charges attract.
- Students learn water molecules break apart salt ions because of charges.

### MATERIALS

For Instructor

- Felt board with felt salt ions and felt water molecules

For students

- Class notes sheets
- Hand held microscopes for pairs of students
- slides from part 1 of activity
- Bar magnet
- Felt board with felt salt ions and felt water molecules for pairs of students
- Atomic Magnifier sheet

### PROCEDURE

*Engage: (20 minutes)*

- Students get into same pair groups as in part 1 of activity.
- Distribute class notes sheets to students.
- Distribute handheld microscopes and slides from part 1 of activity.
- Students record what they see on slides.

**Grade Level:** 5

**Subject Areas:** Science

**Key Concepts:**

- Table salt is composed of sodium atoms and chloride atoms
- In water the sodium and chloride atoms of table salt separate to form a salt water solution
- In the body the sodium and chloride atoms separate
- The separated sodium and chloride atoms in the body play a role in the body's electrical energy.

**Key Cognitive Skills**

- Observation
- Comprehension
- Note Taking
- Data collection

**Duration:** 60 minutes

**Setting:** Indoors

**Background Information**

The messages that travel through the brain and along the nervous system are electrochemical, composed of electrical and chemical signals. Neurotransmitters are chemicals that participate in neuronal signal transmission. The Action Potential (AP) is the electrical impulse that travels along the axon during neuronal signal transmission. The Action

Potential is generated by an influx of sodium ions into the axon. The sodium ions come from the table salt or sodium chloride we ingest. Once sodium chloride enters the body, the sodium and chloride atoms separate as they do in water. Once separated the sodium and chloride atoms carry a charge and are thus referred to as ions, charged particles. The influx of sodium ions changes the electrical balance maintained along the axon. The charges on the ions and the difference in charge between the exterior and interior of the neuron drive the electrical forces of the neuron.

- Discuss that salt came from water in tube, proving salt still in tube even though it seemed to disappear.
- Discuss that we will see how salt disappeared but first we have to see how forces work together.
- Distribute magnets.

*Explore: (5 - 7 minutes)*

- Students work together to see that the like sides of the magnets repel and the opposite ends attract.
- Students record observations in class notes.

*Explain: (10 minutes)*

- Class discusses results of magnet observations.
- Discuss that water particles and salt have similar forces called charges.
- Distribute felt boards to pairs of students.

*Expand: (15 minutes)*

- Remind students of adding salt to tube in part 1, then have students place felt salt ions in bottom of tube on felt board.
- Instructor adds felt salt to tube on felt board in front of class.
- Remind students of adding water to tube in part 1, then have students add felt water molecules to tube.
- Discuss that water like bar magnet and will not break apart but the salt ions will separate.
- Label atoms in water on board
- Students move felt board back and forth like they are shaking the tube.
- Students place felt salt ions next to felt water molecules based on charges.
- Instruct students to place only 1 ion with a water molecule.
- Check for proper placement.
- Discuss that at this point there are no longer salt crystals in the tubes.
- Students record placements and label ions and water on class notes sheet.

*Evaluate: (10 minutes)*

- Students complete atomic magnifier sheet.