

SALT IV: NEURON SALT DANCE

OVERVIEW

Through manipulation of felt board figures, music and dance students learn that the electrical signals in the neurons are generated by the movement of sodium.

GOAL

Students learn how some of the body's electrical energy is generated

SPECIFIC OUTCOMES

- Play instruments, dance or speak with music containing quarter, eighth, or sixteenth notes and whole, half or quarter rests in 4/4 meter.
- Show respect for the reading, instrumental playing, dancing and speaking efforts of others.

MATERIALS

For Instructors

- Felt board with neuron, lightning bolt, felt ions, felt sodium channels, felt receptors, and felt neurotransmitters
- Score of "Salt Dance"
- Poster or transparency of Speaker part

For pairs of students

- Felt board with neuron, lightning bolt, felt ions, felt sodium channels, felt receptors, and felt neurotransmitters

Each student receives one of the following parts with the accompanying instrument or prop

- Drum and drum parts (#'s can vary with class)
- Triangle and triangle parts (#'s can vary with class)
- Bell and bell parts (#'s can vary with class)
- Gong and gong part
- 2 axon terminal dance parts, placards and 2 velcro balls for each dancer
- 2 cell body dance parts, placard and a velcro mitt for each dancer
- 5 Sodium dancer parts and placards
- Speaker part
- Chorus parts (#'s can vary with class)

Props

10 chairs arranged as sodium channels on cell

Grade Level: 5

Subject Areas: Science and Music

Key Concepts:

- The action potential is an electrical impulse
- The action Potential is generated by the movement of sodium ions in and out of the neuron

Key Cognitive Skills

- Observation
- Comprehension

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

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.

North Carolina Standard Course of Study Grade 5

Music

COMPETENCY GOAL 2: The learner will play on instruments, alone and with others, a varied repertoire of music. (National Standard 2)

2.07 Show respect for the instrumental playing efforts of others.

COMPETENCY GOAL 5: The learner will read and notate music. (National Standard 5)

5.01 Read whole, half, quarter, eighth, sixteenth, and dotted note and rest durations in 2/4, 3/4, 4/4, and 6/8 meters.

5.06 Show respect for the reading and notating efforts of others.

PROCEDURE

Engage: (10 minutes)

- Distribute felt boards
- Review basic neurotransmission with receptors, excited cell body and action potential.
- "What does this have to do with salt?"
- Review electrical energy from separated salt ions.
- Review separated ions in body.
- Review or introduce that the action potential is electrical energy.

Explore: (7 minutes)

- Show, on felt board in front of class, and explain how neurotransmission occurs, with the inclusion of ion movement.
- Students follow along on their felt boards.

Explain: (3 minutes)

- The movement of the sodium ions is the electrical action potential.

Expand: (30 minutes)

- "Now we're going to dance the electrical energy of the neuron!"
- Go over poster of speaker part so students can read their own parts
- Set-up chairs for dance
- Distribute parts (It can be helpful for parts to be assigned ahead of time).
- Allow dancers, a drummer (should use at least 2 drummers) speakers and chorus to rehearse together with student leader or instructor.
- Encourage sodium dancers to use creative, "electric like" movements.
- Take musicians outside or other area to practice parts. (rehearse 15 - 20 minutes)
- Run through dance.
- Collect parts

Evaluate: (10 minutes)

Students complete crossword puzzle.