

## Lesson Plan by Ashley Vice

**Lesson:** Sweat Your Socks Off

**Length:** 2 hours

**Adapted From:** Meredith Nelson

**Grade:** 4<sup>th</sup>

### Academic Standards:

#### Science

- 4.2.5 Write descriptions of investigations, using observations and other evidence as support for explanations.
- 4.3.13 Observe and describe the things that give off heat, such as people, animals, and the sun.

### Performance Objectives:

- When in a group, students will form a hypothesis with 75 % accuracy.
- When in a group, students will give three reasons why sweating cools humans down with 100% accuracy.
- When given a journal, student will write at least three things they learned from the experiment with 100% accuracy.
- When in a group, students will participate with 100% accuracy.

### Advance Preparation:

- 8 pairs of socks
- 8 small fans
- One tub of warm water
- Paper for writing down hypothesis and observations
- Journals

### Procedure:

#### Introduction/Motivation:

*(Engagement) (Have students wash their hands prior to this lesson)*

- Tell students that “today we will be talking about evaporation and how it cools us off. We have already discussed what evaporation is, so can someone please remind me how it works (students should explain that evaporation occurs when water turns into vapor)? **(Knowledge)**
- I would like all of you to hold both hands as fists in front of your mouth, like this, then demonstrate the action. **(Bodily/Kinesthetic)** Now, blow back and forth on the backs of your hands. Did both of your hands feel the same when you blew on them? **(Analysis)**
- Now, lick the back of your right hand. Blow on both of your hands again. How did it feel this time? **(Analysis)** Is there any difference from before? **(Analysis)** Why do you think there was a difference? **(Evaluation)**

### **Step-by-Step Plan: (Exploration)**

- Tell the students now they are going to do something similar to this in groups. Tell them after the directions are given, the class will count off by eights to form groups. (If there is an odd number, there can be two recorders or two speakers for a group.) **(Interpersonal)**
- Give the directions: You will each be given a task in your group and I will tell you what your task is for this experiment. The three tasks are: sock-wearer, recorder, and speaker. The sock wearer must sit in front of the fan for five minutes and describe what s/he experiences while wearing a dry sock and a damp sock. The recorder must write down what the sock wearer says, and the speaker will share the groups' results with the rest of the class.
- "Now, each group should find a station with a fan and a pair of socks." (the stations should be set up before hand.) **(Bodily/Kinesthetic)**
- "Now, I would like you all to think about what might happen when the sock wearer puts on one sock that is dry and one sock that is dampened with warm water and then sits in front of the fan for five minutes. With your group, discuss what you think will happen. **(Interpersonal)** Will there be a difference between the two feet? Recorders should write down the group's hypothesis."
- The teacher should now have the sock-wearers, bring one sock over to the tub of warm water that is located in the front of the room. Show them how to dunk it into the water and wring it out to release the excess water so the sock is damp and not dripping. Then have each student do the same and return to their station. **(Bodily/Kinesthetic)**
- Now, the sock wearer should place the damp sock on one foot and the dry sock on the other. Tell the student to, "Sit down in front of your fan and turn it on. Make sure your feet are directly in front of the fan. Please describe to your group members what you are feeling. The recorder should write down the observations."
- While students are doing this, walk around while the students are doing this experiment. Ask guiding questions directly to students. "Sock wearers, what do you feel? **(Analysis)** Recorders and speakers, if you touch the sock wearer's feet, how do they feel to you? **(Analysis)** What do you think is happening? **(Evaluation)** Have you seen any differences between the feet? **(Evaluation)** What happens if you wiggle your feet? **(Analysis)** Why do you think that one foot feels colder than the other?" **(Analysis)**

### **(Explanation)**

- Once students have had the chance to talk in groups and prepared what they are going to share with the class, have them gather back together as a class. Have each speaker share their observations and hypotheses. **(Verbal/Linguistic)** After they do this, ask the class these questions: What did you find during your exploration? **(Knowledge)** Can you tell us about why you think the foot cooled? **(Evaluation)**
- Ask the students if their results verify or reject your hypotheses? **(Knowledge)**
- Then explain what happened during this experiment. Explain that the warm water from the sock evaporated as the fan blew air on it. This water carried heat energy

with it into the air, and the heat energy came from the students' feet. This is why the foot wearing the damp sock felt cooler than the foot wearing the dry sock.

**Closure: (*Extension*)**

- Tell the students, "If the foot cooled down as a result of the warm water, how do you think this relates to the little exploration we did with our hands earlier? (**Analysis**) Students should discuss that our saliva is warm water and had similar effects as the warm sock on the foot.
- Tell the students that sweating happens naturally as our body tries to cool itself off. Ask, "Can anyone explain how the information we gained through this experiment relates to sweating?" (**Evaluation**) Students should describe the process of sweating as a way for the heat of our body to get taken away when the water we release is evaporated. Evaporation carries away the heat energy that was transferred into the body's sweat.
- Ask the students when they are outside at recess, to try and work up a sweat. Report back to me with your thoughts on how you felt when you were sweating. If you do work up a sweat, touch the skin that is damp and let me know how it feels; is it warm or cool? Why do you think this is the case? (**Evaluation**)
- Then when the students return from recess, have them write an entry in their journal about what they've learned today. (**Intrapersonal**)

**Assessment: (*Evaluation*)**

- Written hypotheses and observations will be collected for assessment.
- The teacher will observe students by walking from group to group. She will also assess learning based on student participation and contribution to group discussions.
- Journal entries will be read for accuracy.

**Adaptations/Enrichment:**

The lesson can be adapted in many ways to allow students to participate. A chair with foot stool can be placed in front of the fan, so the student could be the sock wearer. If the student has difficulty in the area of physical development, the foot stool will allow him or her to fully participate without the stress of holding his or her feet to the fan.

If the sock wearer had a difficult time verbalizing observations, then the recorder and the speaker could use their senses of touch to feel the sock wearer's feet and make conclusions based on these observations. By having the recorder and the speaker take on the observation roles, the sock wearer can still fully participate in the activity despite any educational challenges. Most of the tasks can be properly given to students in order to allow all students to participate.

**Self-Reflection:**

Names: \_\_\_\_\_

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## **Sweat Your Socks Off!**

**Hypothesis:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Observations: (See, Feel, Hear, Touch)**