

Lesson Update and CRT Addendum	
Lesson/Activity Title: Suited for Spacewalking: Keeping Your Cool	ID: 14-898
Product Number: EG-1998-03-112-HQ	Grade: 5-12
URL for Lesson: http://www.nasa.gov/pdf/188969main_Keeping_Your_Cool.pdf	
Subject: Evaporation, sublimation, perspiration, circulation.	
Summary: The two investigation activities in this Exploration Brief allow students to demonstrate the principle behind the operation of the space shuttle extravehicular mobility unit, or spacesuit. Students will also be able to experience the water-cooling technology of the EMU.	
Materials for lesson: Two coffee cans with plastic lids, 4 meters of aquarium tubing, Two buckets, Two thermometers, Duct tape, Water (solid and liquid), Heat source (light bulb and fixture), Hole punch, Flood light and fixture	

Review and Recommendations	
ALIGNMENT TO STANDARDS	
NGSS	ETS1, PS2, 5-PS1-2
Common Core State Standards in Mathematics	A-REI, F-IF
CULTURAL RESPONSIVE TEACHING (CRT) RECOMMENDATIONS	
5E Lesson/Description	
1. Engage	A video on cooling systems may be introduced and any prior knowledge of cooling systems explored. Create a dialogue with students about times they were hot during activities. What happens? Why? How does that help? Wrestlers may have experience with wearing a plastic-like suit to sweat out water weight before a match, for example.
2. Explore	These lessons, as written have little room for exploration. Create a design challenge to explore other ways to achieve a similar cooling effect without having to carry additional water perhaps.
3. Explain	Make sure to extract and explain vocabulary as it comes up (evaporation, perspiration...). The students should be explicitly asked to justify their graph selections and explain what information they get by examining the graphs.

<p>4. Expand/Enhance</p>	<p>The activity suggests some Extensions. Additionally, some questions to help students think beyond the classroom activity will be: What type of graph would best represent the data? Or What can you tell about the way the temperature changes by looking at the graph? Or What can we learn about how the cooling</p>
<p>5. Evaluate</p>	<p>Pre and post-assessments of key concepts. Extension questions.</p>

Additional Resources:

http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Suited_for_Spacewalking_Educator_Guide.html