



Have you ever wondered about the temperature of space?




What temperature does an Astronaut experience while in space?



The Temperature can actually drastically change!




120°C in direct sunlight



-100°C shaded behind the space station

Temperature in Space

- Space is very empty with few particles per m³ (Vacuum)
- Only objects, which are made up of many particles, have a measurable temperature




Temperature Review (Pull here)

Particle Theory Review (Pull here)

Heat in Space

- Radiation from the Sun or from an Astronaut's body
- Conduction transfer when Astronaut touches an object



Heat Review (Pull here)

Radiation Review (Pull here)

Conduction Review (Pull here)

What strategies do humans have to manage their temperature on Earth?




Are Astronauts able to use those same strategies in outer space?



Keeping the Body Warm

Bill Nye on Winter Clothing



It is the same idea!



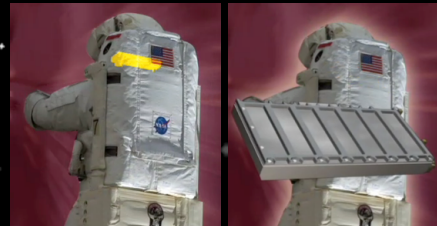
Keeping the Body Cool



LCVG - Liquid Cooling and Ventilation Garment
Regulates body temperature by a system of pumping cold water.

Anyone recognize this Astronaut?

A Reusable Process



Water flows past a plate that is exposed to the vacuum of space which re-cools the water.

Why do we use this? .

Body heat is lost very slowly.
Without this system the Astronaut would die of heat exhaustion.



Today's Demonstration

Materials

- Tubing
- x2 Plastic Cups (one with a lid and another without)
- Some cold water from cooler
- Your bare arm



Instructions

1. Fill up the cup that has a lid with cold water from cooler
2. Wrap the tubing around bare arm of a student snugly a few times (roll up sleeves if required)
3. Take one end of the tubing and place it through the lid of the cup, making sure it is sitting above the bottom of the cup full of water
4. Lift the cup with the lid higher than the other cup and hold it there
5. Siphon the water out of the opposite end of the tube as if you were using it as a straw
6. Place the opposite end of the tube in the empty cup (try not to make a mess)