

TEMPERATURE & HEAT

Unit 20(mostly) & 19 , Dr John P. Cise,

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& The New York Times, December 29, 2012 by Adam Nagourney This application is dedicated to my wife Gertrude Cabacungan

A Record Worth Wilting For: Death Valley Is Hotter Than ...



A 134-degree reading registered on July 10, 1913, at Greenland Ranch in Death Valley, Calif., is now the official world record. FURNACE CREEK, Calif. — For Death Valley, a place that embraces its extremes, this has long been an affront: As furnace-hot as it gets here, it could not lay claim to being **the hottest place on earth. That honor, as it were, has gone since 1922 to a city on the northwestern tip of Libya.**



Death Valley
California

INTRODUCTION: Sand has a very low specific heat($c = 835 \text{ J/kg}^\circ\text{C}$) compared to water ($c = 4200 \text{ J/kg}^\circ\text{C}$). Thus, sand rises in temperature faster than water given the same temperature change. Specific heat(c) = heat(Q)/unit mass(m)/temperature change(Δt).
 $c = Q/m \Delta t$ thus $Q = c m \Delta t$

MORE HINTS: $^\circ\text{C} = 5/9(^\circ\text{F} - 32)$

QUESTIONS: (a) Verify the last sentence in the article below that 134°F is 56.7°C ? In other words convert 134°F to $^\circ\text{C}$.

(b) Normal summer night temperatures are 72°F in the desert at Death Valley. If you were to heat up 1000 kg of sand from 72°F to 134°F , how much heat(Q) would be needed to increase the sand temperature that much?

(c) Answer question (b) but this time instead of heating sand, find the heat needed to heat 1000 kg of water the temperature change?

ANSWERS: (a) _____, (b) $5.18 \times 10^7 \text{ J}$, (c) $26.0 \times 10^7 \text{ J}$, **Note: Water needs a lot of heat.**

Death Valley Until now. After a yearlong investigation by a team of climate scientists, the World Meteorological Organization, the climate agency of the United Nations, announced this fall that it was throwing out a reading of 136.4 degrees claimed by the city of Al Aziziyah on Sept. 13, 1922. It made official what anyone who has soldiered through a Death Valley summer afternoon here could attest to. There is no place hotter in the world. **A 134-degree reading registered on July 10, 1913, at Greenland Ranch here is now the official world record.** “For those of us who survive here in the summer, it was no surprise that it’s the hottest place on the world,” said Charlie Callaghan, a Death Valley National Park ranger who personally recorded a 129-degree day here a few years back. The opening wall panel in a new exhibition at the National Park Service visitor center off Highway 190 has been unveiled with a **burst of superlatives:** “Hottest. Driest. Lowest.” (Lowest refers to a spot in Death Valley, Badwater Basin, which at 282 feet below sea level is the lowest place in North America **“The W.M.O. assessment is that the highest recorded surface temperature of 56.7 degrees C (134 degrees F) was measured on 10 July 1913” in Death Valley, the report said.**