

The above image (right) was taken by the Deep Impact spacecraft as it passed-by the nucleus of Comet Tempel-1. The false-color image (right) shows the temperature map for this comet. The resolution of the images is 160 meters per pixel. The following color pallet was used to map the temperatures, which are given in Kelvins (K). For a comparison, on the Kelvin scale, Absolute Zero is 0 K, and typical room temperature is 293 K. A very hot day in the desert can reach 320 K.

Temperature (K)	Color
320-330	Red
314-319	Yellow
300-313	Green
290-299	Light-Blue
275-289	Blue
265-274	Indigo
< 264	Black

Problem 1 - In what regions on the surface of the comet nucleus would an astronaut feel most comfortable under typical room-temperature conditions?

Problem 2 - Over how many square meters would the temperature conditions exceed the hottest desert conditions on Earth?

Problem 3 - The sun is located to the right of the image so sunlight is traveling from right to left. What do you think might be causing the cold temperature region near the middle of the comet nucleus in the image to the right?

Problem 1 - In what regions on the surface of the comet nucleus would an astronaut feel most comfortable under typical room-temperature conditions?

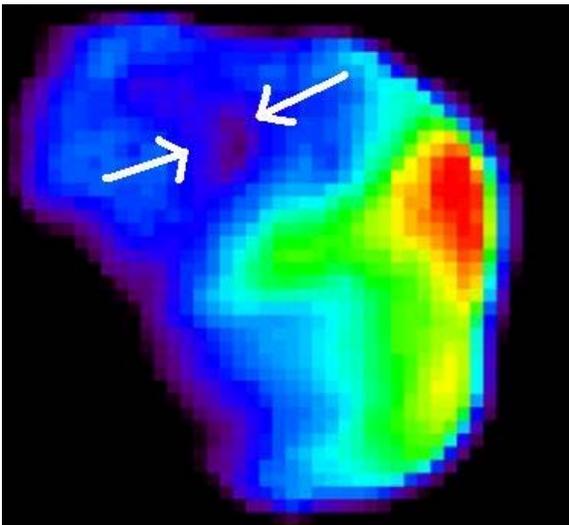
Answer: **Room temperature is 293 K, and this corresponds to a color of light-blue in the false-color temperature map.**

Problem 2 - Over how many square meters would the temperature conditions exceed the hottest desert conditions on Earth?

Answer: These temperatures would be red-colored in the map. By counting pixels there are about 60 pixels that are reddish or red. Each pixel represents an area of 160 meters x 160 meters or 26,000 meters², so the total area is **about 1.6 million meters². This equals 1.6 square kilometers.**

Problem 3 - The sun is located to the right of the image so sunlight is traveling from right to left. What do you think might be causing the cold temperature region near the middle of the comet nucleus in the image to the right?

Answer: Cold temperatures indicate that the sun is not heating the surface, so this region, indicated by the arrow below, must represent a shadowed area on the surface of the comet.



For more information about Tempel-1 see:

http://www.nasa.gov/mission_pages/deepimpact/multimedia/temperature_map-20061002.html