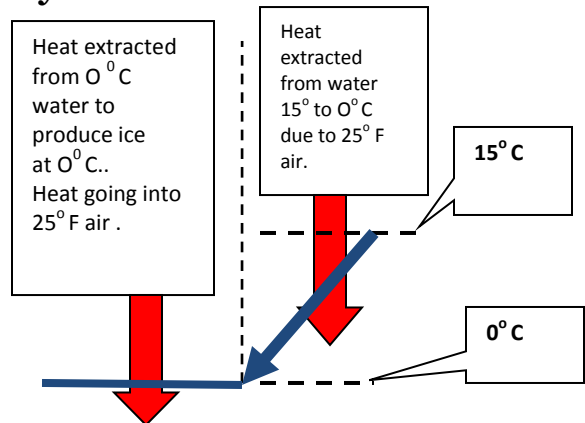


HEAT

Unit 20 Dr John P. Cise , Professor Of Physics, Austin Com. College, 1212 Rio Grande St., Austin Tx. 78701 jpcise@austincc.edu

& New York Times, January 7 ,2010 by Damian Cave, Please send Dr. Cise an e-mail on format which you used this application. Thans! Dr Cise

In Cold Snap, Floridians Shiver, and Pray for the Strawberries



A strawberry farmer inspected his crops as the fourth consecutive night of freezing temperatures and all-night watering gripped Florida, the nation's winter strawberry capital. [More Photos >](#)

DOVER, Fla. — Icicles hang from the thermometer: **25 degrees, at dawn**, and the strawberries that should be on cereal sit suspended beneath hard ice, shiny and clear as lacquer.

Multimedia



[Slide Show](#)

INTRODUCTION: When water freezes it does so at the constant temperature of 32°F or the corresponding 0°C . So, farmers spray warm (15°C) water on the berries so their temperature does not drop below the destructive temperature of 28°F . **QUESTION:** If 2000 kg of water at 15°C is sprayed on the berries, find the amount of heat needed to be extracted (by the 28°F air) to turn the 2000 kg of 15°C water to ice (at 0°C)? **HINT:** specific heat of water = $1\text{ cal/gm }^{\circ}\text{C}$, Latent heat of fusion of water = 80 cal/gm . **ANSWER:** 190×10^6 calories

Strawberries on Ice

Michelle Williamson smiles. **The ice, she says, did its job of keeping all but the ripest berries safe,** and the worst has been averted. Again. For now. Tuesday brought the fourth consecutive night of **freezing temperatures and all-night watering to the nation's winter strawberry capital,** and with another cold front on its way, nearly everyone here expects the frenzy and fatigue to continue.

Mr. Spivey said that he, his father, Dennis, and his brother, Stephen, who goes by Bubba, had been up all night. This has been the freezing routine for strawberry farmers since at least the '50s when ice became a commonly used protective measure. **The idea of a berry under an igloo — as a good thing — may seem odd, but farmers say it is a function of the plant's DNA: strawberries are destroyed at 28 degrees, so ice, constantly watered to stay at a stable 32, protects them.** (Florida citrus plants, which appear to have also survived Tuesday night intact, are also kept warm this way and with water flooding the roots.)