

# NOVA: "Absolute Zero"

**Name:**

**Period:**

**Seat #:**

Turn this in before you glue it in!

## Part 1 – The Conquest of Cold

- 1) Cornelius Drebbel had a wager with King James I in 1620. What was it?
- 2) What does adding salt do to ice?
- 3) What is Robert Boyle primarily famous for?
- 4) When were the first accurately calibrated thermometers made, and where?
- 5) What was the biggest problem with these first thermometers?
- 6) How were thermometers made smaller?
- 7) Describe the 18th century theory that rivaled the theory that particles slow down as they cool and speed up when they warm?
- 8) What was the fate of Lavoisier?
- 9) Who or what did Rumford leave his wife for?
- 10) What was the name of Tudor's ship for transporting ice?

**11)** What was the “single most important economic problem in Europe”?

**12)** Carnot found out that more work could be done by an engine if..... :

**13)** How did the SI unit for energy become the Joule?

**14)** What is the First Law of Thermodynamics?

**15)** What is the Second Law of Thermodynamics?

**16)** Why do some people still call their refrigerator the “ice box” (usually older people)?

Part 2 – The Race for Absolute Zero

**17)** What happened to the rubber ball soaked in liquid Oxygen as demonstrated by James Dewar?

**18)** What was the lowest temperature reached by Faraday?

**19)** Who was the first to liquefy Hydrogen? (Circle one)

- a) Kamerlingh Onnes    b) Dewar    c) Faraday

**20)** ALSO, what was his motivation for doing so?

**21)** At what temperature did Onnes’ team have to reach to liquefy Helium?

**22)** Why did Dewar’s low temperature research end?

**23)** Who was the first to use the term “superconductivity”?

**24)** What is a superfluid?

**25)** Try to describe, in 10 words or less, a Bose-Einstein condensate?

**26)** What were scientists at the UC Boulder and MIT competing to do?

**27)** Who “won” the “race” and what was the atom used in the condensate?

**28)** How does the B-E condensate provide support for quantum mechanics?

**29)** Was Hydrogen ever B-E condensed?

**30)** What is the next big step in the practical application of B-E condensates?

**31)** What was the most interesting part(s) to you? Yes, you have to pick *something!* ☺

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