

Learning Goals

At the end of this activity, students should have the ability to:

Content Knowledge

- 1) Explain how temperature and pressure affect the state of matter.
- 2) Use phase diagrams to predict phase transition behaviors as a function of temperature and/or pressure changes.

Skills Development

- 1) Develop a hypothesis to explain an experimental observation.
- 2) Relate physical phenomena from chemistry to real world observations.

One could extend the exercise to involve specific phase transition calculations if desired, but not included in the exercises provided today.

Regelation Exercise

Watch the 2 minute YouTube video on Regelation

<http://www.youtube.com/watch?v=gM3zP72-rJE>

In your groups, examine the phase diagram for water (provided).

- a) Indicate on the phase diagram a starting point (A) before you lay the wire on the ice.
- b) Mark a point (label it B) to indicate the condition immediately below the wire.
- c) Mark a point (label it C) to indicate the condition immediately above the wire.
- d) Does the rate at which the wire moves through the ice depend on the amount of weight placed on the wire? If so, how?
- e) Does it matter how thick the wire is? If so, why?
- f) Does it matter if the wire can conduct heat? If so, why?
- g) Identify 2 situations in the world where the same or a related process might occur?

Phase Diagram of Water

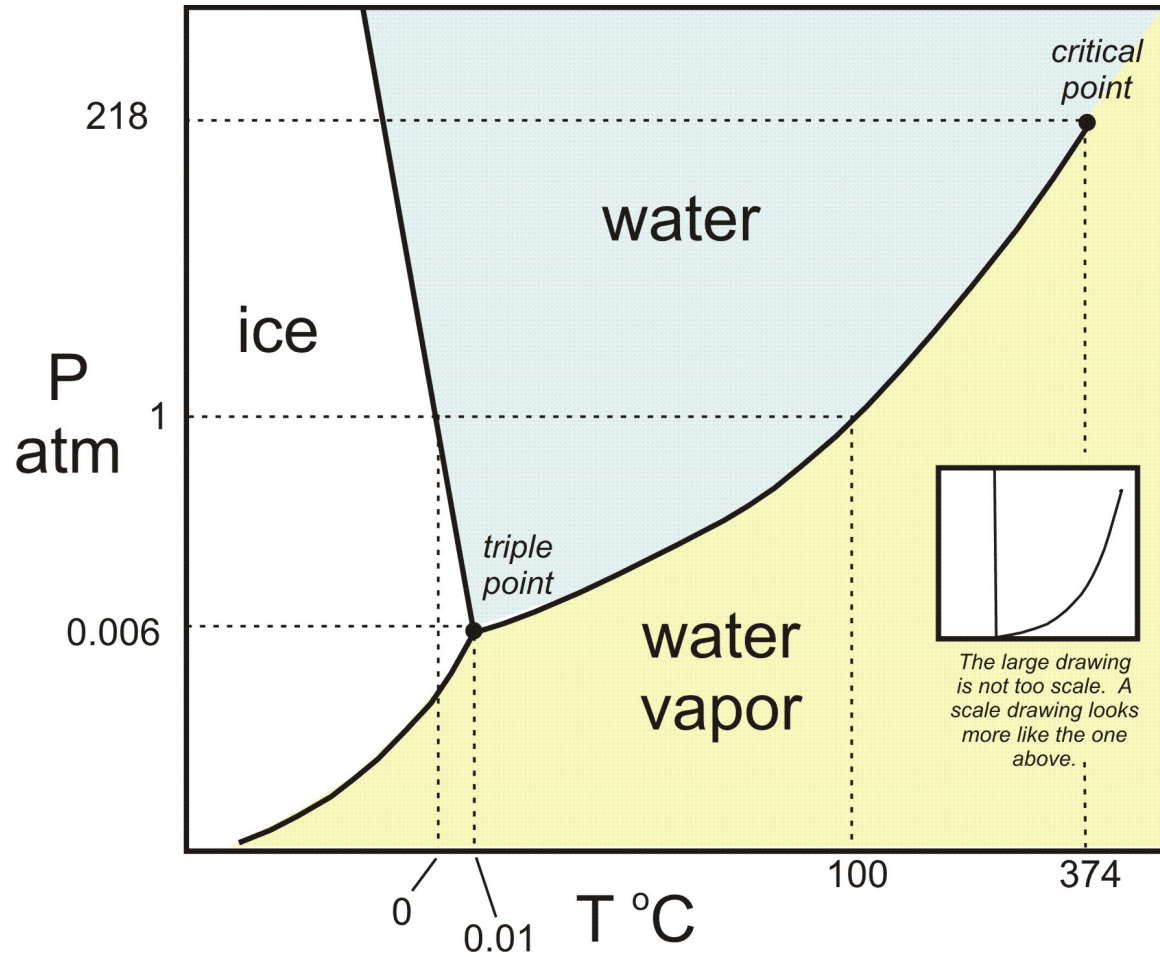
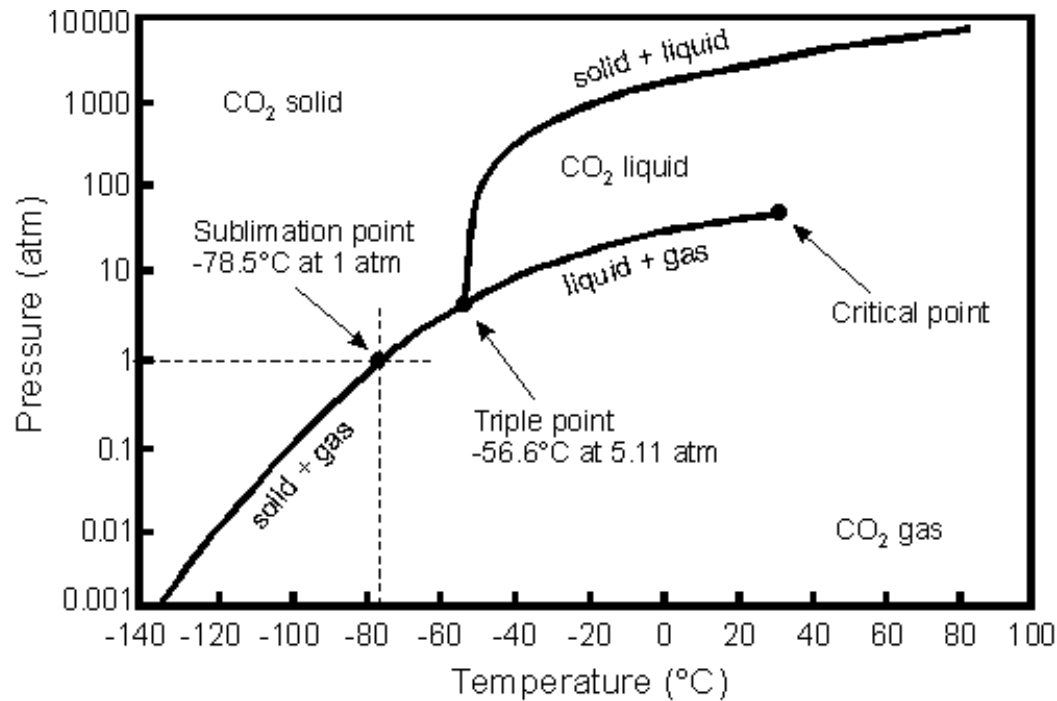


Image from: http://serc.carleton.edu/research_education/equilibria/phaserule.html
Accessed on 07/25/12

Phase Diagram of CO₂



Pressure-Temperature phase diagram for CO₂.

Assessment Question (answer on index card provided):

Would a wire regelate through a block of dry ice (solid CO₂)? Why or why not? Explain in one sentence using the phase diagram for CO₂.

Image from: http://stevengoddard.files.wordpress.com/2010/09/co2_phase_diagram.gif
Accessed on 07/25/12