

Cooking Methods

Boiling
Steaming
Pressure cooking
Baking
Frying
Grilling



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Heat Management

Specific Heat Capacity –

the amount of heat energy required to raise the temperature of 1 gram of a substance 1°C.

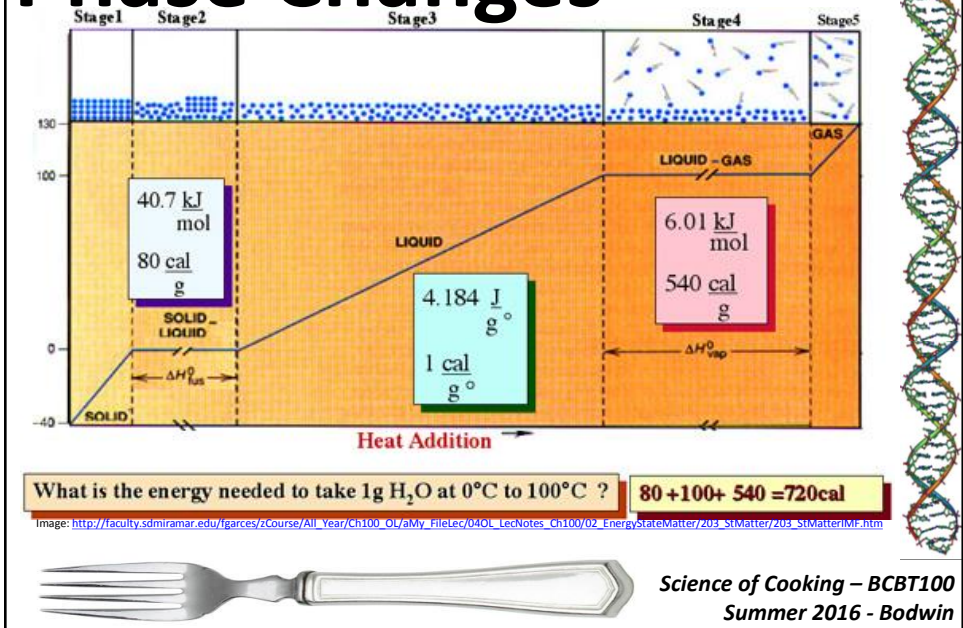
For water, 1 calorie per gram °C
“Dietary Calorie” vs. calorie

http://www.engineeringtoolbox.com/specific-heat-capacity-food-d_295.html

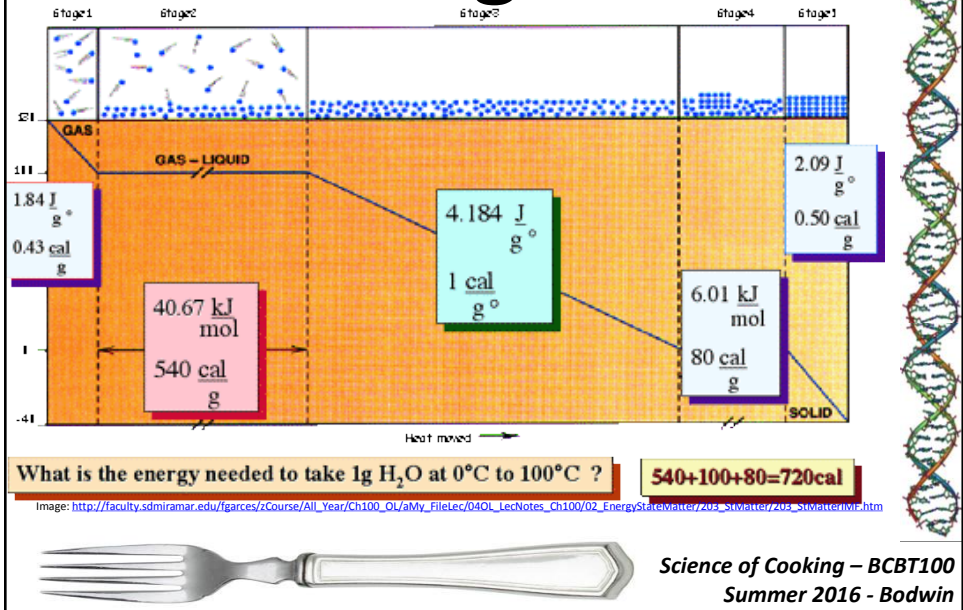


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Phase Changes



Phase Changes



Water-based Cooking

Effective heat transfer

High heat capacity

Boiling

Steaming

Pressure cooking



Image: <http://preparednesspro.wordpress.com/2009/08/11/myths-and-facts-of-water-storage/water-storage-myths-boiling-water/>



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Boiling

Even heating

Extracts flavors

Good for intense flavors (bitter, alkaloids)

Bad for subtle flavors

Easier to control cooking



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Steaming

Even heating
Less flavor extraction
Easy to control
Retain color
Retain nutrients



Image: <http://www.vegetariantimes.com/article/full-steam-ahead/>



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Salting the water

Colligative properties
Vapor pressure
Boiling point elevation



Image: <http://rouxbe.com/tips-techniques/322-salting-water-for-cooking>



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Pressure cookers

Change P_{atm}

Change T_{boiling}

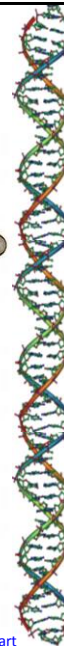
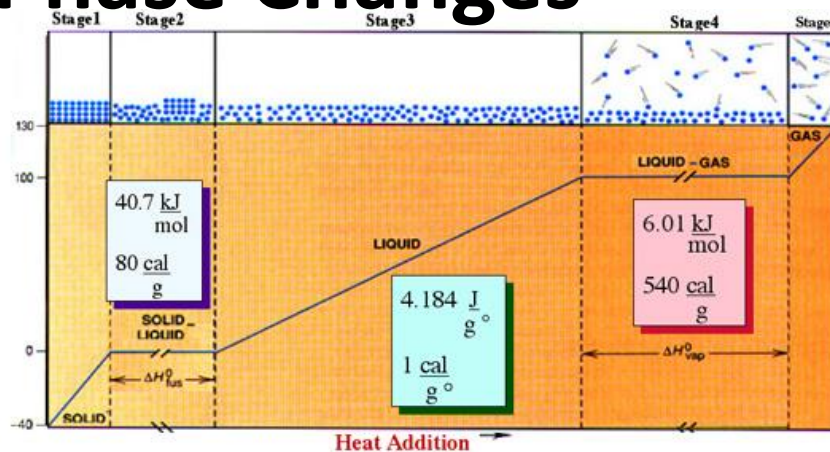


Image: <http://eartheasy.com/all-american-pressure-canner-cooker-model-941-41-5-quart>



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Phase Changes



What is the energy needed to take 1g H_2O at 0°C to 100°C ?

80 + 100 + 540 = 720 cal

Image: http://faculty.sdmiramar.edu/jgarces/zCourse/All_Year/Ch100_OL/aMy_FileLec/040L_LecNotes_Ch100/02_EnergyStateMatter/203_StMatter/203_StMatterIMF.htm



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Phase Diagram

P vs. T
 Unique to each
 substance
 For water →

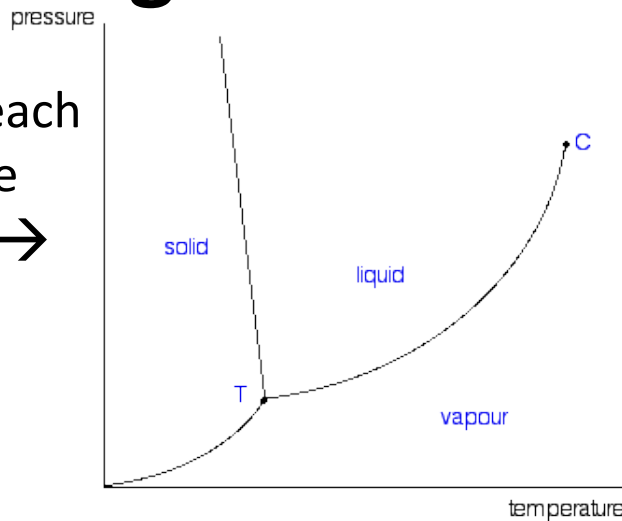


Image: <http://www.chemguide.co.uk/physical/phaseeqia/phasediags.html>



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Phase Diagram

“Normal”
 conditions
 1atm = 15psi

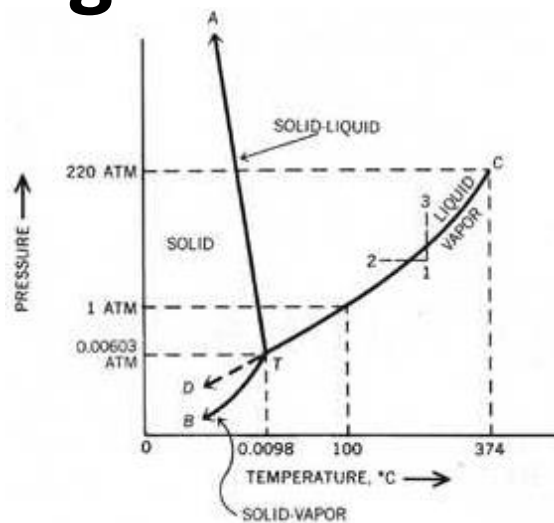


Image: http://www.svvt.edu/classes/MSE2094_NoteBook/96ClassProj/examples/triplpt.html



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