**Thermochemistry Heat of Reaction Chapter 17B**

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**See** [**https://www.learningctronline.com/courses**](https://www.learningctronline.com/courses) **for Materials and Resources.**

**Topics:**

1. Thermochemistry

**Objectives:**

1. Define and calculate the specific heat of a substance and the heat flow related to calorimetry.
2. Identify reactants, products, heat of reaction, and heat flow in potential energy diagrams.
3. Calculate heat flow in thermochemical equations using heat of reaction, standard heats of formation, and Hess's Law.
4. Identify heat flow, potential and kinetic energy, phase changes, and heating or cooling for phase diagrams of a substance.
5. Calculate heat flow for heating and cooling of substances using mass, specific heat, and the change in temperature or heat of fusion or heat of vaporization.
6. Distinguish aspects of heat flow (endothermic, exothermic, potential energy, kinetic energy, heat and temperature).

TAKE NOTE [Assignments due before next class.]

1. Notes / Study Guide
2. Lesson Check & Sample Problems or Alternative Worksheets
3. Thermochemistry & Heating/Cooling Curve Worksheets
4. Lab Heating Curve (Formal Lab Report) … conclusions.
5. Lab Specific Heat
6. Chapter 17 Test
7. Class Song: Don’t You Know it’s Time for Class Now!
8. Week 26 Devotional (<https://www.learningctronline.com/devotional>)

**Text**: Chapter 17: Thermochemistry pp. 554-573; 578-591

Read the assigned pages in the text.

**Class Notes: PowerPoint or PDF**

**Notes/Study Guide:** Fill in the Chapter 17 worksheet to understand the class notes.

**Homework**: TEXT

(1) Answer the KEYED **"Lesson Check"** questions at the end of each of the chapter.

(2) Answer the **"Sample problems"** found in the "Sample Problem" boxes throughout the chapter. An answer KEY is provided for you to use to self-correct your homework problems.

* Put your answers into complete thoughts in a Word document. Do NOT just put the answer, but write a phrase or sentence that you can study from for your tests. Save your work in a WORD document and SAVE into your HOMEWORK folder in the Chemistry folder on the desktop.
* Assignments will be “spot checked” during class or submitted via email.

**Alternate Homework**:

1. Thermochemistry Worksheet
2. Heating & Cooling Curves Hess’ Law Worksheet

**Lab**: Specific Heat – Calorimetry

1. Perform the “Specific Heat – Calorimetry” lab using the worksheet provided.
2. Answers are provided at the end of the document for guidance, but do NOT copy and paste. Use your own words.

[Specific Heat of a Metal](http://somup.com/cFX609niZa) (3:04) Determining the specific heat of cadmium.

* Answers are provided at the end of the document for guidance. Do NOT copy and paste these answers, but write using your own words.
* Save the document into your LAB folder in the Chemistry folder on your desktop.

Heating Curve of Water (Formal Lab Report)

1. Complete the "Heating & Cooling Curves of Water" experiment.
2. A Formal Lab Report according to the guidelines in the Lab Report Format Document is due 4 days AFTER week 27’s class. Therefore, collect the data and do the lab itself, but wait on the formal lab report until after this unit's test.
3. The worksheet provides the foundation of your lab report. Be sure to reference the worksheet.
4. You may also consider using the Lab Report Checklist.
5. The following video links model the results, but you must obtain your own results:

[Heating Curve of Water (Real Time) Part 1](http://somup.com/cFX6D1ni0V) (12:00) Collect data from 0:00 to 12:00 minutes.

[Heating Curve of Water (Real Time) Part 2](http://somup.com/cFX6Dvni0f) (9:00) Collect data from 13:00 to 21:00 minutes.

[Heating Curve of Water (Time Lapse)](http://somup.com/cFX6DGni0X) (1:11)
6. When you watch the video, pay attention to the notes given on the screen.
7. The volume of water in the beaker could be estimated once the ice completely melted, but water hasn't started boiling yet. Using the density of water, one can determine the mass of water (which is the mass of ice, and the mass of gas) used in order to calculate your heat values.
8. Understand that once the water reaches its boiling point, it will remain at the same temperature until the water is mostly vaporized (10-20 more minutes). The videos stop and do not show this aspect. You should, however, add the continued boiling temperatures to your data table up to **30 minutes**.
9. The video shows a "Scatterplot Graph", NOT "best fit" slope lines. You need to plot individual temperature data on your graph before drawing the best fit slope lines.
10. For your graph of the temperature versus time in the lab, you need to draw 3 STRAIGHT slope lines of best fit that represent the stages of heat flow based on your plotted temperature data when ice melts, liquid heats up, and water boils. The following video shows how to draw best fit lines:

[Drawing Slope lines (Best Fit) on your Graph](http://somup.com/cFX6bnni0o) (1:45)
11. Be sure to reference Study Place for directions, the Lab worksheet, and the alternative video(s) (if you used it or them) in your Bibliography.

**TEST:** Thermochemistry

1) the academic integrity policy

* Tests must be completed **WITHOUT** referring to books, notes, the internet, people, or any outside resources.
* Students **MAY** use the approved Periodic Tables, approved Reference Tables, or approved equation (formula) sheet (provided by the teacher) along with calculators and scratch paper.
* A guardian should be proctoring the test. Proctoring means to monitor the following:

2) The test is composed of 20 multiple choice questions and some written problems.

* The **multiple-choice test must be taken "in one sitting"**, meaning that once you start the test, you must complete it without interruption. (45 minutes)
* Take a short break (5-10 minutes)
* The **written portion of the test must be taken "in one sitting"**, meaning that once you start the test, you must complete it without interruption. (40 minutes)

3) There is a **85-minute time limit** on this test. Please have the proctor write the time taken at the top of your answer sheet with their signature or initials.

4) Proctors should NOT be reading the test or engaging students during the test.

5) Do NOT use RED font. Black font is best.

Supplemental Resources (Optional)

1. Vocabulary Crossword (Thermochemistry)
2. Chapter 17 Study Guide Pearson

[Calculating Heat of Reaction Tutorial](http://somup.com/cFlOFYnIoq) (7:28)

[Heating & Cooling Curve Worksheet Tutorial](http://somup.com/cFeDqqVBsA) (8:52)

[Heating Curve Song](https://screencast-o-matic.com/watch/cq6f2UuDuF) (3:20) ... PE, KE, Endo & Exothermic, Graphing Phases (Review).

[q = m c delta T Song](https://screencast-o-matic.com/watch/cq6f2UuDuF) (3:20) ... (Review).

[Do Not Refuse Him Who Speaks Hebrews 12:25-29; God is in Control](http://somup.com/cYhq2ljaLU) (7:10) (3:09)