



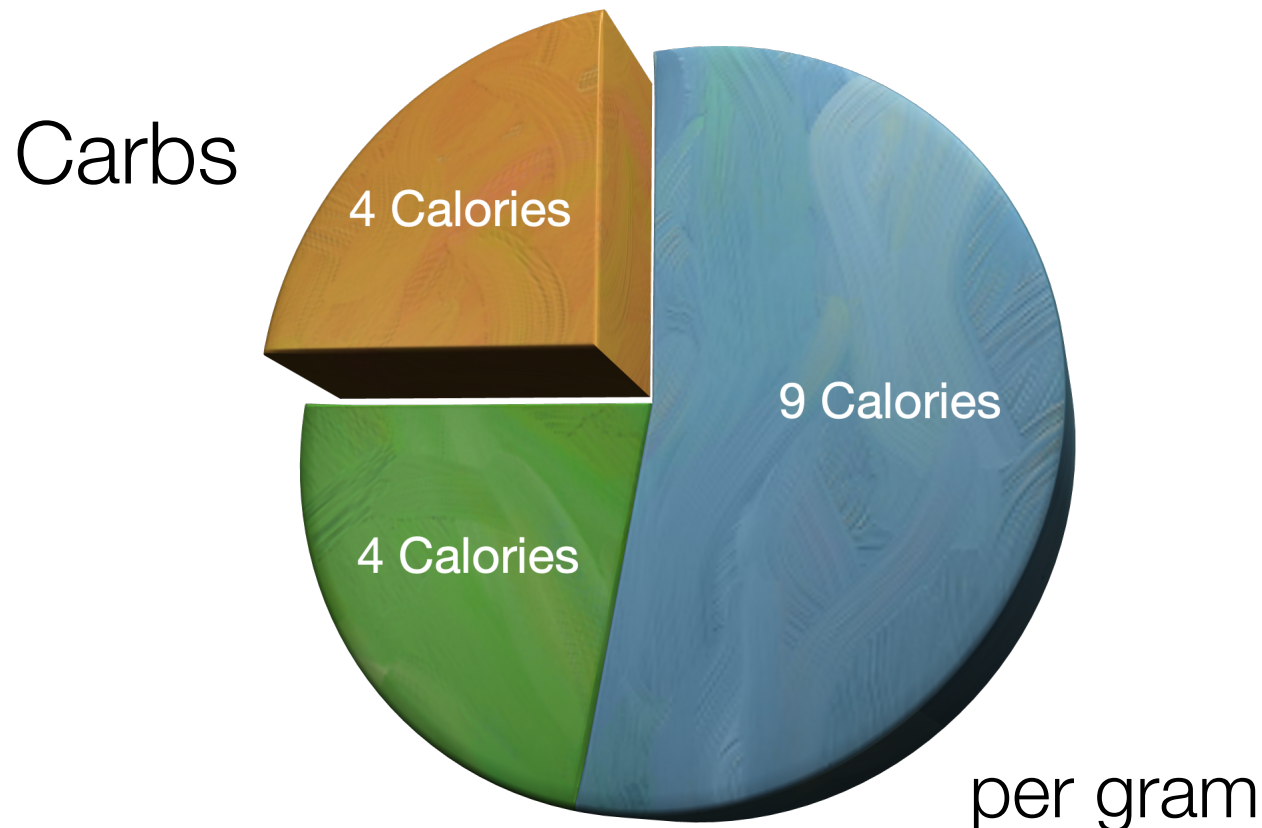
Module 9

Brad Ashburn, PhD
BIOC 141

Energy and Nutrition (Section 7.1)

A **calorie** and **joule** are units of energy.

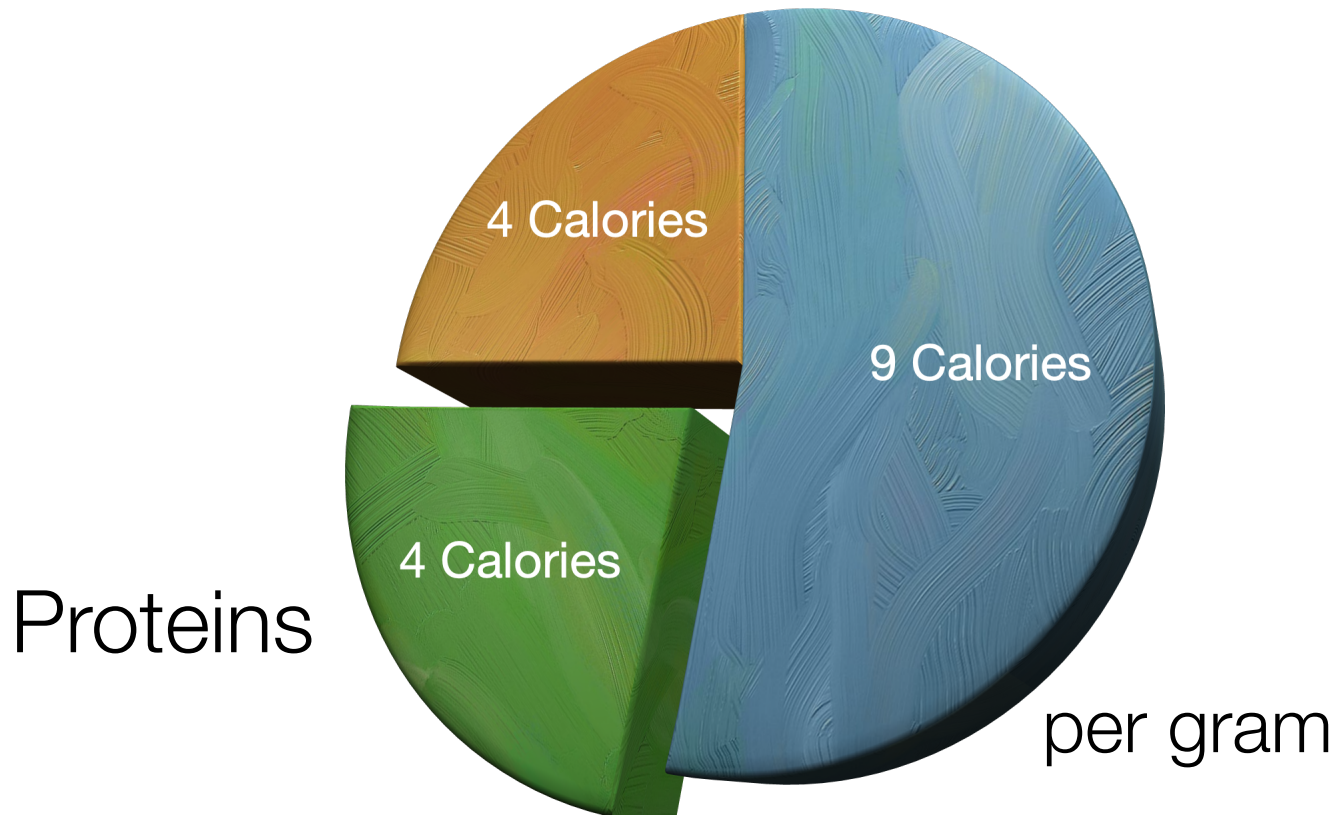
A nutritional **Calorie** = 1,000 calories or **1 kcal**



Energy and Nutrition

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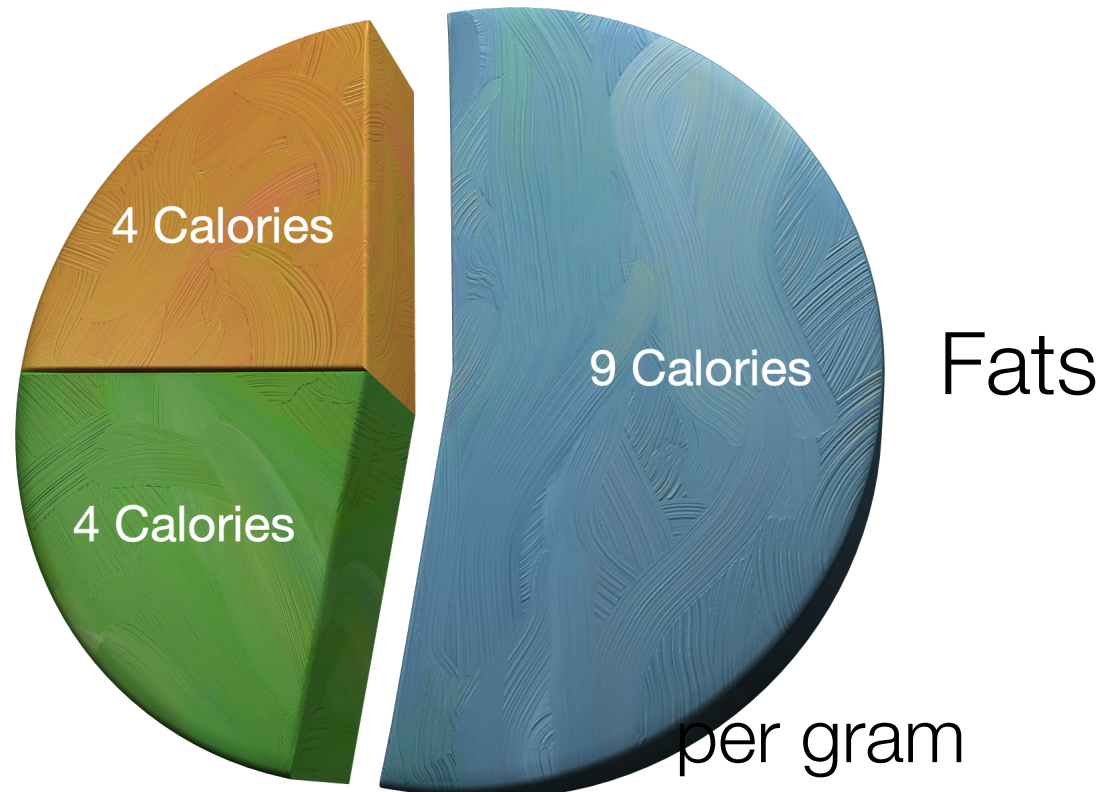
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Energy and Nutrition

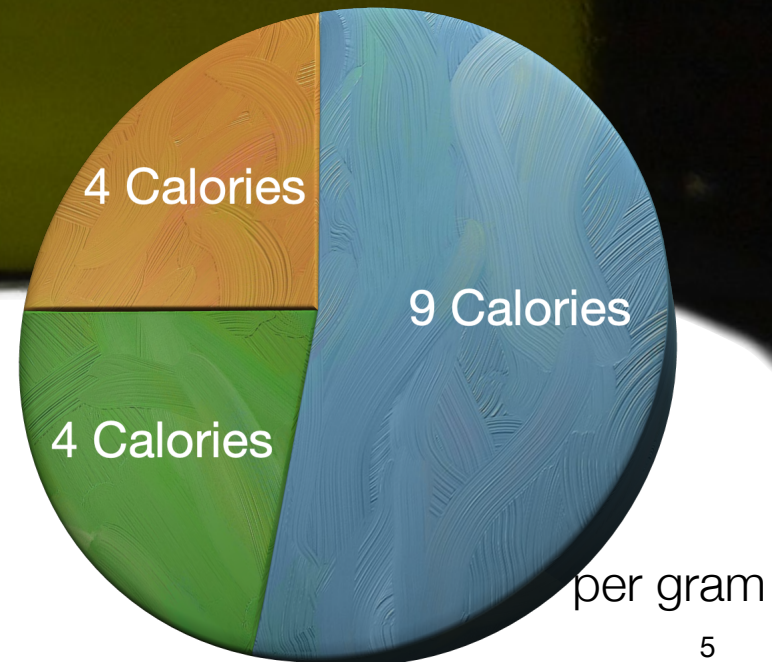
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Example

One tablespoon of olive oil has 14 grams of fat,
how many Calories does it contain?

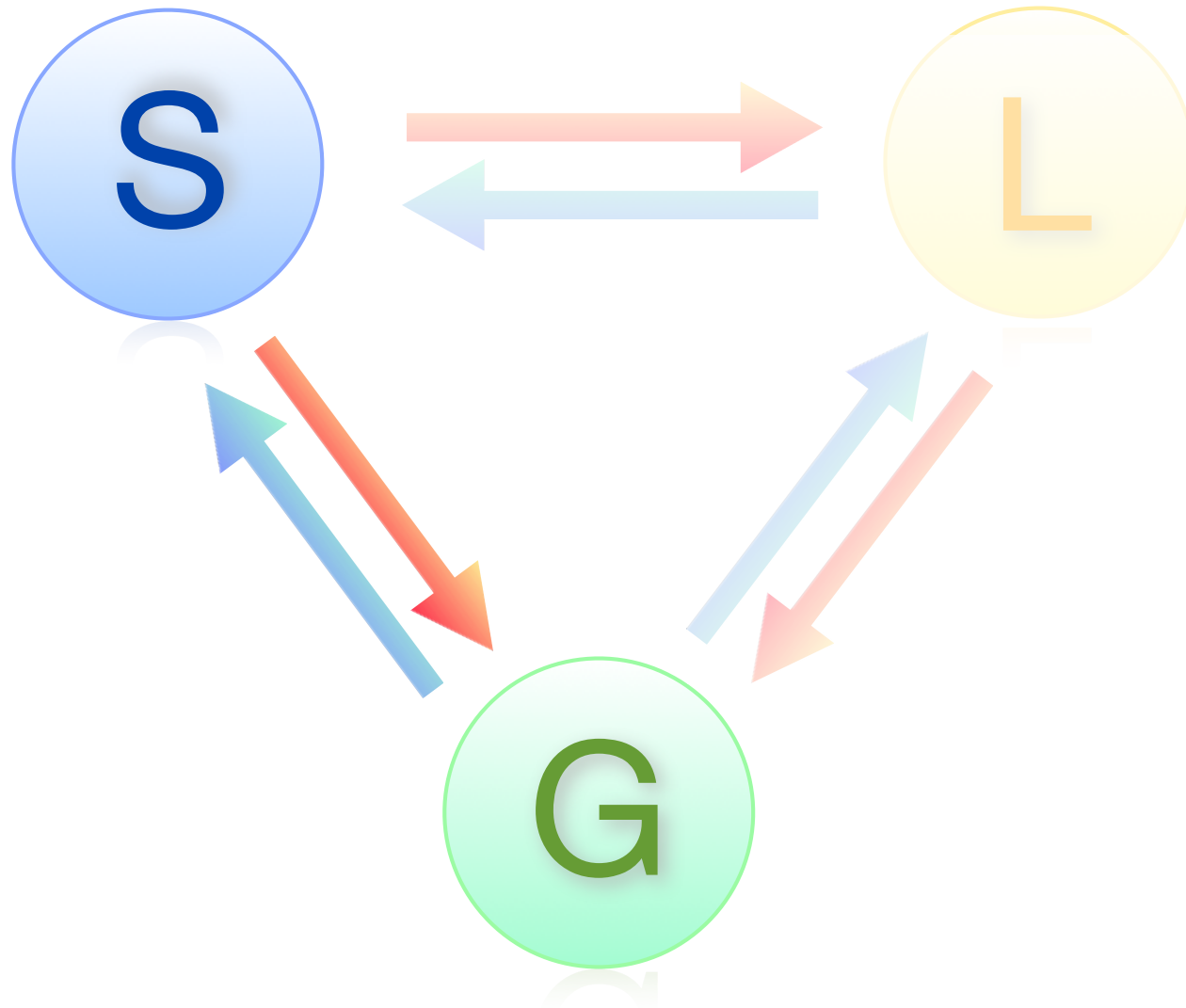


Concept Check

A Wendy's sour cream and chive potato has 3.5 grams of fat, 8.0 grams of protein, and 63 grams of carbohydrates. How many Calories does this **tasty treat** contain?

Add an Item															% Daily Value				
Choose a Menu Category																			
Choose a Menu Item																			
Add Item to Your Meal ▶																			
		QUANTITY	WEIGHT (G)	CALORIES	CALORIES FROM FAT	TOTAL FAT (G)	SATURATED (G)	TRANS FATTY ACIDS	CHOLESTEROL (MG)	SODIUM (MG)	CARBOHYDRATES (G)	DIETARY FIBER (G)	SUGARS (G)	PROTEIN (G)	VITAMIN A	VITAMIN C	CALCIUM	IRON	DELETE ITEM
	Sour Cream and Chives Potato Personalize It ▶	1	308		35	3.5	2.0	0.0	10	50	63	7	4	8	6%	60%	8%	15%	☐
Your Meal Total:			308		35	3.5	2.0	0.0	10	50	63	7	4	8	6%	60%	8%	15%	

Phase Changes (Section 7.3)



Energy Change in Chemical Reactions (Sec 7.4)

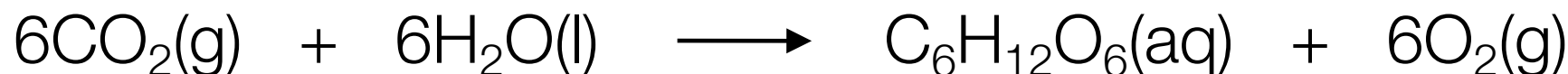


When energy is **absorbed**, the reaction is endothermic and ΔH is **positive**.

When energy is **released**, the reaction is exothermic and ΔH is **negative**.

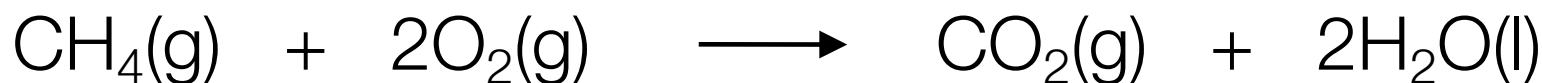
Energy Change in Chemical Reactions

When ΔH is positive:



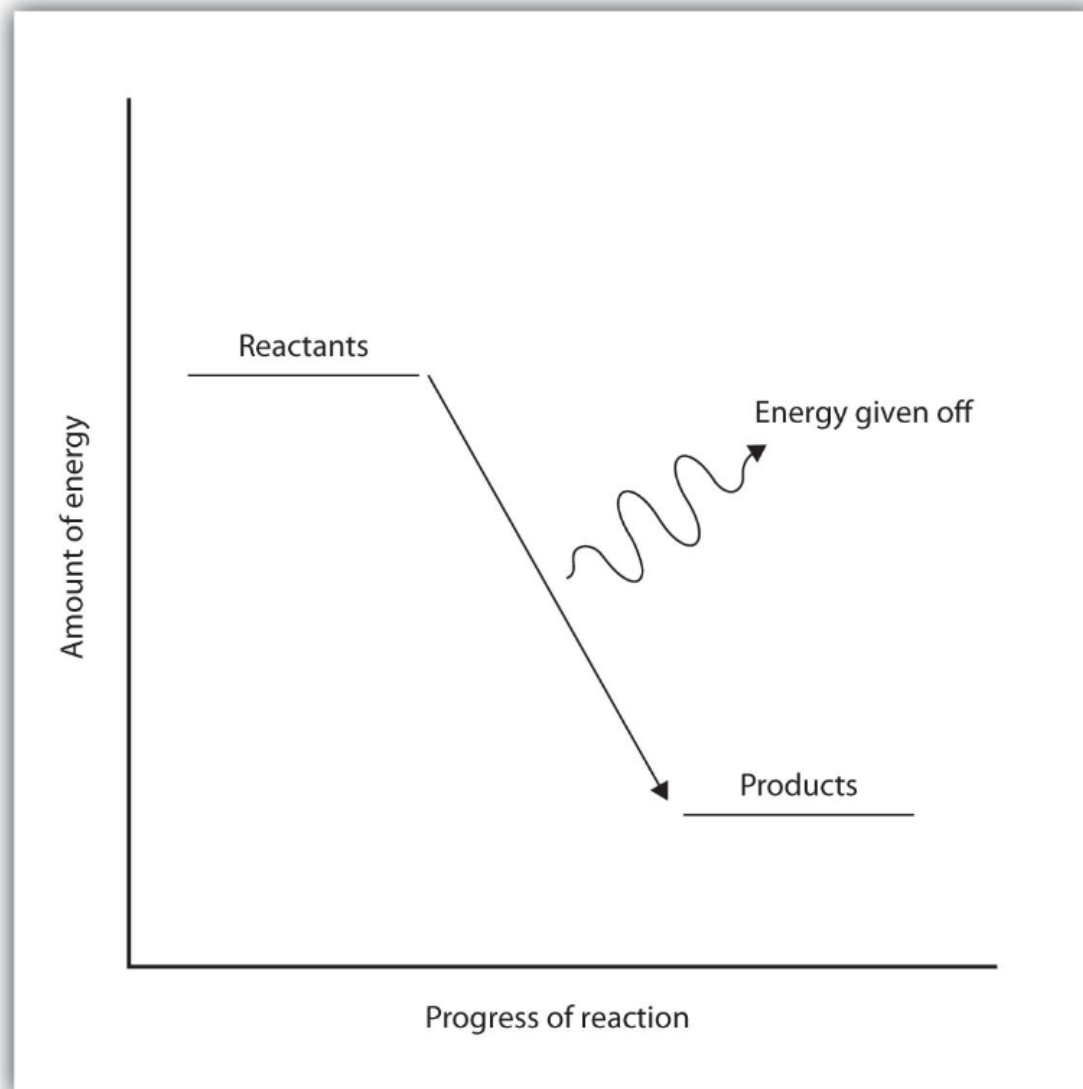
$$\Delta H = +678 \text{ kcal}$$

When ΔH is negative:

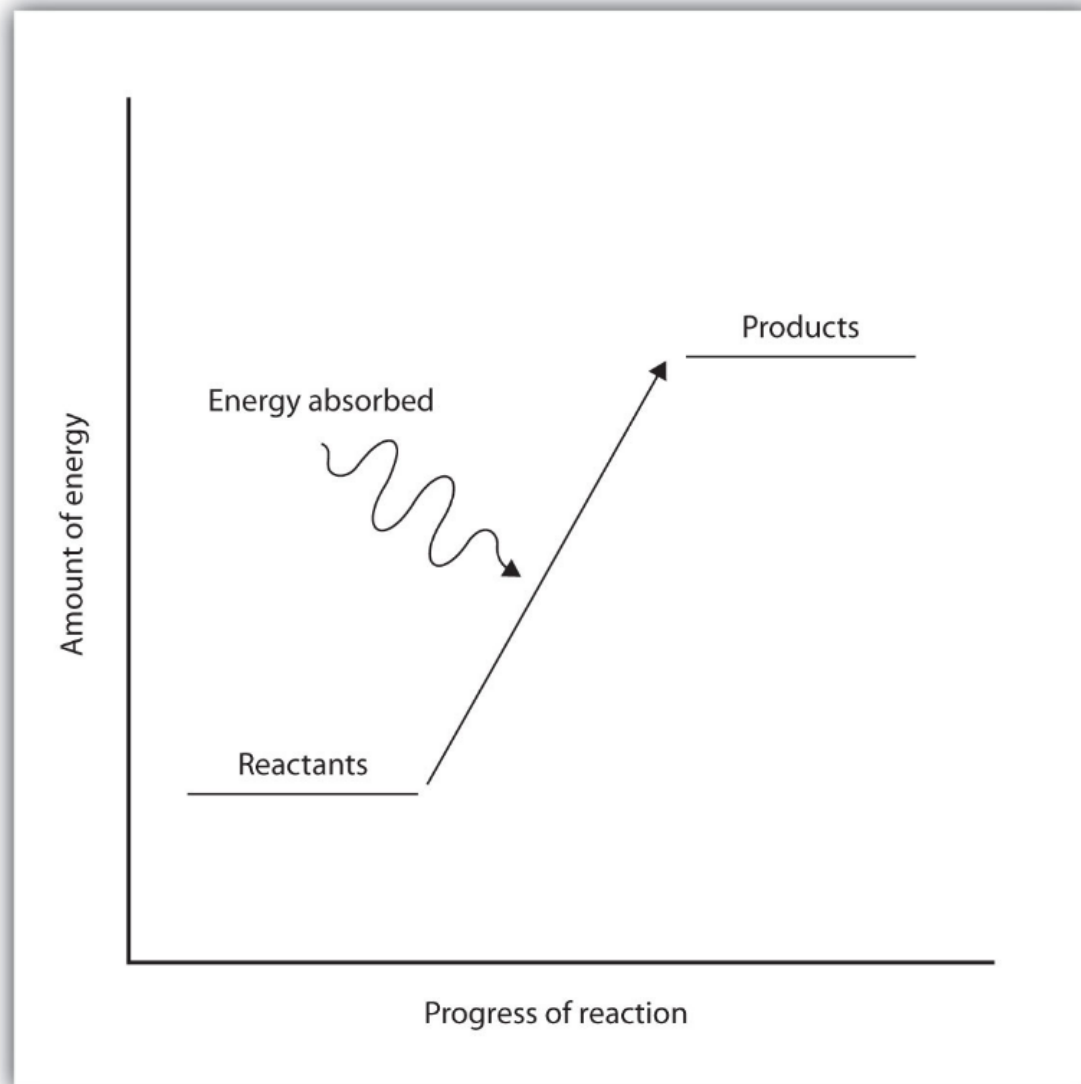


$$\Delta H = -213 \text{ kcal}$$

Exothermic Reaction



Endothermic Reaction



Reaction Rate

Three Factors determine the rate of a chemical reaction.

Concentration

Temperature

Catalyst

Concept Review (Section 7.4)

CONCEPT REVIEW EXERCISES

1. What is the connection between energy and chemical bonds?
2. Why does energy change during the course of a chemical reaction?

Practice Problems: 3-6