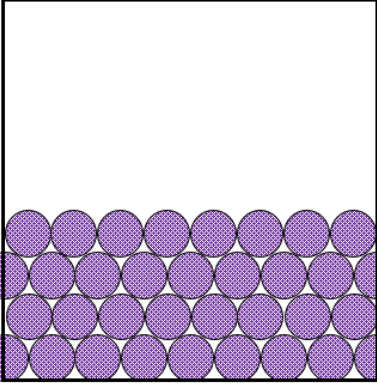
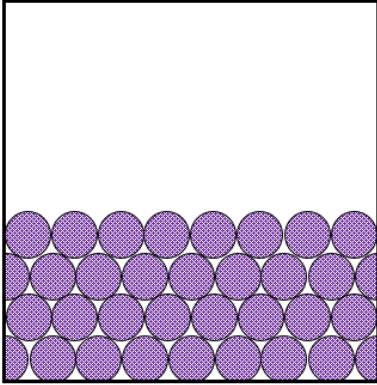
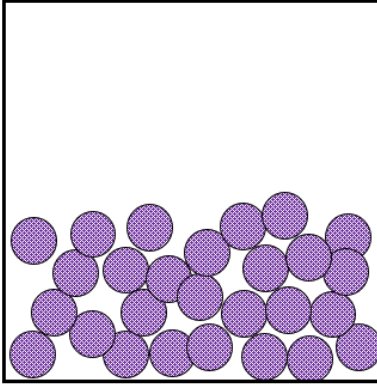


Faculty Submitting: Allison Kelly

Specify here whether “Pre” or “End” of Unit and the Unit #: Pre Unit 15

<i>LOs: Spontaneity</i> <i>Define entropy and use standard molar entropies to calculate standard entropies of reaction</i> <i>Calculate Standard Free Energy of a reaction using Standard Free Energy of formation or standard enthalpy and standard entropy</i> <i>Perform calculations relating Free Energy to temperature and equilibrium constants</i>	
Unit 15_ Question 1	Canvas Question Type: Matching
	Match the following terms to their definitions Spontaneous Reaction – A reaction that occurs naturally under certain conditions Nonspontaneous Reaction – A reaction that only occurs with continual input of energy <i>Distractors:</i> A reaction that occurs rapidly A reaction that occurs slowly
Read More	https://openstax.org/books/chemistry-2e/pages/16-1-spontaneity
Unit 15_ Question 2	Canvas Question Type: Fill in the Blank
	A spontaneous process results in a more [uniform] distribution of matter or energy
Read More	https://openstax.org/books/chemistry-2e/pages/16-1-spontaneity
Unit 15_ Question 3	Canvas Question Type: Multiple Choice
	Order the following in terms of increasing entropy
	Correct Answer: : $S_{\text{solid}} < S_{\text{liquid}} \ll S_{\text{gas}}$ Wrong Answers: $S_{\text{gas}} \ll S_{\text{liquid}} < S_{\text{solid}}$ $S_{\text{liquid}} \ll S_{\text{gas}} < S_{\text{solid}}$ $S_{\text{liquid}} < S_{\text{solid}} \ll S_{\text{gas}}$
Read More	https://openstax.org/books/chemistry-2e/pages/16-2-entropy#CNX_Chem_16_03_Entropies
Unit 15_ Question 4	Canvas Question Type: Fill in Multiple Blanks

	Entropy (S) is a thermodynamic property that is related to the number of [microstates/W] for the system. The change in entropy (ΔS) is the ratio between reversible [heat/q] and temperature in [kelvin/K].
Read More	https://openstax.org/books/chemistry-2e/pages/16-2-entropy
Unit 15_ Question 5	Canvas Question Type: Multiple Choice
	Which of the following statements is true about spontaneity?
	Correct Answer: for spontaneous changes the entropy of the universe is increasing Wrong Answers: for spontaneous changes the entropy of the system is increasing for spontaneous changes the enthalpy of the surroundings is increasing for spontaneous changes the entropy of the universe is zero
Read More	https://openstax.org/books/chemistry-2e/pages/16-3-the-second-and-third-laws-of-thermodynamics
Unit 15_ Question 6	Canvas Question Type: Multiple Choice
	According to the third law of thermodynamics, which of these systems has an entropy of zero? <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>System 1</p>  <p>Temperature = 0 K</p> </div> <div style="text-align: center;"> <p>System 2</p>  <p>Temperature = 298.15 K</p> </div> <div style="text-align: center;"> <p>System 3</p>  <p>Temperature = 298.15 K</p> </div> </div> <p>ALT TEXT: There are three boxes indicating the three systems. System 1 shows circles stacked in an orderly fashion and is labelled Temperature = 0 K. System 2 shows circles stacked in an orderly fashion and is labeled Temperature = 298.15 K. System 3 shows circles randomly overlapping each other and is labeled Temperature = 298.15 K.</p>
	Correct Answer: System 1

	Wrong Answers: System 2 System 3
Read More	https://openstax.org/books/chemistry-2e/pages/16-3-the-second-and-third-laws-of-thermodynamics
Unit 15_ Question 7	Canvas Question Type: Matching
	Match the following Spontaneous: $\Delta G < 0$ Nonspontaneous: $\Delta G > 0$ Equilibrium: $\Delta G = 0$
Read More	https://openstax.org/books/chemistry-2e/pages/16-4-free-energy
Unit 15_ Question 8	Canvas Question Type: Multiple Choice QUESTION GROUP
8a	For a reaction where ΔH is negative and ΔS is positive
	Correct Answer: The reaction is spontaneous at all temperatures Wrong Answers: The reaction is only spontaneous at low temperatures The reaction is only spontaneous at high temperatures The reaction is never spontaneous
8b	For a reaction where ΔH is negative and ΔS is negative
	Correct Answer: The reaction is only spontaneous at low temperatures Wrong Answers: The reaction is only spontaneous at high temperatures The reaction is spontaneous at all temperatures The reaction is never spontaneous
8c	For a reaction where ΔH is positive and ΔS is negative
	Correct Answer: The reaction is never spontaneous Wrong Answers: The reaction is only spontaneous at low temperatures

	<p>The reaction is only spontaneous at high temperatures</p> <p>The reaction is spontaneous at all temperatures</p>
8d	<p>For a reaction where ΔH is positive and ΔS is positive</p>
	<p>Correct Answer:</p> <p>The reaction is only spontaneous at high temperatures</p> <p>Wrong Answers:</p> <p>The reaction is only spontaneous at low temperatures</p> <p>The reaction is spontaneous at all temperatures</p> <p>The reaction is never spontaneous</p>
Read More	<p>https://openstax.org/books/chemistry-2e/pages/16-4-free-energy#CNX_Chem_16_04_Scenarios</p>