Spontaneity and Entropy - Reading Guide

*sections 16.1 and 16.2 in OpenStax*

**Spontaneous and Nonspontaneous Processes (Section 16.1)**

What is a **spontaneous** process?

Give one example of a spontaneous process:

What is a **nonspontaneous** process?

Give one example of a nonspontaneous process:

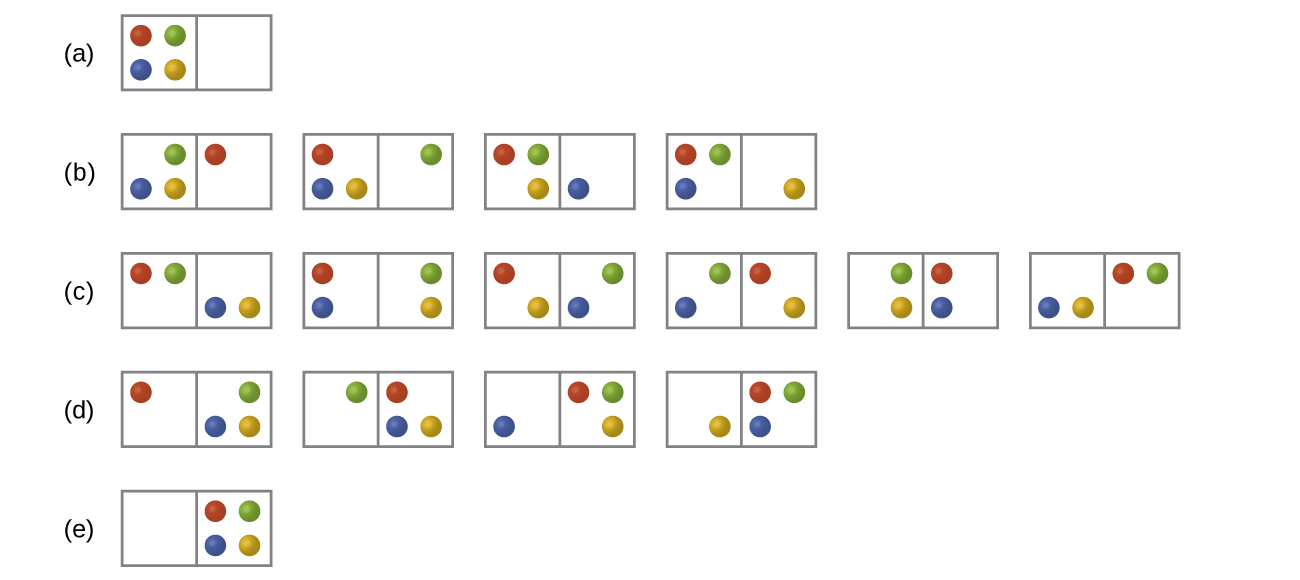
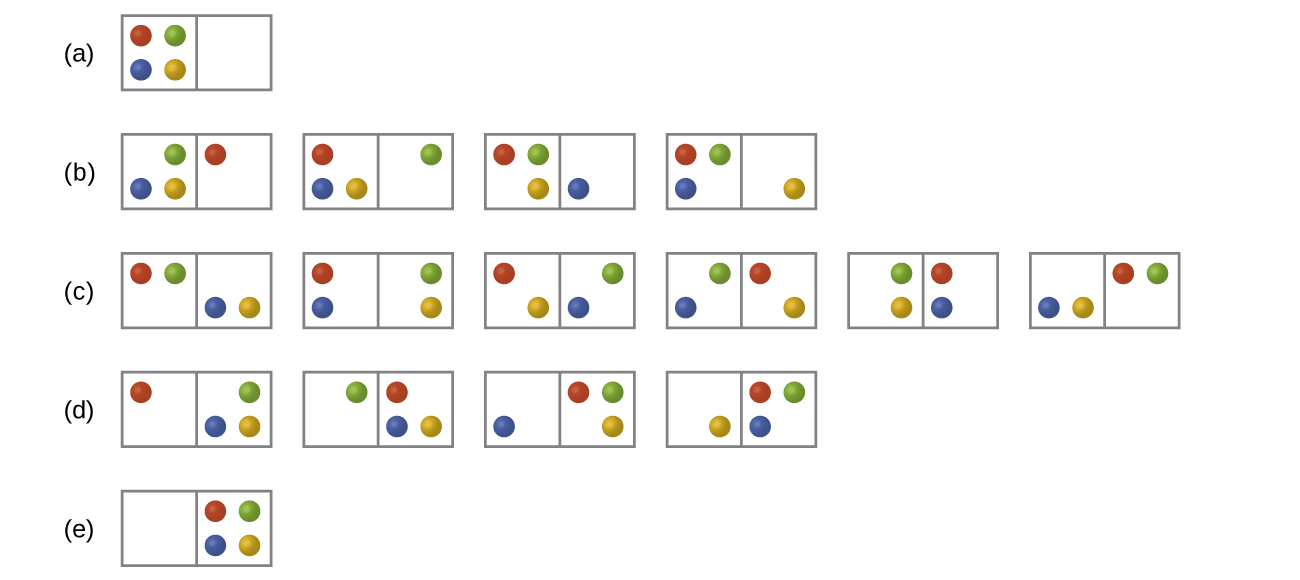
Does the speed of a process affect the spontaneity of a reaction? \_\_\_\_\_\_\_ (*Yes/No)*

Based on your answer, do you think a catalyst can make a nonspontaneous reaction become spontaneous? *Explain.*

**Entropy (Section 16.2)**

How does **entropy** relate to the number of **microstates** for a system?

Which of the following arrangements of four particles in two boxes has the most **microstates**? *Explain.*



(3:1)

(2:2)

Which of the arrangements above has the greatest **entropy**? *Explain.*

List the states of matter in order of *increasing* entropy: \_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_

List the solids Au, Al, C in order of *increasing* entropy at 25oC: \_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_

Explain why a more complex molecule like NO has higher entropy than Ar.

Predict the sign (+ or –) of ∆S (change in entropy) for each of the following:

Sublimation of dry ice (CO2): \_\_\_\_\_\_\_

Dissolving NaCl in water: \_\_\_\_\_\_\_

Precipitation of Ag+ and Cl–: \_\_\_\_\_\_\_

Freezing water: \_\_\_\_\_\_\_

**End of Chapter 16 Practice Problems**

#3, 5, 13, 15, 17

For detailed solutions to these problems, go to the [OpenStax website](https://openstaxcollege.org/textbooks/chemistry/resources) and download the “Student Answer and Solution Guide.”