

CONCEPT: SPONTANEOUS VS NONSPONTANEOUS REACTIONS

- **Spontaneity:** determines whether a reaction/process, under certain conditions, _____ or _____.
 - **Spontaneous:** a _____ process which does not require a constant outside _____ source
 - _____ formation of products at equilibrium
 - **Nonspontaneous:** an _____ process which requires a constant outside energy source
 - Does _____ formation of products at equilibrium
- Spontaneity does not determine the speed of a reaction/process

	<p style="color: green;">spontaneous</p> \rightleftharpoons <p style="color: red;">nonspontaneous</p>		Rate in forward: _____
<p style="color: red;">nonspontaneous</p> $6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \xrightarrow{\text{sunlight}} \text{Glucose} + 6 \text{ O}_2$ <p style="color: green;">spontaneous</p>			Rate in forward: _____

EXAMPLE: Label each process as spontaneous or nonspontaneous.

- a) a sugar cube dissolved in room temperature water _____
- b) mixing of 3 gases in a container _____
- c) heat flows from cold object to warm object _____
- d) ice cube melts at $-1.0 \text{ }^\circ\text{C}$ _____
- e) ball rolls down a hill _____
- f) plant respiration: O_2 and glucose produce CO_2 and ATP _____