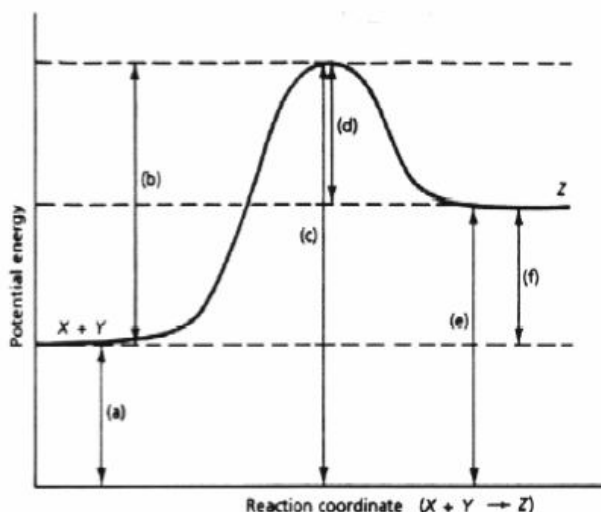
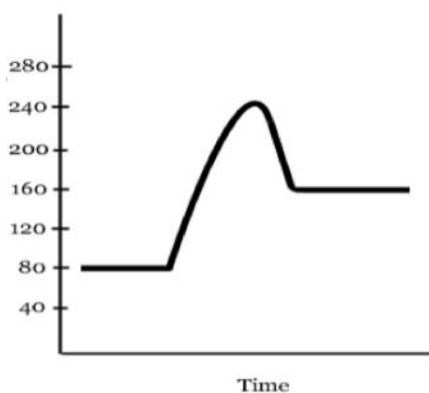


Potential Energy Diagram Worksheet **ANSWERS**



- Which of the letters a–f in the diagram represents the potential energy of the products? **e**
- Which letter indicates the potential energy of the activated complex? **c**
- Which letter indicates the potential energy of the reactants? **a**
- Which letter indicates the activation energy? **b**
- Which letter indicates the heat of reaction? **f**
- Is the reaction exothermic or endothermic? **endo**
- Which letter indicates the activation energy of the reverse reaction? **d**
- Which letter indicates the heat of reaction of the reverse reaction? **f**
- Is the reverse reaction exothermic or endothermic? **exo**



- The PE of the reactants of the forward reaction is about **80** kilojoules.
- The PE of the products of the forward reaction is about **160** kilojoules.
- The PE of the activated complex of the forward reaction is about **240** kilojoules.
- The activation energy of the forward reaction is about **160** kilojoules.
- The heat of reaction (ΔH) of the forward reaction is about **+80** kilojoules.
- The forward reaction is **endothermic**
- The PE of the reactants of the reverse reaction is about **160** kilojoules.
- The PE of the products of the reverse reaction is about **80** kilojoules.
- The PE of the activated complex of the reverse reaction is about **240** kilojoules.
- The activation energy of the reverse reaction is about **80** kilojoules.
- The heat of reaction (ΔH) of the reverse reaction is about **-80** kilojoules.
- The reverse reaction is **exothermic** (endothermic or exothermic).

Reaction Rates and Potential Energy Diagrams

1. Chemical reactions occur when reactants collide. For what reasons may a collision fail to produce a chemical reaction?

Not enough energy; improper angle.

2. If every collision between reactants leads to a reaction, what determines the rate at which the reaction occurs?

Nature of reactants, Concentration, Temperature, Catalysts.

3. What is the activation energy of a reaction, and how is this energy related to the activated complex of the reaction?

E_a is the minimum amount of energy for a reaction to occur. It is the amount of energy required to create an activated complex.

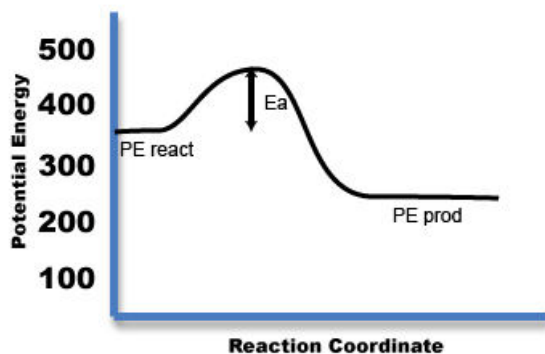
4. What happens when a catalyst is used in a reaction?

A catalyst changes the reaction mechanism, in the process lowering the activation energy.

5. Name 4 things that will speed up or slow down a chemical reaction.

Increase concentration by distillation of a solvent, Increase concentration by increasing pressure of a gas, Increase temp, Add a catalyst, Add an inhibitor.

6. Draw an energy diagram for a reaction. Label the axis, PE of reactants = 350 KJ/mol, E_a = 100 KJ/mol, PE of products = 250 KJ/mol.



7. Is the reaction in # 6 exothermic or endothermic? Explain.

Exothermic. The ΔH is -100 KJ/mol which means heat is released.

8. How could you lower the activation energy for the reaction in #6?

Add a catalyst.