Reactions and Rates 3 Clicker Questions

Activity 3:
Introduction to **Equilibrium**

Trish Loeblein
PhET

Learning Goals

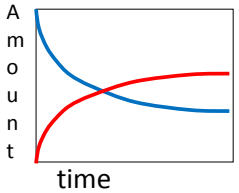
Students will be able to:

- Use a physical experiment to model chemical equilibrium
- Sketch how the number of reactants and products will change as a reaction proceeds
- Predict how changing the initial conditions will affect the equilibrium amounts of reactants and products.
- Predict how the shape of the reaction coordinate will affect the equilibrium amounts of reactants and products.

Which best shows that equilibrium has been reached?

A

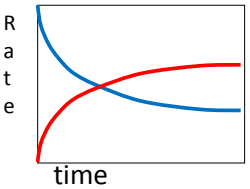
Amount of substance vs time



-Product -Reactants

B

Reaction Rates vs time

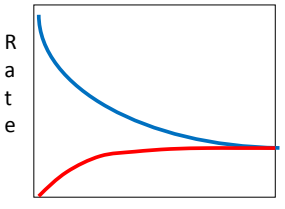


-Forward -Reverse

Correct rate graph

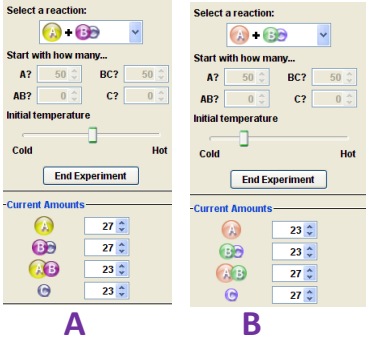
Forward reaction rate =Reverse rate

Reaction Rates vs time



-Forward -Reverse

Which could show that equilibrium has been reached?



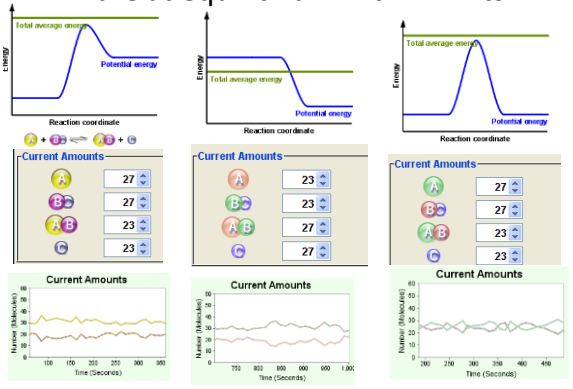
A

B

C neither

D either

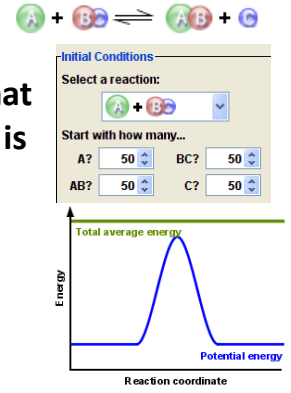
All are at equilibrium within limits

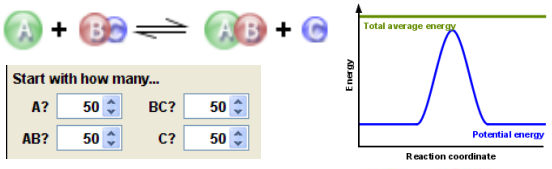


Which best shows that equilibrium has been reached?

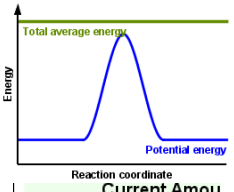
A. The number of reactants is greater than the products
B. The number of products is greater than the reactants
C. The number of products is equal to the reactants
D. The number of products varies little

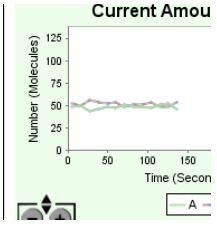
At equilibrium, what would you predict is in the container?

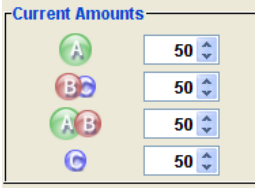




A. Container will have mostly A & BC
B. Container will have mostly AB & C
C. Container will have a mixture of all four with nearly equal amounts
D. No reaction will occur since the products and reactants have the same energy

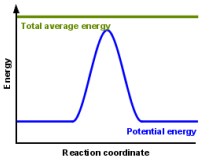




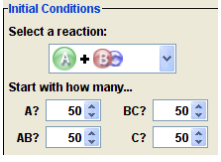


data

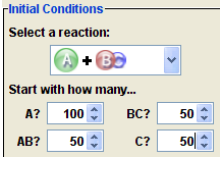
How will the equilibrium of second trial compare to the equilibrium of the first?

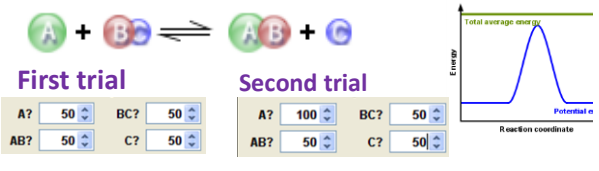


First experiment



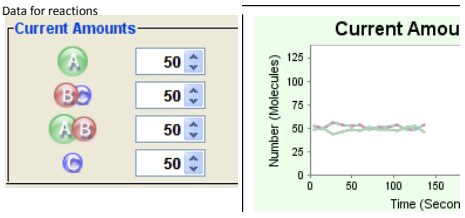
Second experiment

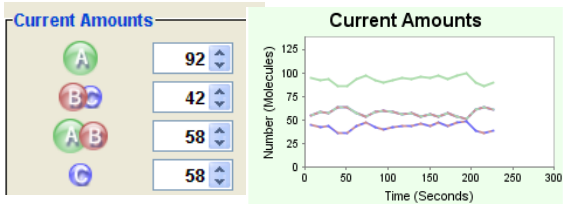




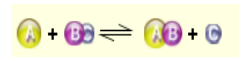
A. There will be more A & BC
B. There will be more AB & C
C. There will be more A & AB & C
D. There will be more BC & AB & C
E. The ratios will still be about the same

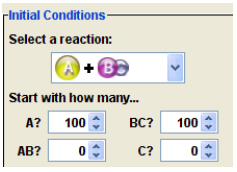
Data for reactions

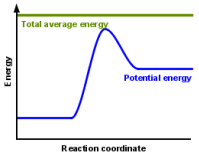


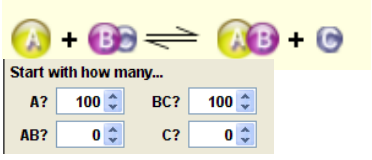


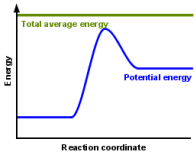
At equilibrium, what would you predict is in the container?











A. Container will have only AB & C
B. Container will have only A & BC
C. Container will have a mixture of all four with more AB & C
D. Container will have a mixture of all four with more A & BC

data