The ratio
of the concentrations
of products and
reactants is known
as this.

Equilibrium Constant

Write the equilibrium constant expression for the following reaction

$3H_2(g) + N_2(g) <--> 2NH_3 (g)$

$$K = \frac{[NH_3]^2}{[N_2][H_2]^3}$$

For the following reaction:

$2\ NO_2(g) \leftrightarrow N_2O_4(g)$

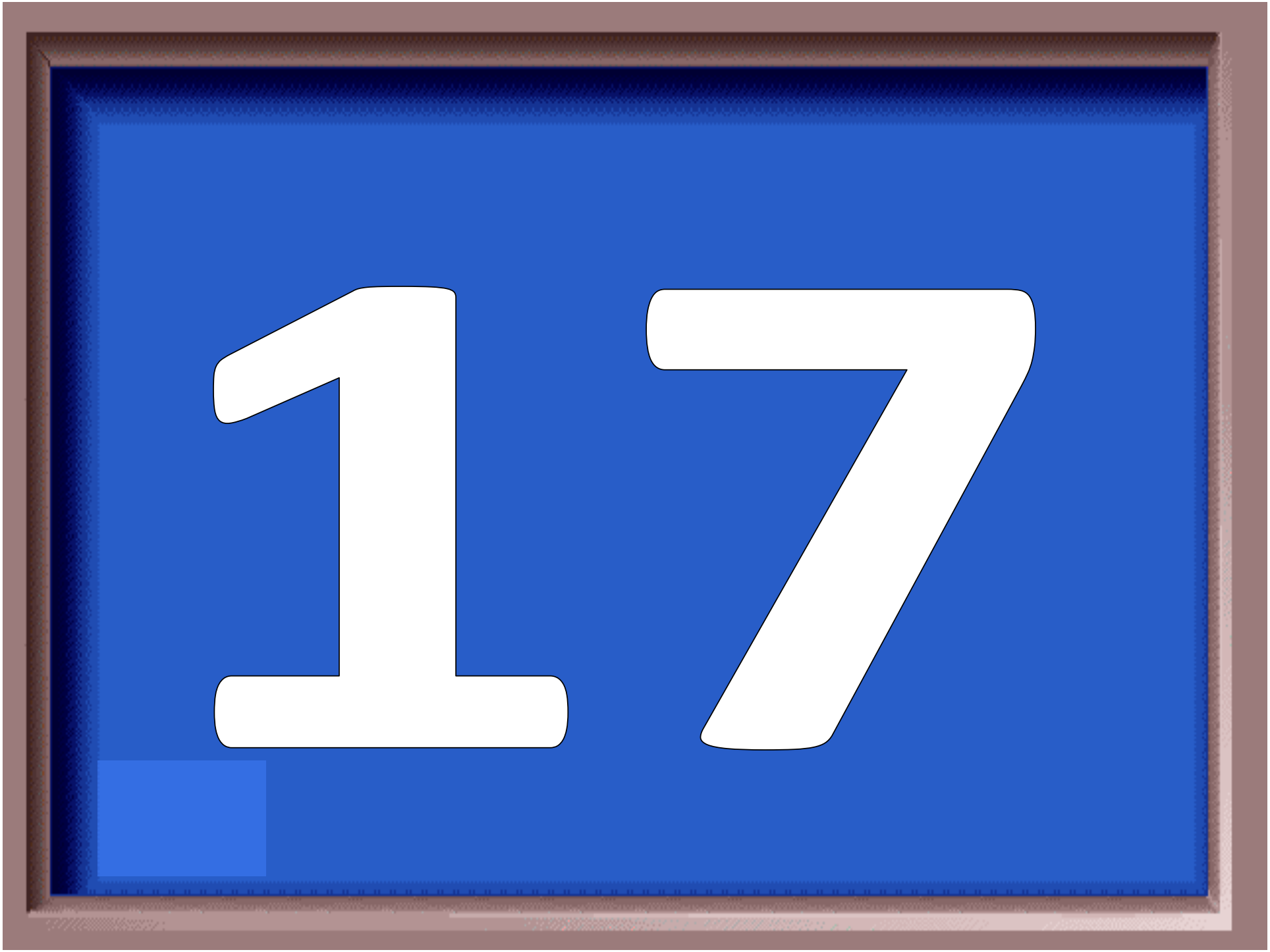
At 25°C, what is the equilibrium constant when the concentration of NO_2 and N_2O_4 is 0.35 M and 0.13 M respectively.

1.1

For the following reaction:

$Na_2CO_3(s) \leftrightarrow 2\ Na^+(aq) + CO_3^{2-}(aq)$

At 56°C, what is the equilibrium constant when: $[Na_2CO_3] = 2.3$ M $[Na^+] = 3.5$ M and $[CO_3^{2-}] = 1.4$ M.


17

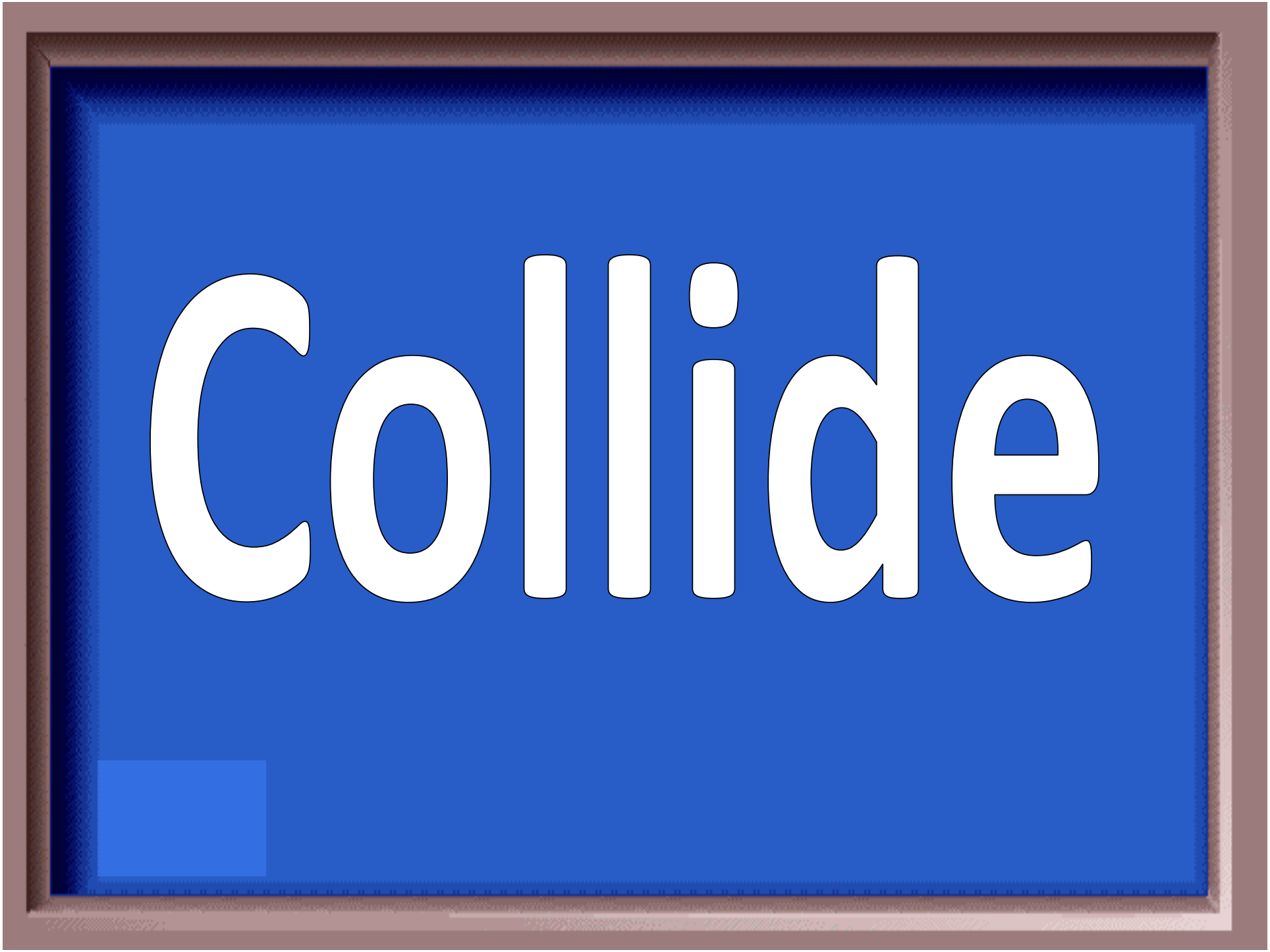
For the following reaction:

$2\ SO_3(g) \leftrightarrow O_2(g) + 2\ SO_2(g)$

At 33°C, what is the equilibrium concentration of SO_3 when, at equilibrium, K for the reaction is 4.25 and concentration of SO_2 and O_2 is 0.57 M and 0.42 M Respectively.

0.18 M

When molecules do this with enough energy, they react


Collide

These are the two criteria of an effective collision

Have enough energy and the correct orientation

This is the energy required for a reaction to happen

Activation Energy

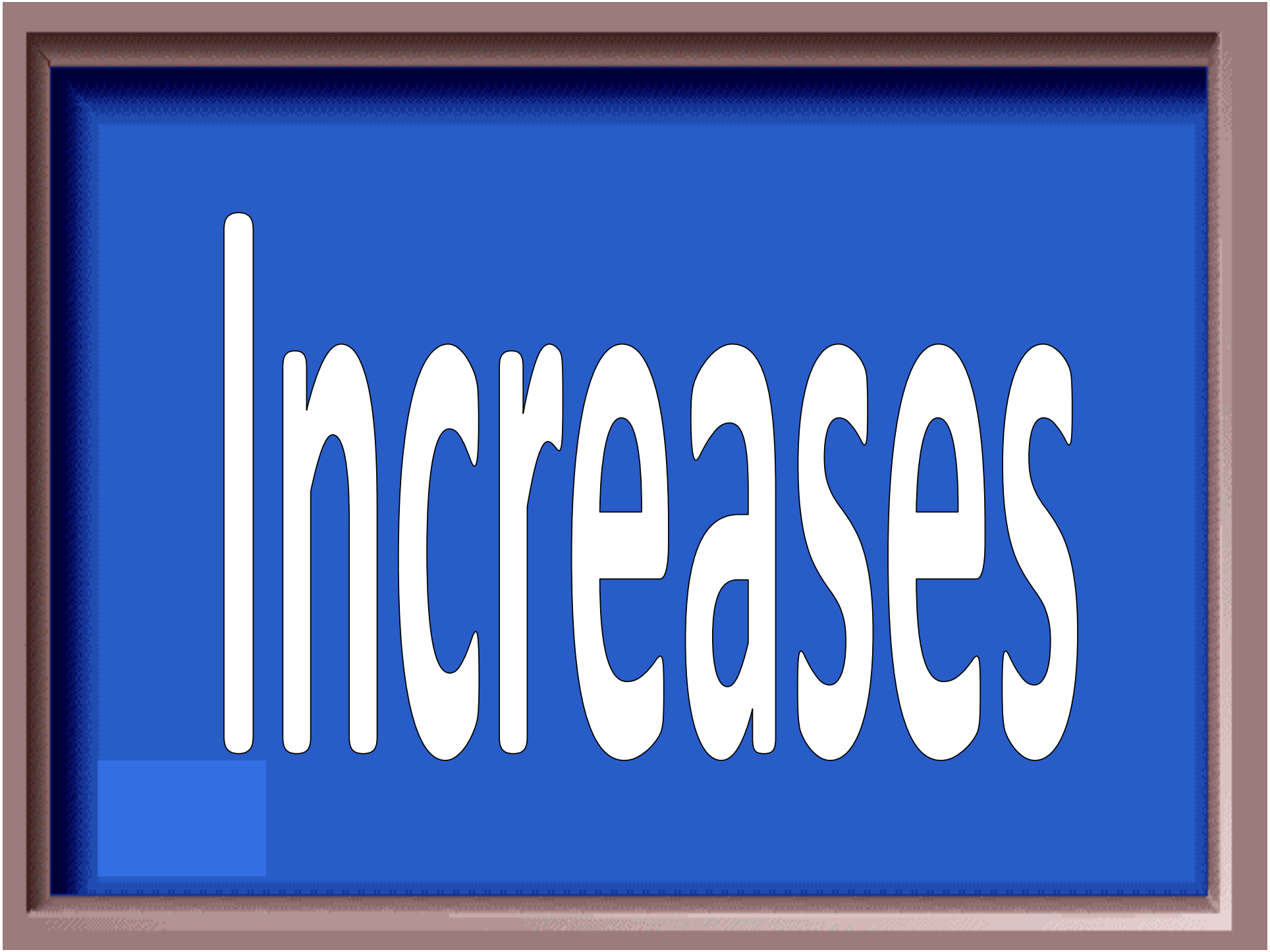
The best way to measure reaction rate is by measuring this over time.

Concentration of reactants (down) or products (up)

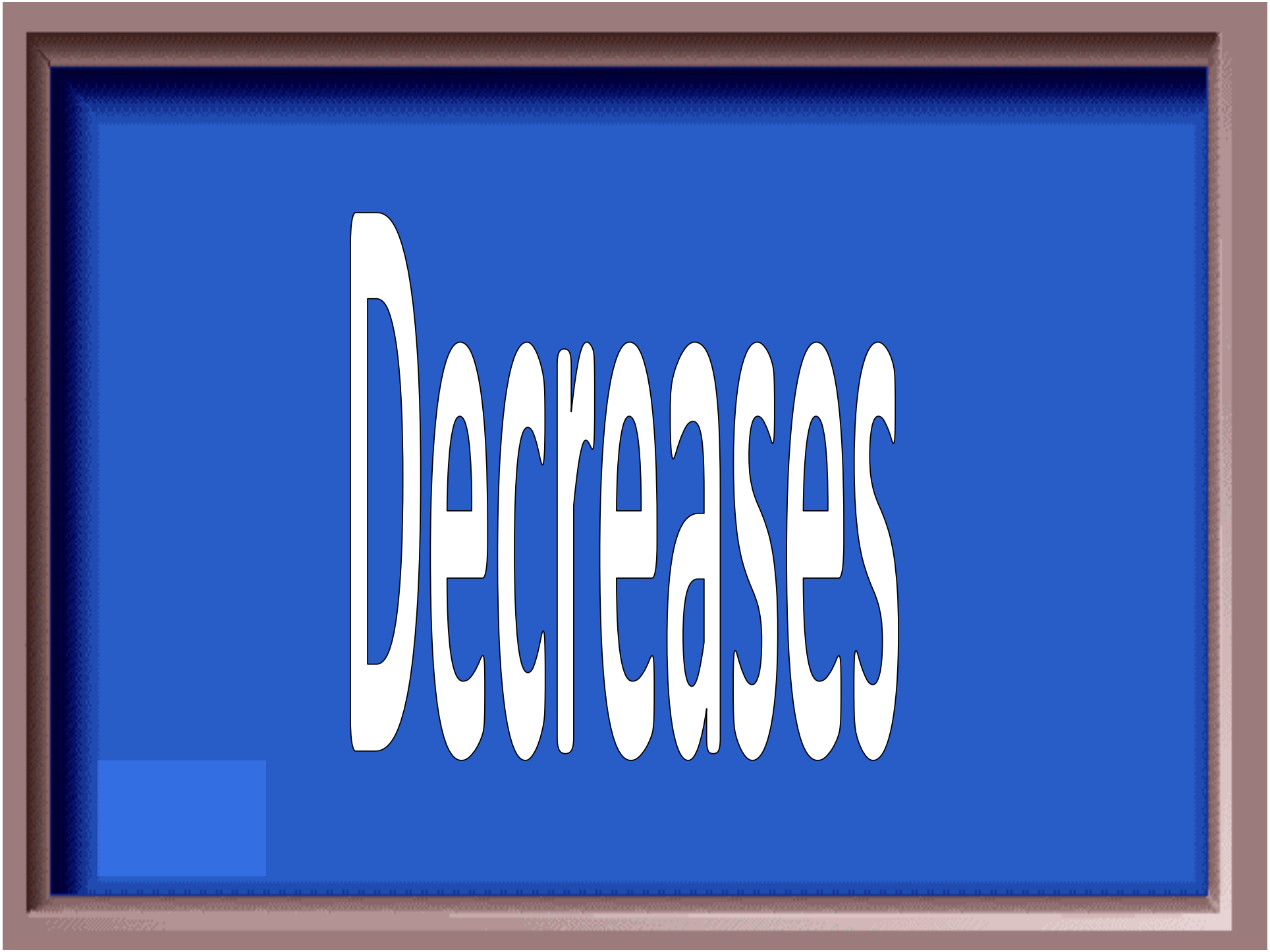
If the change in potential energy of the reaction is +24kJ and the activation energy of the forward reaction is 45kJ, this is the activation energy of the reverse reaction.

21kJ

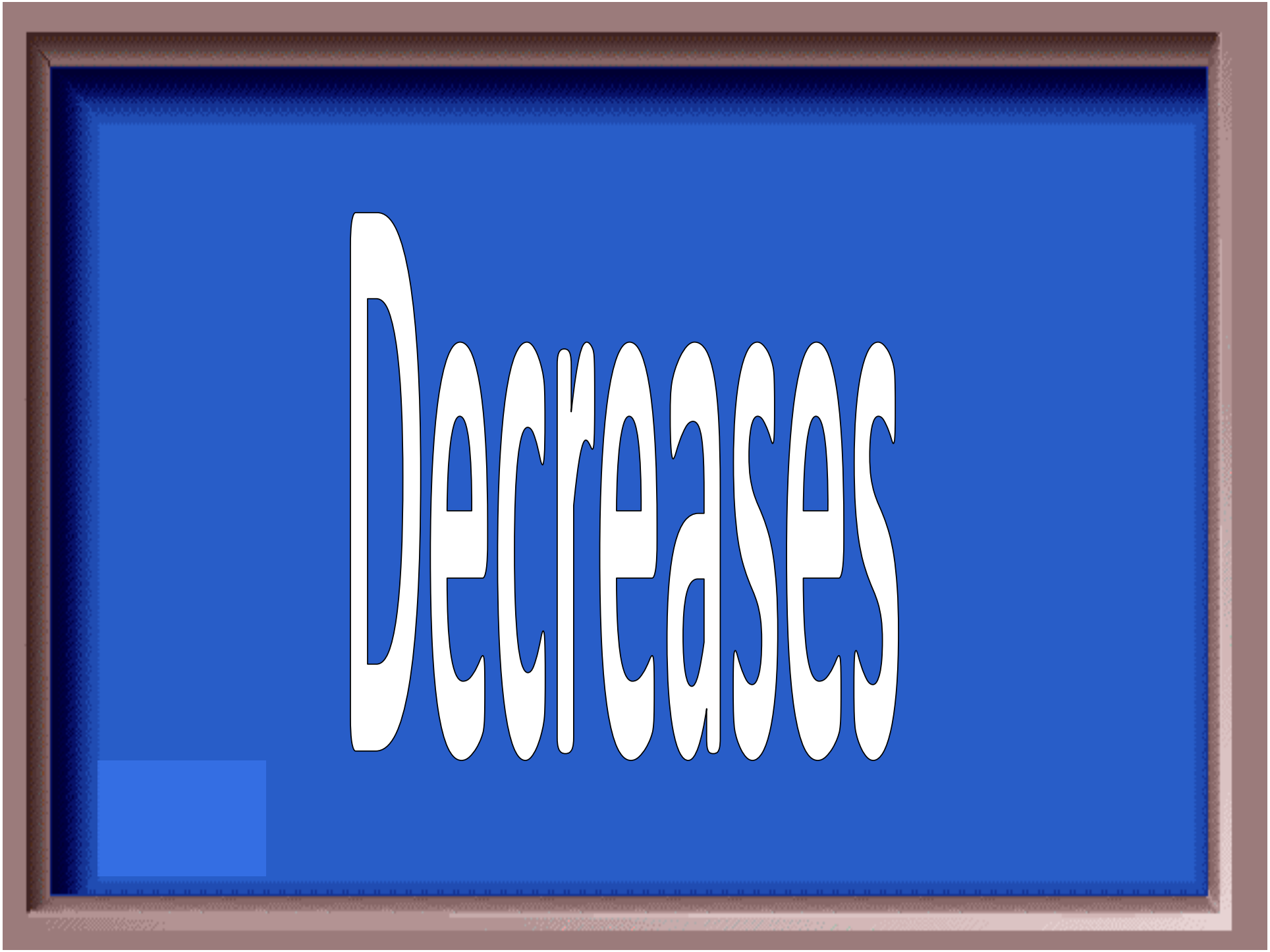
When the temperature increases, the reaction rate does this


Increases

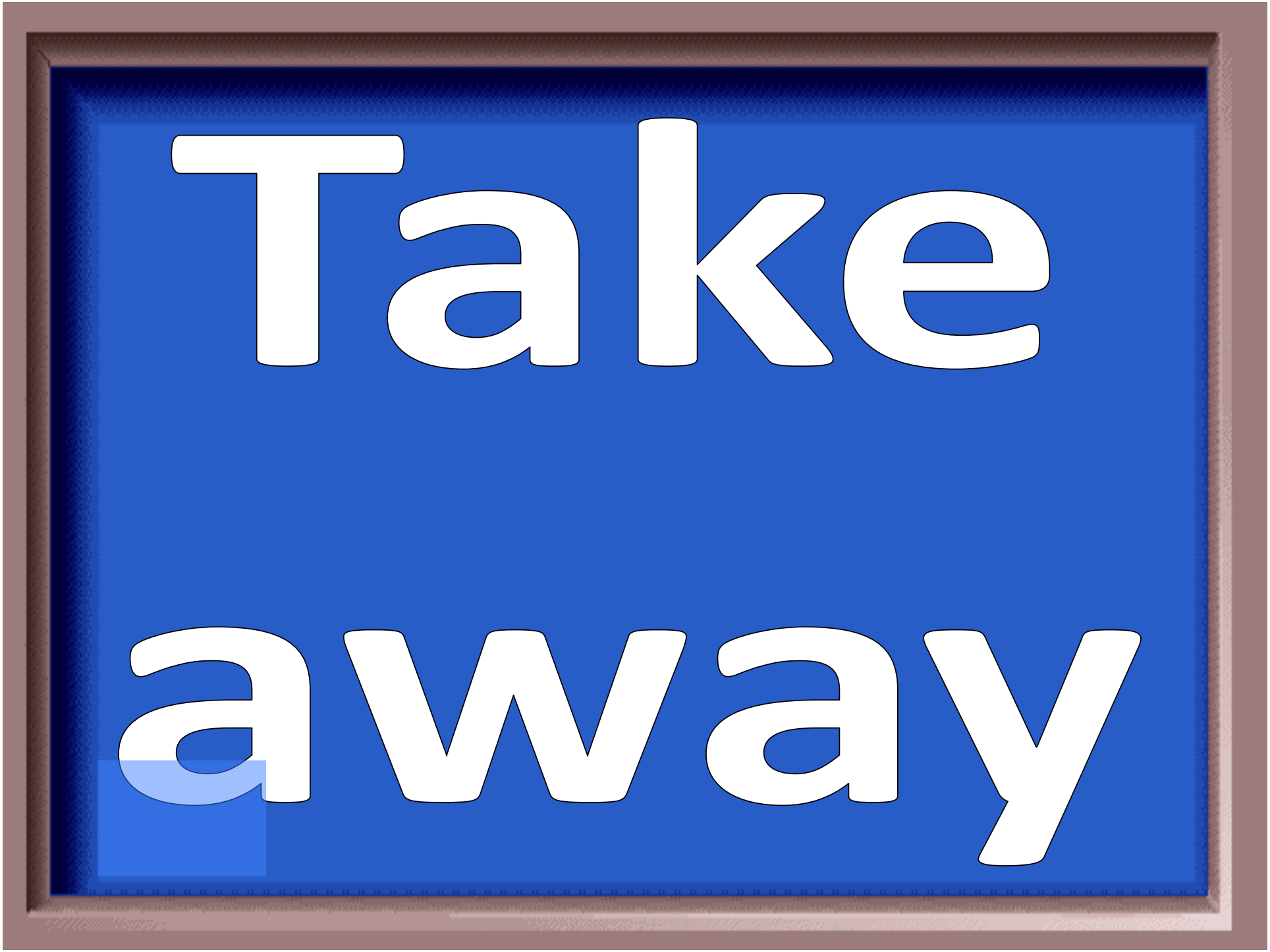
When the pressure decreases, the reaction rate of gases does this


Decreases

When the particle size increases, the reaction rate does this


Decreases

To increase forward reaction rate, you can either add reactant or do this to the products


Take
away

These are the reasons reaction rate decreases when temperature Decreases.

Less energy at collision

Less frequent collisions

You need to add this to make a reaction speed up

Catalyst

A catalyst increases reaction rate by doing this.

Activation Energy

A catalyst does this to the hump of a reaction graph

Lowering activation energy

A substance is a catalyst because it does not do this in a reaction

Get used up or get consumed

These are the body's catalysts

Enzymes

This symbol states that the reaction is at equilibrium

A reaction is at equilibrium when the following two things happen

Forward and reverse rxn rates are equal and concentrations are constant

This is false about this statement:
A substance is at equilibrium when the concentration of the reactants and products are equal and constant.

Concentrations don't have to be equal.

Pressure does not affect these states at equilibrium

Solids

Liquids

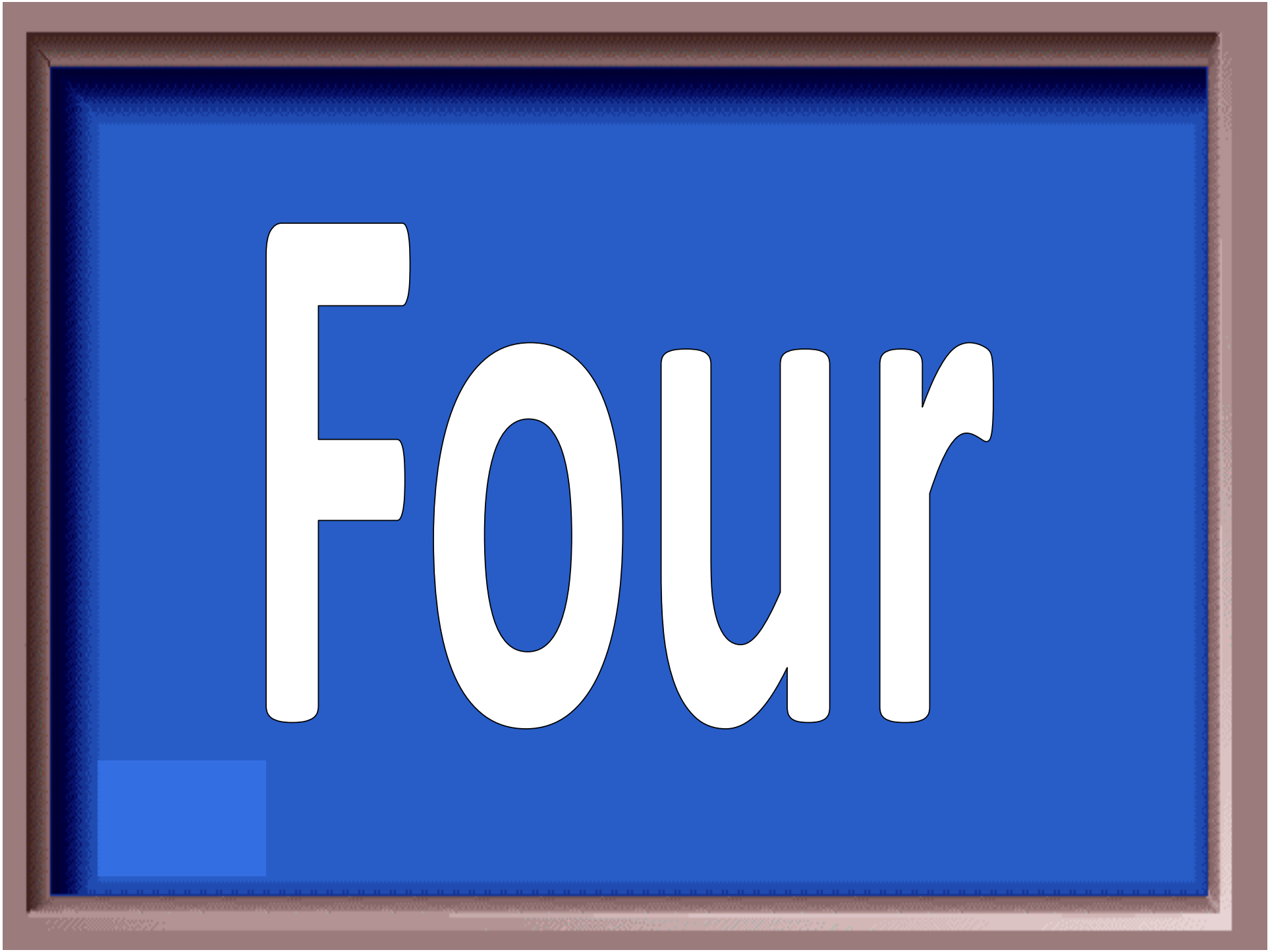
Aqueous

This principle states that a reaction will respond to any stress applied to a reaction

Le Chatelier's Principle

In this reaction,
$N_2 + 3H_2 \leftrightarrows 2NH_3 + 22kcal$,
there are this many moles

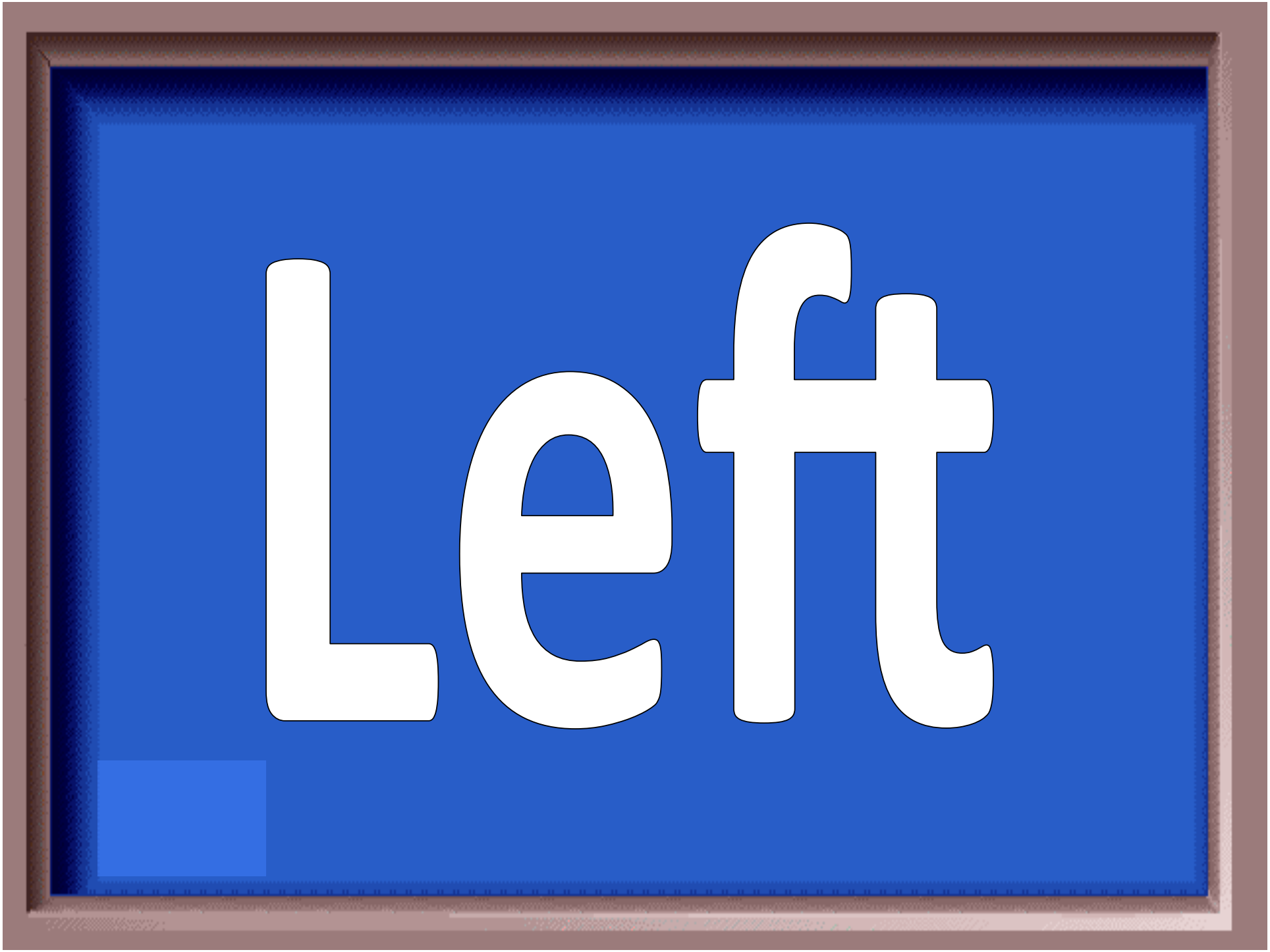
of reactants


Four

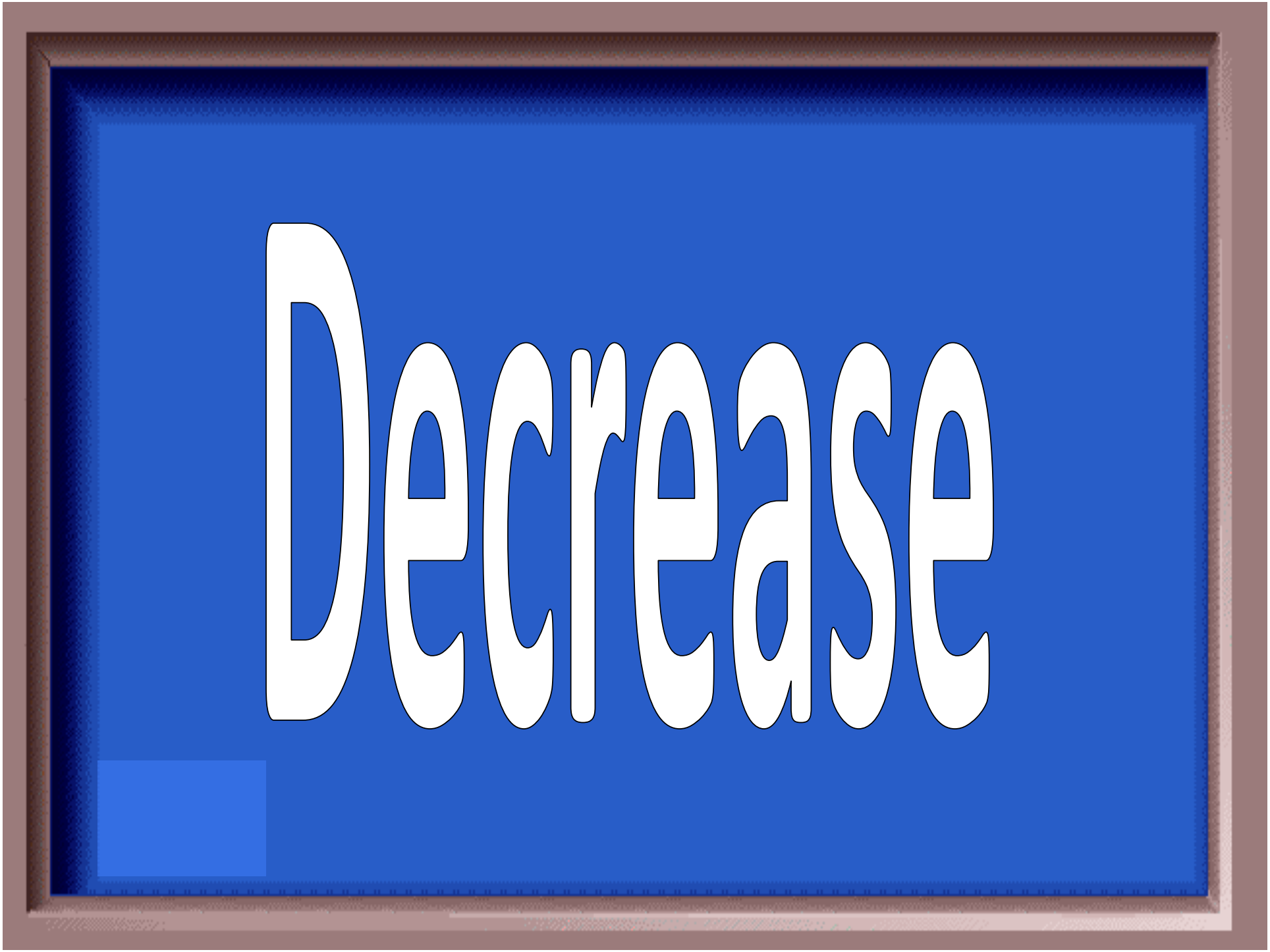
In this reaction, $N_2 + 3H_2 \leftrightarrows 2NH_3 +$ 22kcal, adding N_2 shifts the reaction in this direction


Right

In this reaction,
$N_2 + 3H_2 \leftrightarrows 2NH_3 + 22kcal$,
increasing temperature would shift the reaction in this direction


Left

In this reaction, $N_2 + 3H_2 \leftrightarrows 2NH_3 +$ 22kcal, doing this to the pressure of the reaction will increase the concentration of the reactants


Decrease

In this reaction,

$2H_2 + O_2 \leftrightarrows 2H_2O + 42kcal$,

WITHOUT adding or removing any of the substances, you need to do these two things to increase the amount of H_2O

Increase pressure and decrease temperature