

CLASS COPY

**YOU MUST RETURN
BEFORE LEAVING!**

Share with a partner

Instructions

- 1) Put the following Target at the top of your notes:
I can explain how rate affecting factors change the speed of a reaction, and can relate it back to Collision Theory
- 2) Take notes in your notebook
- 3) Add color annotations to your notes
- 4) Add KCQ boxes at the bottom of your notes
- 5) When the notes are finished go show the sub and they will stamp your work as completed.
- 6) Get the “Kinetics Worksheet” from the sub and work on that for the rest of the period.

Collision theory

Reactants must collide in order to react

Activation energy

Minimum amount of energy colliding particles need in order to react.

Just because two molecules hit each other doesn't mean they will react!

Molecules must hit each other
Fast Enough AND
In the Correct Orientation

The activation energy is used to make sure the molecules are going fast enough to hit hard enough, and to make sure the molecules rotate around in the right orientation so they can be “EFFECTIVE collisions.”

Factors of Reaction Rate

1. Temperature
2. Concentration
3. Surface area
4. Catalysts

Increase any of these, you get more effective collisions... so it goes faster!

Temperature

Higher temperature

- = Higher kinetic energy
- = More collisions AND more effective collisions
- = More likely to get over the activation curve
- = faster rate



Concentration Higher Concentration

= More particles

= More chances of properly aligned collisions

= Faster rate

**UP TO A POINT!!! If it gets too crowded it can actually slow down your reaction!
They get in each other's way!**



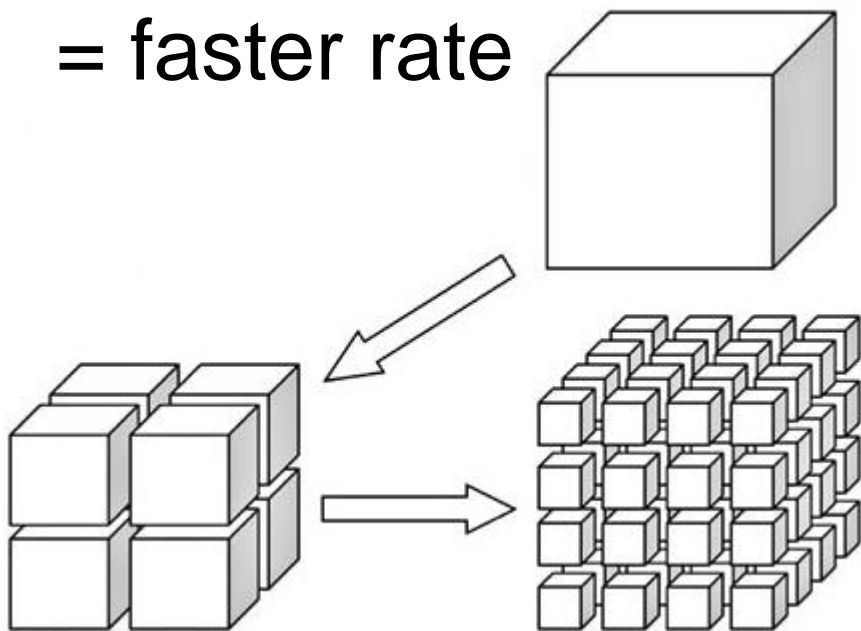
Surface Area

More Surface Area

= More access to
chemicals

= more collisions

= faster rate



Catalysts



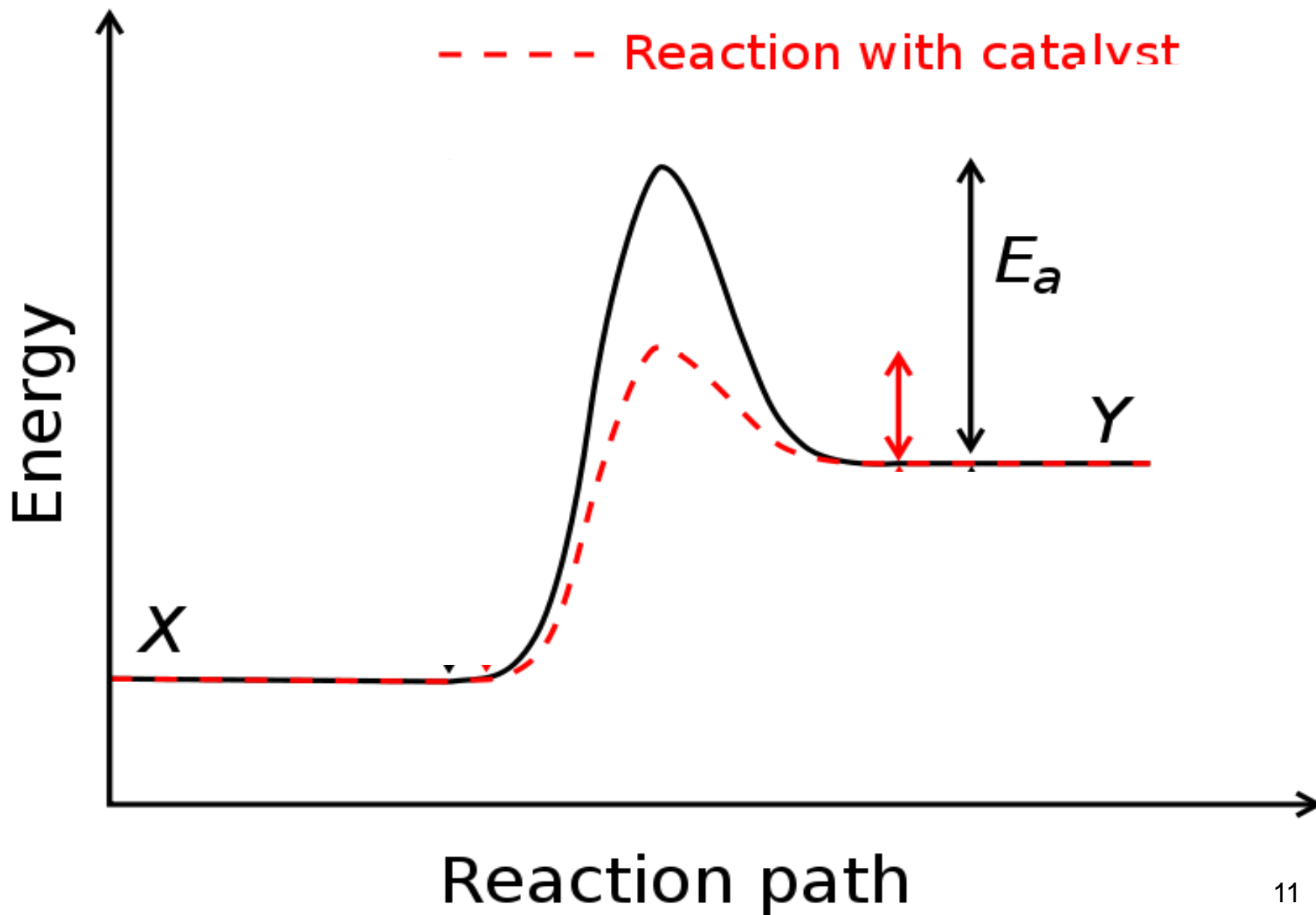
What is it?

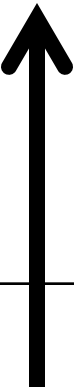
- A chemical that you add to rxn
- Does NOT get used up during reaction
- Helps orient molecules to reach transition state easier
 - So you do not need as much energy
 - **Lowers Activation Energy**
 - = faster reaction BECAUSE more molecules will have the needed energy to get over E_a

You don't get "more" collisions – you just get more collisions that will be EFFECTIVE!

— Reaction without catalyst

- - - Reaction with catalyst



Changes # of Collisions	Changes Activation Energy
1) Temperature 2) Surface Area 3) Concentration	1) Catalyst 

it changes the # of EFFECTIVE collisions because now more molecules have enough energy since there is less energy required