Honors Biology Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
NDHS Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Enzymes and Metabolism**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: sum of all chemical reactions in a cell

 Parts of a Chemical Reaction:

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** 🡪 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 Examples: **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Two types of Metabolism:**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_**: Reactions that

 Called  Reactions

 Example:

 : Reactions that

 Called  Reactions

 Example:  **=**

All Chemical Reactions Need  to start =

 Reactions that have enough energy to start at room temperature are called

 Reactions that don’t have enough energy to start at room temperature are call  **.**

**Energy Profile of a Chemical Reaction**Key: E = amount of Energy
 t = time
 Ea = Activation Energy

**Exothermic Reaction:**

The products have  than the reactants =



Change in Energy

Products

**Endothermic Reaction:**

 The products have  than the reactants = energy is



Change in Energy

**Role of Enzymes:**

Enzymes are .

Enzymes Lower the

* Give a  for reactions
* Reactions happen



Enzymes are  structures that bind to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and cause them to .

 Substrates fit  into the  of the enzyme called the  and cause the enzyme to  – called a  **.**

 EX: Putting your hand in a glove.

 The enzyme-substrate complex (when the two are bound together) create a  that allows the reaction to happen faster. 

**Factors that Affect Enzymes:**1) :

 Increase in temperature  a reaction because it provides more energy and makes the molecules collide faster.
 HOWEVER, if the temperature

 : to  the chemical structure of a molecule –

 Ex: Cooking an egg, having a fever

2)  – all enzymes work best at a specific pH –

 Most work best between  .

 Some work better in acidic conditions and some in basic.

 If the pH is  the enzyme will  and stop working.

3)

 If you have  and you , the reaction will go .

 If you have  and increase the amount of , the reaction will go  until you reach the point of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and the enzymes are working at  **\_\_\_\_**. Adding more substrate will not make the reaction go any faster.



4)

 Substances that  to enzymes and  Co-factor =
 Ex:  in hemoglobin
  in DNA polymerase (builds new DNA)
 Co-enzyme =
 Ex: Riboflavin (B2) and Niacin (B3) for components in cellular respiration =

5) **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Substances that bind to the enzyme and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

 **Types**:

 1) **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Bind to the **\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 2) **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Bind to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the enzyme **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (change in shape) so the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



6)

 Some enzymes and metabolic pathways (a series of several enzymatic reactions) are  **.**

 When , excess product

 This keeps the cell from making too much of one product and



**ARE ENZYMES IMPORTANT?
!!!!!YES!!!!!**

They control  that happens inside your cells.

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