**Recombinant DNA Guided Notes**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**:** DNA is cut out of one organism and put into another organism. This creates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DNA – DNA artificially formed by combining genetic material from several different organisms. A \_\_\_\_\_\_\_\_\_\_\_\_ will be transferred from one organism to another. For example: the human insulin gene can be removed from a human cell. It can be put into a bacterial cell. The bacteria will now make human insulin.

2. **How are genes cut for gene splicing?** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a circular ring of DNA in a bacteria cell. It is very simple and easy to manipulate.

3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-** cutting genes out of DNA.

*How to splice genes:*

1. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ enzyme cuts the insulin gene out of the human DNA.

2. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is removed from a bacteria and cut with a restriction enzyme.

* A **restriction enzyme** is an enzyme that cuts the DNA at a specific \_\_\_\_\_\_\_\_\_\_\_\_. There are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of restriction enzymes. Each cuts DNA at a different sequence. Some look for GGCC and cut in between the G and C. Every time GGCC is found in the DNA it is cut by the restriction enzyme. The restriction enzyme cuts the DNA, leaving “\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_”, which helps the new gene to attach. The ends are then stitched together by another enzyme.

3. The human gene is placed into the bacteria plasmid via a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (way to get a DNA from one organism into another!). In this case, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used!

4. The plasmid is placed back into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell. The cell now has directions (DNA) to make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. That's exactly what it does. Its human insulin, bacteria do not make insulin on their own.

5. List three benefits of using recombinant DNA to produce human insulin:

1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_