

On the bacterium DNA, find the “gene of interest” and highlight in red.

Below is a **bacterium DNA sequence containing the gene that provides resistance to glyphosate** (the active ingredient in Roundup herbicide. This sequence is represented by the following letters – **ATATGCTTG**. We are going to use HindIII (A'AGCTT) in order to cut this DNA. Cut this DNA so we can insert it into soybean DNA. Find someone with soybean DNA and paste your “Round up Ready” gene into the soybean sequence using the sticky ends. Congratulations, you have just performed your first experiment in genetic engineering! (NOTE: an enzyme called “ligase” is used to permanently seal these fragments together).

(Activity inspired by BioPharmaceutical Technology Center Institute, Madison WI)

**ATTCGATGAAGCTTATATGCTTGAAGCTTGACAGACAGAGAATTCGAA
TAAGCTACTTCGAATATACGAACTTCGAACTGTCTGTCTCTTAAGTT**

IMPORTANT !! RUN THIS PAGE ON YELLOW PAPER (OR ANY COLOR EXCEPT GREEN) !!

On the bacterium DNA, find the “recognition sequence” for the restriction enzyme. Highlight them. Why is it important that there are two sequences? What is important about the location of these two sequences?

Below is a **bacterium DNA sequence containing the gene that provides resistance to glyphosate** (the active ingredient in Roundup herbicide. This sequence is represented by the following letters – **ATATGCTTG**. We are going to use **HindIII (A'AGCTT)** in order to cut this DNA. Cut this DNA so we can insert it into soybean DNA. Find someone with soybean DNA and paste your “Round up Ready” gene into the soybean sequence using the sticky ends. Congratulations, you have just performed your first experiment in genetic engineering! (NOTE: an enzyme called “ligase” is used to permanently seal these fragments together).

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ATTCGATGAAGCTT**ATATGCTT**GAAGCTTGACAGACAGAGAATTTCGAA
TAAGCTACTT**CGAATATACGAACTT**CGAACTGTCTGTCTCTTAAGTT

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On the soybean DNA sequence, find the recognition sequence for the restriction enzyme. Why is it important to use the same restriction enzyme?

Below is a **soybean DNA sequence**. We are going to use **HindIII (AAGCTT)** in order to cut this DNA. Cut this DNA so we can insert the gene that will make the soybean resist the effects of Roundup (glyphosate). Find someone with the "Round up Ready" gene and paste this gene sequence into the soybean sequence using the sticky ends. Congratulations, you have just performed your first experiment in genetic engineering! (NOTE: an enzyme called "ligase" is used to permanently seal these fragments together).
(Activity inspired by BioPharmaceutical Technology Center Institute, Madison WI)

ATTCGATGAATTCGATAAGCTTGAATTCAGACAGACAGAGAATTCTAA
TAAGCTACTTAAGCTATT CGAACTTAAGTCTGT CTGTCTCTTAAGATT

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On the bacterium DNA, draw a line where the restriction enzyme will cut the bacterium DNA.

Below is a **bacterium DNA sequence containing the gene that provides resistance** (the active ingredient in Roundup herbicide). This sequence is represented by the following **ATATGCTTG**. We are going to use **HindIII (A'AGCTT)** in order to cut this DNA. Cut this DNA and insert it into soybean DNA. Find someone with soybean DNA and paste your "Round up R" gene into the soybean sequence using the sticky ends. Congratulations, you have just performed your first experiment in genetic engineering! (NOTE: an enzyme called "ligase" is used to permanently join the DNA fragments together).

(Activity inspired by BioPharmaceutical Technology Center Institute, Madison WI)



On the soybean DNA, draw a line where the restriction enzyme will cut the soybean DNA.

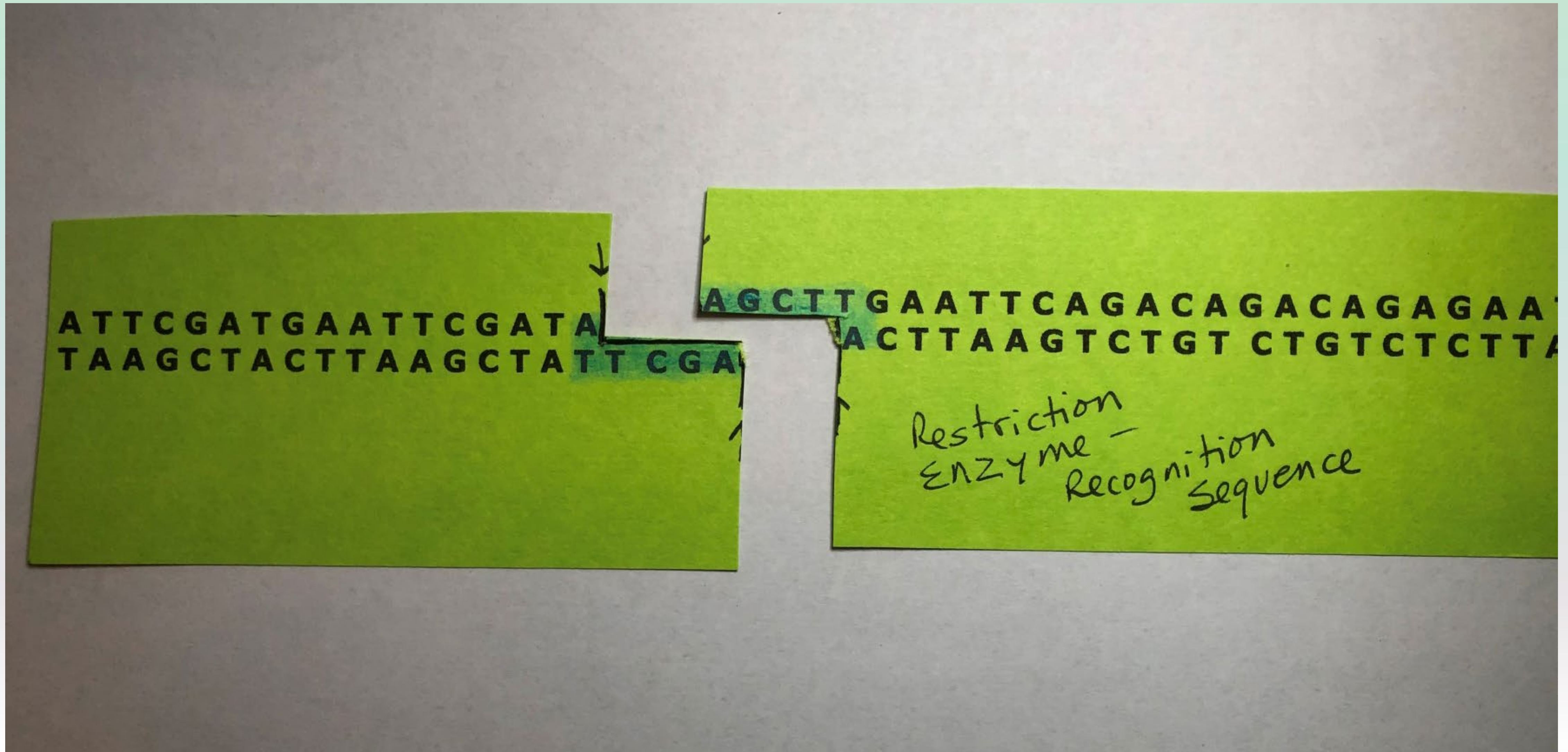
Below is a **soybean DNA sequence**. We are going to use **HindIII (A¹AGCTT)** in order to cut this DNA so we can insert the gene that will make the soybean resist the effects of Roundup. Find someone with the "Round up Ready" gene and paste this gene sequence into the soybean DNA using the sticky ends. Congratulations, you have just performed your first experiment in genetic engineering! (NOTE: an enzyme called "ligase" is used to permanently seal these fragments together.)
(Activity inspired by BioPharmaceutical Technology Center Institute, Madison WI)

ATTGATGAATTGATAGCTTGAATTCAGACAGACAGAGA
TAAGCTACTTAAGCTATTGAACTTAAGTCTGTCTGTCTCT

Restriction
enzyme -
recognition
sequence

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Cut the soybean DNA apart on the line you just drew.



Cut the bacterium DNA apart on the lines you just drew.



Lay the cut outs on a sheet of plain paper. Move the gene of interest from the bacterium and into the soybean DNA sequence.



Match “sticky ends” so that the gene of interest (in this case herbicide resistance) is now incorporated into the soybean’s genome. Tape or glue the cut outs down and complete labeling your project and writing about what this paper model represents. Use the terms on your instruction sheet.

