

Name: \_\_\_\_\_ Partner's Name: \_\_\_\_\_ Color: \_\_\_\_\_ Date: \_\_\_\_\_ W

**Complex Text & CER: Antibiotic Resistance \*VERSION B\***

<https://www.reactgroup.org/toolbox/understand/antibiotic-resistance/mutation-and-selection/>

**Overview: Mutations can result in antibiotic resistance in bacteria. Resistant bacteria survive antibiotic treatment and can increase in numbers by natural selection.**

Directions:

1. With your table partner, take turns reading each paragraph out loud. Highlight key points as you read.
2. Write the most important sentence from the paragraph in the “key point” section.
3. Write down your partner’s key point.

## Mutations

Bacteria grow and multiply fast and can reach large numbers. When bacteria multiply, one cell divides into two cells. Before the bacterium can divide, it needs to make two identical copies of the DNA in its chromosome; one for each cell. Every time the bacterium goes through this process there is a chance (or risk, depending on the end result) that errors occur; so-called mutations. These mutations are random and can be located anywhere in the DNA. Mutations can also form due to external factors like radiation or harmful chemicals.

My key point:

Partner's key point:

## Natural selection

While some mutations are harmful to the bacteria, others can provide an advantage given the right circumstances. Here, Darwin’s theory of natural selection comes in. If a mutation gives the bacterium an advantage in a particular environment, this bacterium will grow better than its neighbors and can increase in numbers – it is selected *for*.

My key point:

Partner's key point:

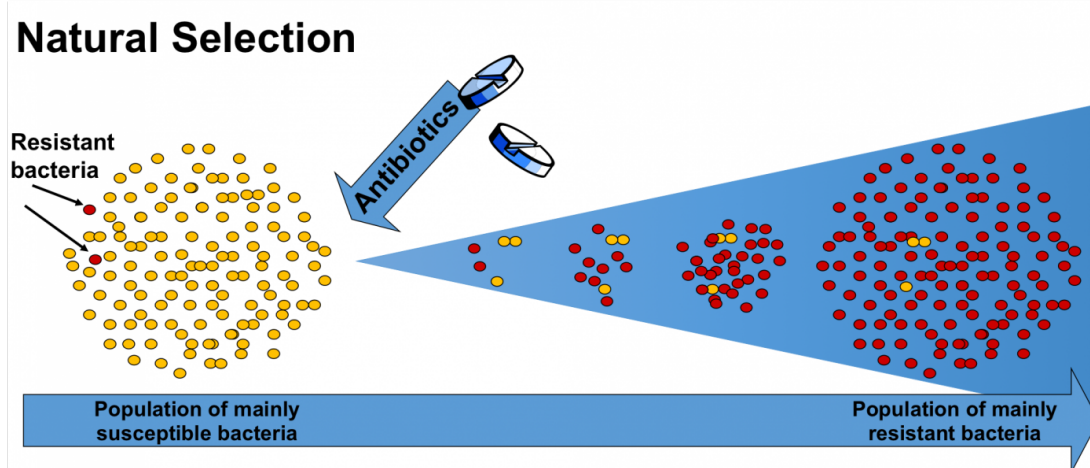
## Mutations can provide resistance to antibiotics

Mutations are one way for bacteria to become resistant to antibiotics. Some spontaneous mutations (or genes that have been acquired from other bacteria through [horizontal gene transfer](#)) may make the bacterium resistant to an antibiotic (See: [Antibiotic resistance – Resistance mechanisms in bacteria](#) for information about how bacteria resist antibiotic action). If we were to treat the bacterial population with that specific antibiotic, only the resistant bacteria will be able to multiply; the antibiotic selects for them. These bacteria can now increase in numbers and the end result is a population consisting of mainly resistant bacteria.

My key point:

Partner's key point:

*Analyze the image and read the text beneath it, then create key points.*



**Figure 1.** Natural selection of antibiotic resistant bacteria. The starting point in this example is a large bacterial population mainly consisting of bacteria that are susceptible to antibiotics and a couple of bacteria that are antibiotic-resistant by chance. A bactericidal antibiotic is added, which kills most of the susceptible bacteria in the population, while the resistant bacteria survives. Only the resistant bacteria will continue to proliferate in the presence of the antibiotic and increases in number over time. The end result is a population of mainly resistant bacteria.

My key point:

Partner's key point:

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**\*\*FIRST DRAFT\*\***

### Claim-Evidence Reasoning (CER): Antibacterial Soaps

Background:

Some hand soaps are labeled “antibacterial,” often accompanied by a “+” sign. This means that they contain chemicals specifically designed to kill bacteria. While “regular” soaps (without the label) simply help wash bacteria off your body, these added chemicals kill bacteria before washing them away.



**Question:** Should drugstores sell and advertise the use of antibacterial hand soaps? Why or why not? Respond using CER format.

**[Note: Must use the words “mutation” and “natural selection” in your answer.]**

Claim: Drugstores \_\_\_\_\_ sell and advertise the use of antibacterial hand soaps. (← Notice that the claim does not start with “I believe” or “I think”- instead, just state your claim. If you wrote it, the reader understands that you believe/think it.)

Evidence 1 (take an exact line from text): \_\_\_\_\_

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Reasoning 1 (explain why the evidence is relevant to your claim):

*This is important because* \_\_\_\_\_

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Evidence 2 (take an exact line from text): \_\_\_\_\_

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Reasoning 2 (explain why the evidence is relevant to your claim):

*This is important because* \_\_\_\_\_

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Conclusion (address the counter point, then finish with why your claim is better):

(Counter point →) *Even though* \_\_\_\_\_

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(Your claim, re-state in different words →) *The evidence shows that* \_\_\_\_\_

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Partner Edit by \_\_\_\_\_

<b>Compliments:</b> (Minimum 3)	<b>Questions:</b> (Minimum 2)	<b>Suggestions:</b> (Minimum 3)
1)	1)	1)
2)	2)	2)
3)	3)	3)

I agree with the feedback that \_\_\_\_\_

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I disagree with the feedback that \_\_\_\_\_

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