

Cross-Curricular Discussion: Q

Directions: The following list of discussion questions is provided to help you take notes, brainstorm ideas and test your thinking in order to be more actively engaged in class discussions related to this article. All questions in this section are related to topics covered in "[Genes foretell flu shot response.](#)"

BIOLOGICAL SCIENCES**Discussion questions:**

1. What are genes and viruses made of and how do they replicate?

Extension prompts:

2. What do genes produce and how are their activity levels controlled?

3. How does the immune system specifically attack things that it recognizes should not be in your body?

4. How do vaccines work?

CHEMICAL SCIENCES

Discussion questions:

You may want to check out [Cancer's Sweet Cloak Guide](#) and explore Cross-curricular discussion: Q in the Chemical Sciences and Physical Sciences sections if you are interested in additional questions on protein composition and structure.

1. What is the difference between a physical change and a chemical change? Provide an example of each.

2. What are simple examples of physical changes and chemical changes for DNA?

Extension prompts:

3. Many vaccines contain an adjuvant. What is that?

4. Why might it be undesirable to have too little or too much of an adjuvant in a vaccine?

ENGINEERING AND EXPERIMENTAL DESIGN

Discussion questions:

1. Why is it harder for researchers to identify genes that could predict how well older people's immune systems respond to flu vaccines? How could a study deal with that problem?

Extension prompts:

2. "[Genes foretell flu shot response](#)" showed that analyzing how active certain genes are could predict how well a person would respond to the flu vaccine. Beyond what was mentioned in the article, what useful predictions could be made by analyzing gene activity?