

Unit 2: Lesson 4 – History of Vaccine Research

Activity 1: Timeline of vaccine research

Materials

- Computer with Internet access
- Poster paper, or other large sheet of paper and/or graphics software
- Drawing instruments (if using poster paper).

Instructions

1. Work in small groups.
2. Using resources suggested by the teacher, research each of scientific researchers in the list.
3. Complete the table, showing the researchers significant discoveries and the dates of their discoveries.
4. Use the information in the table to create a timeline including each of these researchers, showing the dates of their significant discoveries. Bear in mind that some researchers may have more than one significant discovery.

List of vaccine researchers

Researcher Name	Significant Discovery	Year
Martinus Beijerinck		
Baruch Blumberg		
Herbert Boyer		
Alexis Carrel		
Stanley Cohen		
John F. Enders		
Ernest Goodpasture		
Maurice Hilleman		
Edward Jenner		
Saul Krugman		
Louis Pasteur		
Alfred Prince		
Frederick Robbins		
Jonas Salk		
Max Theiler		

Thomas Weller		
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Activity 2: On the Shoulders of Giants

When asked about his accomplishments, English scientist Sir Isaac Newton famously said, "If I have seen further than others, it is by standing upon the shoulders of giants." By this, he meant that he could not have accomplished what he did without the work of others before him. The same is true in medical research, including the history of vaccine development. In this activity you investigate how work by early scientists laid the foundation for later discoveries.

Materials

- On the Shoulders of Giants worksheet
- Chapter 3 of *Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases*, titled *Eight Doors*

Instructions

1. View the section of the documentary film, *Hilleman* related to the development of the mumps vaccine.
2. View the animation *Attenuation: How Scientists Make Live Vaccines* (<https://vimeo.com/227180098>) which describes the process of making weakened live vaccine. (If needed you may refer to your notes from the previous lesson.)
3. Read the *Eight Doors* chapter.
4. Work in the group assigned by your teacher (one of eight groups in the class).
5. Research the discovery assigned to your group.
6. Answer the questions in the worksheet.
7. Use the questions to help you create a brief presentation to share with the class.

Activity 2: On the Shoulders of Giants Worksheet

Circle the section of the chapter you were assigned.

Door 1: Edward
Jenner's Smallpox

Door 2: Louis
Pasteur's Rabies
Vaccine

Door 3: Martinus
Beijerinck

Door 4: Alexis
Carrel

Door 5: Ernest
Goodpasture

Door 6: Max
Theiler

Door 7: John
Enders, Thomas
Weller, and
Frederick Robbins

Door 8: Jonas Salk

1. What was the main discovery by this researcher (or research team)?
2. When and where was the discovery made?
3. How did this discovery help foster the development of vaccines?
4. List and describe one or two additional facts that you learned from the reading.

Activity 3: Hepatitis B Vaccine – A Tale of Two Vaccines

The purpose of this activity is to understand that as science evolves, better solutions may present themselves and to consider the communications and ethical balance involved in scientific progress.

Materials

- Hepatitis B Vaccine – A Tale of Two Vaccines Worksheet
- Copies of or access to Chapter 8 of *Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases*
- Computer access or capability for projection of video and animation

Directions

1. From the movie, *Hilleman*, watch the section related to hepatitis B vaccine.
2. View the animation, *Using Genetic Engineering to Make Vaccines* (<https://vimeo.com/227180912>).
3. Read pages 115 to 127 and 136 to 140 in *Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases*.
4. As you review these resources, complete the Hepatitis B Vaccine – A Tale of Two Vaccines Worksheet.
5. After the class discussion, complete the writing assignment titled: *Use of blood-derived hepatitis B vaccine—methods and ethics*. Ensure that your essay addresses the right or wrong of using blood from infected individuals to make a vaccine, considered from these points of view:
 - a. Someone whose blood was used to make the vaccine, but could not benefit
 - b. Someone whose child was at risk of liver cancer from hepatitis B infection
 - c. Whether or not you would be vaccinated with such a vaccine or risk hepatitis B infection

Activity 2: Hepatitis B Vaccine – A Tale of Two Vaccines Worksheet

Question	Hepatitis B vaccine derived from blood	Hepatitis B vaccine made using genetic engineering
What was the problem that Hilleman faced?		
What discoveries preceded the creation of the vaccine?		
How did Hilleman discover a solution to the problem?		
How did society react to the new discovery?		