

Journal Club: Gene Editing

OVERVIEW

Scientists and doctors often have regular meetings to discuss research articles or scientific papers as a way of staying up to date in their field of work. These meetings are often referred to as “journal clubs.”

The Next Step Science Journal Club materials aim to enable you to use the journal club format to introduce students to scientific content and increase their ability to comprehend and communicate scientific concepts.

The Journal Club can be used in class or to start an after-school, or lunch period, club of interested students. For each topic, students should read the related article and answer the writing prompt before the meeting. The meeting offers the opportunity to discuss what students read and wrote. The materials provided herein also provide an opportunity to hear subject matter experts discuss the topic and answer questions raised by students from the Children’s Hospital of Philadelphia Research Internship for Scholars and Emerging Scientists (CHOP-RISES) high school summer program. Although typically journal clubs do not include a writing or video aspect, these additional resources aim to enhance students’ experiences with this series.

OBJECTIVES

The Journal Club activities are designed to:

- Increase students’ awareness of how data advances scientific knowledge and the ongoing generation of new or more expansive information about scientific topics
- Provide an ongoing opportunity for students to read scientific writing, identify central concepts, and practice summarizing scientific information
- Enable students to critically analyze scientific findings by articulating the strengths and weaknesses as well as consider the importance of the information in the field at large

LESSON

The lesson progression outlined below is for one 45-minute class, or lunch, period. An after-school club can be expanded to an hour by including the writing prompt or lengthening the opportunity for discussion.

TEACHER GUIDE

The reading and writing portions are suggested to be assigned in advance, so students have read the information by the start of class or the meeting and have started to think about discussion points through the writing prompt. Students can view the article online or you can offer printed copies.

Gene editing-related content

- **Reading assignment**

Before meeting: Have students read the article, *How can gene editing cure diseases?*, before the class or meeting discussion. Access the article:

<https://sciencejournalforkids.org/wp-content/uploads/2020/03/Nanoparticles-article.pdf>

- **Writing assignment**

Before meeting: Have students write a minimum of 100 words related to the below prompt:

Some people consider gene editing unethical. All powerful tools can be used for good or for bad. Do you think it is ethical for scientists and physicians to genetically edit a gene to modify or cure a disease? Explain your reasoning.

- **Group discussion**

Time: 30 minutes

Discuss what students learned from the reading, using the writing prompt or one of these questions to engage students in the discussion:

-What did you read that surprised you?

-If you were diagnosed with a disease for which gene therapy was a treatment option, would you consider this type of treatment?

-What do you think are the benefits and limitations of working with mice to study gene editing?

-Do you think it is important for society to have regulations related to what gene editing can be used for? Why or why not?

- **Watch the Video**

Time: 10 minutes

Journal Club Expert Answers: Gene Editing

<https://vimeo.com/386241400>

TEACHER GUIDE

- **Wrap up** Time: 5 minutes
If time allows, provide an opportunity for students to share any new or additional thoughts that the video may have generated. Summarize any take-away messages.

ADDITIONAL RESOURCES

- More resources on the topic of gene editing
 - Video: *Engineers Made Fake DNA To Fix Genetic Disorders*
<https://youtu.be/rO3zfqcnCdw>
 - National Human Genome Research Institute
 - What is Genome Editing? <https://www.genome.gov/about-genomics/policy-issues/what-is-Genome-Editing>
 - How Does Genome Editing Work?
<https://www.genome.gov/about-genomics/policy-issues/Genome-Editing/How-genome-editing-works>
 - What are the Ethical Concerns of Genome Editing?
<https://www.genome.gov/about-genomics/policy-issues/Genome-Editing/ethical-concerns>
 - Home page: <https://www.genome.gov>
 - U.S. National Library of Medicine Genetics Home Reference
<https://ghr.nlm.nih.gov>
- General journal club resources
 - Science Journal for Kids and Teens: <https://sciencejournalforkids.org>
 - The Journal of Emerging Investigators - Research by middle and high school scientists: <https://www.emerginginvestigators.org>
 - Additional VMP Journal Club topics can be found at vaccinemakers.org/next-step-science.