

Step-by-step, whiteboard-ready

SCHOLASTIC
SCOPE
 DIGITAL LESSON

What Could Go Wrong?

Approximate
time to
complete
lesson: four
class periods



FEATURED SKILLS

synthesizing information from multiple texts; focused research

SUMMARY

Our step-by-step, multimedia lesson is a fabulous cross-curricular activity that incorporates classic literature, science, and history. First, your students will watch a video about the thrilling (and terrifying!) scientific advancements of Mary Shelley's era. Next, they will read and discuss our play adaptation of Shelley's *Frankenstein*. Then they will make connections between *Frankenstein* and the debate over cloning. As a culminating activity, they will work in groups to write a set of guidelines for responsible scientific research.

MAIN OBJECTIVES

- to read a play that examines one scientist's responsibilities
- to read a debate and other texts that raise questions about cloning
- to form opinions using text evidence and participate in a class discussion
- to analyze information in a culminating activity

MATERIALS

Click the links below.

- ▶ student copies of the play *Frankenstein* and the debate “Should We Bring Back the Woolly Mammoth?” from the October 22, 2012, issue of *Scope*
- ▶ *Scope* video [“The Electrifying Age of Frankenstein”](#)
- ▶ *Scope* activity sheet [“Critical-Thinking Questions”](#)
- ▶ [answer key](#) for activity sheet

1 INTRODUCTION AND VIDEO VIEWING

Duration: 10 minutes

Tell students that they are going to read a play adaptation of the novel *Frankenstein* by Mary Shelley. What do they think the story is about? After a few students respond, tell the class that one idea *Frankenstein* explores is the responsibility that goes along with scientific advancement. How should possible outcomes, both positive and negative, guide a scientist’s work? Show our short video about scientific progress in Mary Shelley’s time and encourage students to take notes while they watch.

2 READ AND DISCUSS THE PLAY

Duration: one class period

Assign roles and have students read *Frankenstein* aloud. Check comprehension by projecting or distributing the critical-thinking questions and having students respond in small groups. Each group should also discuss the question posed at the end of the video: How does the play reflect what was going on in science in Mary Shelley’s day?

3 DEBATE: CLONING

Duration: 30 minutes

Direct students to read the debate on pages 20-21, “Should We Bring Back the Woolly Mammoth?” As students read, they should look

for positive and negative potential consequences of cloning the woolly mammoth; they should write these in the chart on page 21 when they finish reading. As a class, review the text evidence students found for each side of the debate. Then give students a chance to share their opinions. Guide students as they respond to each other, making sure they support their opinions with facts.

4 FOCUSED RESEARCH

Duration: 30 minutes

Divide students into three groups to search online for information on cloning. Direct each group to one of the articles listed below. *Note: The first two sites mention human cloning and the ethical issues surrounding it. Preview the material to make sure it is appropriate for your students.*

1. **National Human Genome Research Institute: Cloning** Have students read all the sections through “What are the potential drawbacks to animal cloning?”
2. **Genetic Science Learning Center: Cloning** Have students read sections “What Is Cloning?” “Click and Clone,” “Why Clone?” and “What Are the Risks of Cloning?”
3. **CNN: “Research progress: Pig cloning for organs”** and **Daily Mail: “Heart of genetically modified pig ‘successfully**

transplanted into monkey’, South Korea scientists claim” *Note: Because the ads and links on the Daily Mail’s website are constantly updated, we cannot ensure the appropriateness of all images and content that appear alongside the article. We recommend previewing the article and if desired, using the “Print Article” option to print pages 1-5, perhaps covering up the list of links on page 5 before making copies to distribute to students.*

As groups research, have them consider the following:

1. What does the source explain about how cloning works?
2. What benefits of cloning does the article present?
3. What drawbacks of cloning does the article present?
4. Based on what you read, what is one recommendation you would make to a scientist who is interested in cloning?

Finally, ask each group to present its findings to the class.

5 CULMINATING ACTIVITY: WRITING SCIENTIFIC GUIDELINES

Duration: one class period

Drawing on the ideas and information in *Frankenstein*, in *Scope*’s debate, and in the online resources students explored, have groups develop a list of five questions a scientist should ask himself or herself before conducting an experiment, to ensure that it is a responsible undertaking.

6 OPTIONAL EXTENSION: ESSAY

Duration: 30 minutes, or one class period

“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.” —Isaac Asimov

Ask students to write an essay about this quote, explaining what they think it means and applying it to both the play and the woolly-mammoth debate. Guide them with these questions:

1. What is the difference between knowledge and wisdom?
2. Do you think that Victor Frankenstein had more scientific knowledge than he did wisdom?
3. If scientists have the knowledge to clone a woolly mammoth, what kind of wisdom do they need?