



# Research Woman Crush Wednesday: Jane Cooke Wright

## Mitosis and Cancer

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<b>Grade Level</b>	9th – 10th Grade	<b>Time Frame</b>	2-3 class period(s)
<b>Subject</b>	Science	<b>Duration</b>	60-120 minutes
<b>Course</b>	Biology		

### Essential Question

What happens when there is uncontrolled cell division during mitosis? How have women in history shaped science today?

### Summary

This lesson is part of the "Woman Crush Wednesday" series that looks at the ways female scientists have shaped our views of science. In this biology lesson, students will explore the many contributions of Jane Cooke Wright, with special attention on her study of the impact of uncontrolled cell division during mitosis and cancer types and treatments. This lesson extends students' understanding of mitosis through real world applications. Students should have knowledge of the process of cellular division prior to this lesson.

### Snapshot

#### Engage

Students discuss what qualities characterize trailblazers and watch a video about the work of physician Jane Cooke Wright.

#### Explore

Students play a kinesthetic game of tag, which simulates cells that are controlled, uncontrolled, and undergoing treatment.

#### Explain

Students build vocabulary by using a TIP Chart as they learn about the uncontrolled replication of cells and the field of oncology.

#### Extend

Students research cancer treatments and answer questions on a note catcher.

#### Evaluate

Students complete an exit ticket by answering the prompt "What happens when there is uncontrolled cell division during mitosis?"

## Standards

*Oklahoma Academic Standards (Biology)*

**B.LS1.4 :** Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

**B.LS1.4.1:** In multicellular organisms, individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow.

## Attachments

- [Lesson Slides—WCW Jane Cooke Wright \(5E\).pptx](#)
- [Note Catcher—WCW Jane Cooke Wright - Spanish.docx](#)
- [Note Catcher—WCW Jane Cooke Wright - Spanish.pdf](#)
- [Note Catcher—WCW Jane Cooke Wright.docx](#)
- [Note Catcher—WCW Jane Cooke Wright.pdf](#)
- [TIP Chart—WCW Jane Cooke Wright - Spanish.docx](#)
- [TIP Chart—WCW Jane Cooke Wright - Spanish.pdf](#)
- [TIP Chart—WCW Jane Cooke Wright.docx](#)
- [TIP Chart—WCW Jane Cooke Wright.pdf](#)

## Materials

- Lesson slides (attached)
- Internet access
- Presentation equipment to show slides with video and audio
- TIP Chart handout (attached; one per student)
- Note Catcher (attached; half sheet per group)

5 minutes

## Engage

Introduce the lesson using the attached **Lesson Slides**. Display **slides 3 and 4** to share the essential questions and lesson objectives as needed.

Display **slide 5**. Ask the class "What is a trailblazer? Can you think of any trailblazers? What makes those people trailblazers?"

Generate a class list of the qualities that characterize a trailblazer. Write answers/lists on the board to refer back to later, if needed.

Move to **slide 6**. Watch the "[Paying Tribute to ASCO Founder Jane C. Wright, MD](https://www.youtube.com/watch?v=6hHiWeki9GE)" video of real-life trailblazer Jane Cooke Wright, which describes her immense contributions to science.

### Embedded video

<https://youtube.com/watch?v=6hHiWeki9GE>

Show **slide 7**, which lists the highlights of Jane Cooke Wright's contributions. Briefly review them with students. Ask students "Now that you've identified traits of trailblazers, would you consider Jane Cooke Wright a trailblazer? Why or why not?"

### Sample Student Responses

- She was a woman working in science when it was mostly men at the time.
- She was young.
- She was a minority.

15 minutes

# Explore

## Teacher's Note

The following kinesthetic learning activity should be held outdoors or in a gym to allow students to move freely as they play a tagging game. Decide how you want to recognize students as "Treatment" in Round 2 of the game. This could be armbands, a sign, tag, or sticker. It just has to be something that is easily visible to other students. It is important to set boundary lines. Stop each round when you see fit.

Transition to **slide 8**. Go over the rules of the game before moving outside or to your open space:

1. To better understand the effects of the uncontrolled division of cancer cells, take students to an open space to engage in the following tagging game that simulates cell division.
2. Start Round One like a normal tagging game with one tagger.
3. Explain that this tagger is an abnormal cell that is replicating out of control. Every time a new person is tagged they become a replicating cell and can start tagging too.
4. Set a time limit based on your class size.
5. Play Round One of the game once or twice.
6. Discuss what they noticed and felt as taggers or "cells" that began to replicate.

## Sample Student Responses

- The more taggers there were (the more cell replication got out of control) the harder it was to stay away.
- Things got out of control quickly.

After round 1, display **slide 9**. Describe instructions for Round Two:

1. Designate 3-5 students, depending on the size of your class, as "Treatment."
2. Assign "Treatment" taggers to tag the taggers (the cells replicating out of control).
3. Let students know that "Treatment" taggers cannot be tagged themselves.
4. Before Round Two begins, announce that, when a "Treatment" tagger tags one of the "out of control cells," that person has to freeze and can no longer tag others.

Have students play Round Two once or twice. When you think it is time to end the game, ask the students the following questions:

- What did you notice about each of the two rounds?
- Were the "Treatment" taggers able to stop all of the "out of control cells?"
- Were some "out of control cells" able to evade treatment?
- How did the students being chased by the taggers feel knowing that the "Treatment" students could stop the "replicating cell" students?

### Sample Student Responses

- It was frustrating that some of the "out of control cells" were so hard to catch.
- It felt better knowing that there were people there to protect from the taggers.

Display **slide 10**. Ask students to use the prompts on the slide to discuss what happened in both rounds of tag. Encourage them to see the connection between the tagging game and what happens when cancer cells begin to replicate. Ask them to connect treatment group (in the game) with the technology Jane Cooke Wright worked on to attack rapidly growing cells.

Show **slides 11-12** and provide information on the student survey.

7 minutes

## Explain

Display **slide 13**. Explain the [TIP chart](#) strategy. Pass out copies of the attached **Tip Chart** handout or have students write on their own paper using the example on the slide.

Display **slide 14**. Show The Amoeba Sisters' video "[The Cell Cycle \(and Cancer\)](#)". You only need to show the first 3:30 of the video.

### Embedded video

<https://youtube.com/watch?v=QVCjdNxjreE>

As students watch, have them complete the I (information) column. You may choose to pause the video after each term and allow students to fill in the column.

### Teacher's Note: Video Time Stamps

- Cell cycle: 0:55
- Cell division: 1:19
- Mitosis: 1:36
- Cancer: 1:59
- Tumor: 3:01
- Radiation/chemotherapy: 3:12

Allow students time to complete the P (picture) column.

8 minutes

## Extend

Display **slide 15**. Put students in groups of three. Assign groups to select one of the eight forms of cancer treatment listed on the slide. If you allow groups to pick, make sure that all of the treatment forms are covered.

Invite students to use their own devices to visit the [National Cancer Institute website](#) using the QR code on the slide. Encourage groups to explore additional resources. This site provides information about how treatments address replicating cells and should be required as a source for all groups.

Pass out the attached **Note Catcher** handout and explain the expectations. There are three questions, so assigning each student one of the three will expedite this part of the lesson.

5 minutes

## Evaluate

Show **slide 16**. Ask students to complete an [Exit Ticket](#) prompt by answering "What happens when there is uncontrolled cell division growth during mitosis?"

Move to **slides 17-18** and have students complete the second survey.



## Resources

- Amoeba Sisters. (2018, Mar 20). *The cell cycle (and cancer)*. [Video]. YouTube. <https://www.youtube.com/watch?v=QVCjdNxjreE>
- ConquerCancerFdn. (2011, June 21). *Paying tribute to ASCO founder Jane C. Wright, MD*. [Video]. <https://www.youtube.com/watch?v=6hHiWeki9GE>
- K20 Center. (n.d.). Bell Ringers and Exit Tickets. Strategies. <https://learn.k20center.ou.edu/strategy/125>
- K20 Center. (n.d.). TIP Chart. Strategies. <https://learn.k20center.ou.edu/strategy/187>