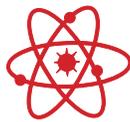


### ABOUT THE BOOK

**The fascinating, little-known story of how two brilliant female physicists' groundbreaking discoveries led to the creation of the atomic bomb.**

In 1934, Irène Curie, working with her husband and fellow scientist, Frederic Joliot, made a discovery that would change the world: artificial radioactivity. This breakthrough allowed scientists to modify elements and create new ones by altering the structure of atoms. Curie shared a Nobel Prize with her husband for their work. But when she was nominated to the French Academy of Sciences, the Academy denied her admission and voted to disqualify all women from membership. Curie's work expanded opportunities for atomic research. Four years later, rival physicist Lise Meitner made a brilliant leap of understanding that unlocked the secret of nuclear fission. Meitner's unique insight was critical to the revolution in science that led to nuclear energy and the race to build the atom bomb, yet her achievement was left unrecognized by the Nobel committee in favor of that of her male colleague.

*Radioactive!* presents the story of two women breaking ground in a male-dominated field, scientists still largely unknown despite their crucial contributions to cutting-edge research, in a nonfiction narrative that reads with the suspense of a thriller. Photographs and sidebars illuminate and clarify the science in the book.



Erin Summerill

### ABOUT THE AUTHOR

**WINIFRED CONKLING** is an award-winning author of fiction and nonfiction for young readers whose works include *Passenger on the Pearl: The True Story of Emily Edmonson's Flight from Slavery* and the middle-grade novel *Sylvia and Aki*, winner of the Jane Addams Children's Literature Award and the Tomás Rivera Award. She studied journalism at Northwestern University and received an MFA in writing for children and young adults from the Vermont College of Fine Arts.



# RADIOACTIVE



## Week 1: Chapters 1-4

### DAY 1: CURIOUS ABOUT THE CURIES

The Curies and Lise Meitner made major contributions to science with their discoveries. Do you know who they are and for what they are known?

- Students will fill out a K-W-L (Know/Want to Know/Learned) Chart. The “Know” and “Want to Know” will be completed prior to beginning the book, and the “Learned” section will be completed as the students read the book.
  - a. In the “Know” section, students will write down any facts they already know about these brilliant scientists and their discoveries
  - b. Students will write down any questions they “Want to Know” in the next section
  - c. As students read *Radioactive*, they can fill out the “Learned” section with important or interesting facts about these great science pioneers and their lives
- After filling out the chart individually, students can add their thoughts to a chart that the teacher places in the front of the room.

A copy of the chart can be found at the following link: <http://www.readwritethink.org/classroom-resources/printouts/chart-a-30226.html>.

**Common Core:** CCSS.ELA-LITERACY.RI.6.4, 7.4, CCSS.ELA-LITERACY.RI.7.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** If your classroom has a Smartboard, you can download a copy of the KWL Chart from the following website: <http://exchange.smarttech.com/search.html?q=KWL> and complete as a class.

### DAY 2: FOR THE LOVE OF SCIENCE!

The Curies spent their days devoted to making scientific discoveries that would change the world as we know it! [“Radium” and “polonium”, natural and artificial radioactivity (page 18) . . . ] “The world of physics was exploding with exciting possibilities, and, at least for that moment, nothing seemed impossible” (page 58). If you could spend every day doing one thing that you are passionate about, what would it be?

- Students will write down something they love to learn about or do on a piece of paper, and write their name underneath. The student ideas will be taped around the room for all to see. Students will do a “museum walk” around the room and, on sticky notes, leave questions or comments for their peers about their classmates’ expertise.
- After the museum walk, the teacher can choose a few volunteers to go up to their words, and explain why they chose what they did. The student will then read and answer some the comments posted by their classmates.

**Common Core:** CCSS.ELA-LITERACY.RI.7.7, CCSS.ELA-LITERACY.RI.8.3

**Technology Integration:** The teacher can use the template at <http://exchange.smarttech.com/details?id=d786bea3-881c-43e4-b913-80cdc22bcc46> to create a web of the things the class loves to learn about and do. In the center bubble, the teacher writes the phrase “Our Expertise,” and each student adds an idea to a bubble. The class will see in one visual the ideas they all love to learn about, which ideas are similar, and which ideas are unique.

### DAY 3: CURIE CONVERSATIONS

As the “First Family of Science” (page 67), Marie, Pierre, and Irène led very interesting lives with complicated relationships. If you were sitting in a room with these three family members, what would the conversations be like?

- Students will break into groups of three and work together to create a short script (1-2 pages) between these three family members. Some important things to think about and possibly include in your script:
  - Where and when is the conversation occurring?
  - What is happening in their lives?
  - What is the relationship like between this mother, father and daughter (i.e. emotions and feelings)?
  - What is going on in this point of their scientific discoveries?
  - How are they perceived by their peers at this time?
- The teacher can choose some group volunteers to perform their scripts for the class.

**Common Core:** CCSS.ELA-LITERACY.WHST.6-8.10, CCSS.ELA-LITERACY.WHST.6-8.4, CSS.ELA-LITERACY.RI.6.1 CCSS.ELA-LITERACY .RI.7.4, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Create a Wiki at <http://www.wikispaces.com/> that students can use to enter their dialogue and add to and edit their work. Be sure to choose the “Education” box when you are using the website for use in the classroom. Or create an iMovie from your script once it is complete.

### DAY 4: LIKE MOTHER, LIKE DAUGHTER?

Marie and the “Little Queen” Irène Curie (page 20), are a unique mother-daughter pair. Take a look at the ways they are similar, and the ways they are different.

- On the whiteboard, the teacher will draw a large Venn diagram, with Marie and Irène written above each circle. Students will come to the front and add a statement or word to a part of the diagram. Once the diagram is complete, the class can discuss examples and reasons of how the two are similar and how they are different.

**Common Core:** CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** If the classroom has a Smartboard, the teacher can download a template from <http://exchange.smarttech.com/details?id=d930d006-b0a9-4343-bdaf-3205dc5398e3>. The teacher and students can complete the Venn diagram using this format.

### DAY 5: JOURNAL ENTRY #1—LETTERS HOME: WAR TIME HEROES

Throughout the book, students will respond to different writing prompts in a response journal. This will be the first of the responses included in the journal.

Marie and Irène Curie used their knowledge of radioactivity to x-ray the wounded and aid the doctors on the front lines during WWI. Students will write a letter home from either Marie or Irène Curie’s point of view. The letter should include the following, with examples and inferences from the book:

- a. what they witnessed while on the war front
- b. how their accomplishments helped the soldiers
- c. how the doctors felt about their presence
- d. reasons why their participation was necessary

When students are finished writing, they can exchange notebooks with a peer for edits and comments.

**Common Core:** CCSS.ELA-LITERACY.WHST.6-8.10, CCSS.ELA-LITERACY.WHST.6-8.4, CSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY .RI.8.2, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can post their journal entries on the blog spot <http://kidblog.org/home/>. Once their entry has been edited and approved by the teacher, students can read their peers’ entries and comment on their posts.



# RADIOACTIVE



## Week 2: Chapters 5-8

### DAY 1: READ ALL ABOUT IT!

Winifred Conkling captivates her readers with consistent information and facts about this exciting time in history. If you were going to share the most important and interesting facts with someone else, which would you choose?

- Students will create a storyboard about the main events that have occurred in the story. Students can use a large piece of paper and divide it into eight boxes. The storyboard boxes can include the following:
  - a. main characters and their relevance, important events, contributions to science, and any historical impacts on society
  - b. illustrations, text, and keywords
- After the storyboards are complete, the class can discuss some common themes and important ideas that they included on their storyboards. The teacher can choose to write these on the whiteboard as a visual for the class.

**Common Core:** CCSS.ELA-LITERACY.RST.6-8.2, CSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY.RI.6.4,7.4, CCSS.ELA-LITERACY.RI.7.7, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can use [www.storyboardthat.com](http://www.storyboardthat.com) to showcase the most important events, themes, and facts from the book and then share with their peers.

### DAY 2: CHARACTER MAP!

Winifred Conkling describes how Lise Meitner challenges societal norms to become one of the best female scientists, despite restrictions put on her by society as a woman doing “men’s work.”

- Students will create a character map showcasing Lise Meitner. The teacher can print out a character map from [www.educationoasis.com](http://www.educationoasis.com) or students can fold a piece of paper into four squares. Write one of these words in each of the four squares: *Accomplishments, Behavior, Feelings, Description*.
- Students will fill out each box by writing words and sentences, citing examples and evidence from the book.
- After completion, students can add their words to a character chart written on the whiteboard and launch the class into a discussion about Lise Meitner.
- Would this be someone you would like to spend time with? Why or why not?

**Common Core:** CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** The class can complete a character map on the Smartboard using the template <http://exchange.smarttech.com/details.html?id=54118c03-ea4c-4497-ba2f-b65995f965bf>.

### DAY 3: JOURNAL ENTRY # 2—THE WOMEN IN SCIENCE

Lise Meitner and Irène Curie are both inspirational women who made major contributions to the science community and hoped that society would use their discoveries for the well-being of mankind. Choose one of these two women and

- a. Describe why you find her inspirational, citing examples from the text.
- b. Include facts about her contributions to science.
- c. Include any character attributes that you feel have impacted her ability to be successful.

As students complete their entry, they can exchange notebooks with a peer for edits and comments.

**Common Core:** CCSS.ELA-LITERACY.WHST.6-8.10, CCSS.ELA-LITERACY.WHST.6-8.4, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can post their journal entries on the blog spot <http://kidblog.org/home/>. Once their entry has been edited and approved by the teacher, students can read their peers’ entries and comment on their posts.

## DAY 4: LITERATURE CIRCLES

Students will be divided into groups of four. Each student will be assigned a role:

- a. Vocabulary Enricher—This student chooses 5 words that they deem important, interesting, unfamiliar, etc., and creates a definition for each that can be shared with the group.
- b. Discussion Director—This student creates 5 thought-provoking questions based on the reading thus far. This student also facilitates the group during discussion and records the participation of the members.
- c. Literary Luminary—This student chooses a part of the story to share with the rest of the group. The passages can be interesting, shocking, impactful, important, etc. After reading the passage aloud to the group, this student will give a reason why they chose that particular passage.
- d. Community Connector—This person will connect the nonfiction biography written by Winifred Conkling to the outside world. Connections can be made between the facilitator and their person’s life, other novels, science and society today, etc.

Once given their roles, students can spend the remainder of the lesson completing their task.

**Common Core:** CCSS.ELA-LITERACY.RST.6-8.2, CCSS.ELA-LITERACY.RST.6-8.4, CCSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY.RI.6.4, CCSS.ELA-LITERACY.RI.6.5, CCSS.ELA-LITERACY.RI.7.4, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1, CCSS.ELA-LITERACY.RI.9-10.5

**Technology Integration:** Students can use organizers like Popplet (Popplet.com) to gather their notes and thoughts to share with the group.

## DAY 5: LITERATURE CIRCLE DAY #2—SHARE DAY

During the first day of the Literature Circle, students were given a role and spent their time completing their tasks. Today, students will focus on sharing their findings with their group. The Discussion Director is responsible for helping guide students into discussions about *Radioactive!*, while facilitating the sharing of each role’s work from the previous day.



# RADIOACTIVE



## Week 3: Chapters 9-12

### DAY 1: WORD WALL—AROUND THE WORLD!

There are a lot of tricky words and scientific ideas described in *Radioactive!*. Students will create a vocabulary word wall that they can revisit throughout the story to help them understand the book and ideas described.

- The teacher will pass out sticky notes to each student. Each student will think of a word that they read and are unsure of the meaning. (examples might include: radium, radioactivity, fission, etc.)
- One by one, the students will place their words on a word wall in the class. This will start a discussion about what each word means and how it was used in the book. If there are duplicates, the students can reiterate the meaning of the word. The teacher can choose to revisit the wall at different points of the story to enforce the meaning of the important words or add to the collection of words already posted.
- Play Around-the-World with the word wall! The teacher points to a word and the student who can describe or define the word first, moves to the next student. The teacher then presents another word and the game continues. See if anyone can make it Around the World!

**Common Core:** CCSS.ELA-LITERACY.RST.6-8.4, CCSS.ELA-LITERACY.RI.6.4, CCSS.ELA-LITERACY.RI.7.4, CCSS.ELA-LITERACY.RI.8.4

**Technology Integration:** The chosen words can be typed into flashcards on the Smartboard. The teacher can use these to play Around the World with the class.

### DAY 2: ESCAPE!

Lise Meitner remained in Germany during some of the most dangerous times in history and eventually escaped to Holland after an elaborate plan. She had to leave behind her scientific notebooks and only took 10 marks and a ring. If you were escaping and could only take 1 or 2 items, what would they be?

- Students will create a picture of the artifact they would bring.
- One by one, students can place their artifact in a shoebox and tell the class which item they would bring and why.
- After the class is finished, this can be a starting point for a discussion about how Lise eventually escaped and how she was feeling. Be sure to use fact and make inferences from the story. Empathy is an important human emotion. How would you feel if you were Lise?

**Common Core:** CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Each student can create a slide with either a picture showing the artifact, an illustration, video, words, and/or audio at Animoto.com. The teacher can compile each artifact slide and the class can watch together.

### DAY 3: JOURNAL ENTRY # 3—WAR TIME SCIENCE

The discovery of fission helped create the atomic bomb that ended the war. Some believe that this was necessary, while others felt that this discovery's use for destruction was immoral. Write a journal entry stating which side you agree with, citing:

- a. reasons why you think that using science in war ended up with a positive outcome, or
- b. reasons why you think that the scientific discoveries use for war was immoral.
- c. Use examples from the book to support your opinion and ideas.

As the students complete their entries, they can partner with a peer to edit and comment on each other's entry.

**Common Core:** CCSS.ELA-LITERACY.WHST.6-8.10, CCSS.ELA-LITERACY.WHST.6-8.4, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can post their journal entries on the blog spot <http://kidblog.org/home/>. Once their entry has been edited and approved by the teacher, students can read their peers' entries and comment on their posts.

#### DAY 4: AWARD CEREMONY!

The Nobel Prize was one of the highest awards to receive honoring these scientists for their work and discoveries. Choose a character in the book and create an award for that person.

- Give reasons why they are receiving this award.
- Use examples from the book about their actions that would warrant them receiving the award.
- Write a statement from that character's point of view upon receiving the award, based on your understanding of the character from the book

Students can have an award ceremony where each presents their award to their recipient!

**Common Core:** [CSS.ELA-LITERACY.RI.6.1](#), [CCSS.ELA-LITERACY.RI.7.7](#), [CCSS.ELA-LITERACY.RI.8.2](#), [CCSS.ELA-LITERACY.RI.8.3](#), [CCSS.ELA-LITERACY.RI.9-10.1](#)

**Technology Integration:** Students can create an iMovie using an ipad or flip phone presenting the award to their recipient. The teacher compiles these short clips to create an Award Show.

#### DAY 5: FISHBOWL

The teacher will have 5 students sit in a circle while the class listens to the discussion. In a bowl, the teacher will place the names of the characters in the book (Marie Curie, Irène Curie, Frederick Joliet-Curie, Lise Meitner, Otto Hahn, etc.) The students speaking in the Fishbowl will draw a name and “become” that person. During the discussion, the student answers any questions from the point of view of the person drawn. The teacher can choose to switch the students involved in the Fishbowl with the other active listeners. The students listening will write down questions for the Fishbowl discussion, which can be collected and read by a facilitator.

- The discussion should mainly be students-led, but some guiding questions might be:
- What do you think the most important contributions to science were?
- Which of your colleagues do you admire and why?
- Do you agree with what society has done with your scientific discoveries? Why or why not?

**Common Core:** [CCSS.ELA-LITERACY.RST.6-8.2](#), [CSS.ELA-LITERACY.RI.6.1](#), [CCSS.ELA-LITERACY.RI.6.6](#), [CCSS.ELA-LITERACY.RI.7.6](#), [CCSS.ELA-LITERACY.RI.8.2](#), [CCSS.ELA-LITERACY.RI.8.3](#), [CCSS.ELA-LITERACY.RI.9-10.1](#)

**Technology Integration:** Before the Fishbowl begins, students can record a question using ipadio. These questions can be used to help facilitate discussion during the Fishbowl.



# RADIOACTIVE



## Week 4: Chapters 13-15

### DAY 1: BINGO! WHO'S WHO?

The teacher gives each student a Bingo Board and the students write the names of the people mentioned in *Radioactive!* in each square. Many names can be found on pages 198–201. Some other examples include: Lise Meitner, Otto Hahn, Irène Curie, Frederick Curie, Otto Robert Frisch, Albert Einstein, Ida Noddack.

The teacher reads character descriptions from the book, or facts about the people, pages 198–201, and the students place a marker on the name of whomever the teacher is describing. First one to Bingo wins!

Blank Bingo boards can be found at <http://print-bingo.com/>.

**Common Core:** CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.8.4,

**Technology Integration:** Use your Smartboard and a template at <http://exchange.smarttech.com/> to play with the class! The teacher can ask the class to brainstorm important names in the book to create Bingo boards.

### DAY 2: AGREE OR DISAGREE?

Students stand in the front of the room and place a sign on one side that reads “Agree” and a sign on the other that reads “Disagree.” The teacher reads a statement, and if the students agree with the statement they step towards the “Agree” sign. If they disagree they step towards the “Disagree” sign. The class can discuss some reasons why they chose to agree or disagree for that particular statement. Some of the statements the teacher can read are:

- Men and women worked together to make scientific discoveries and were seen as equals.
- Both Lise Meitner and Irène Curie deserve to be known by all as two of the most brilliant women scientists of all time.
- Fission is when an atom splits into two or more parts.
- Both Marie and Irène Curie passed away from illnesses attributed to the many years that they handled radium.
- Lise Meitner was nominated 15 times for the Pulitzer Prize, and, unjustly, did not ever win.
- Society has the right to take scientific discoveries and do with them what it chooses; whether it is for good or bad.
- The discovery of radium and the understanding of fission to create the atomic bomb were necessary to end the war.
- Lise Meitner should have forgiven Otto Hahn after he took credit for the discovery of fission.

**Common Core:** CSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY.RI.6.6, CCSS.ELA-LITERACY.RI.7.6, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** The class can use a polling application such as [www.pollanywhere.com](http://www.pollanywhere.com) to answer the statements. The class can see immediate results to launch discussions.

## Week 4: Chapters 13–15

**DAY 3: JOURNAL ENTRY # 4: TO WIN OR NOT TO WIN?**

Lise Meitner was nominated for the Nobel Prize for her work in physics 15 times—but never won. Some believed she deserved to win for her accomplishments. Write a letter to the Pulitzer Prize committee as Lise’s peer and take one of the following stances:

- reasons why you believe she deserves to win, or
- reasons why you support the committee’s decision

Include supporting evidence and examples from the book. In the final paragraph, explain what you think Winifred Conkling’s intentions were for the reader about Lise Meitner throughout her story.

As students complete their entries, they can partner with a peer to edit and comment on each other’s entry.

**Common Core:** CCSS.ELA-LITERACY.WHST.6-8.10, CCSS.ELA-LITERACY.WHST.6-8.4, CCSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY.RI.7.6, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can post their journal entries on the blog spot <http://kidblog.org/home/>. Once their entry has been edited and approved by the teacher, students can read their peers’ entries and comment on their posts.

**DAY 4: RADIOACTIVE! ACROSTIC POEM**

Write down the title of the book. For each letter, write a sentence describing themes, or something important that occurred in the book

- Post examples on the wall for the class to see.
- Do a museum walk and allow students to see each other’s work.
- Students can leave sticky notes with comments for their peers.

**Common Core:** CSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY.RI.6.6, CCSS.ELA-LITERACY.RI.7.6, CCSS.ELA-LITERACY.RI.7.7, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.4, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can write their poems in the web application Flipz TV (tutorial at [http://www.technogogy.org.uk/flipz\\_tutorial.html](http://www.technogogy.org.uk/flipz_tutorial.html)). Once on the website, the students will recite their poems without punctuation, save it when they are pleased, and listen as it plays back. Students can listen to each other’s poems and comment about what they liked best about it.

**DAY 5: THAT’S A WRAP!**

Break students into groups of three and have them create a poster with the following elements:

- one book theme they saw reoccurring in *Radioactive!*
  - favorite person you learned about and why
  - most shocking or interesting moment in the book
  - three fun facts you didn’t know about before reading the book
  - one three-sentence review on Winifred’s Conkling’s book, and what you believe she meant to accomplish by writing *Radioactive!*
- Students will revise and edit the poster for grammar, spelling, and content.

When the groups have completed their posters, each group can choose 3 parts of their posters to share with the class.

**Common Core:** CSS.ELA-LITERACY.RI.6.1, CCSS.ELA-LITERACY.RI.6.6, CCSS.ELA-LITERACY.RI.7.6, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.9-10.1, CCSS.ELA-LITERACY.RI.9-10.5,

**Technology Integration:** Students can use Comic Life (Comiclfe.com) and include all of the elements mentioned above.



# RADIOACTIVE



## EXTENSION ACTIVITIES

### ATOMIC BOMB DEBATE—SCIENCE FOR GOOD OR EVIL?

Using science to create weapons is a hot topic! Different people in *Radioactive!* agreed with the creation and use of the atomic bomb, while others, like Lise Meitner, did not. “I will have nothing to do with that bomb!” (page 160).

Do you believe that the discovery of fission should have been used only for the good of humanity or was the atomic bomb necessary to end the war?

Divide the class into two teams, for or against the use of the atomic bomb. Each debate team will:

- Give an opening statement with a brief overview as to why you believe what you do.
- Research and present facts and reasons why you support your side. Use relevant examples from the book.
- Give a closing statement, which will restate your opinion and main facts presented.

A chosen moderator will help guide the debate, allowing each side a chance to present their reasoning.

**Common Core:** CCSS.ELA-LITERACY.WHST.6-8.1.A, CCSS.ELA-LITERACY.WHST.6-8.1.B, CCSS.ELA-LITERACY.WHST.6-8.2.B, CCSS.ELA-LITERACY.WHST.6-8.2.E, CCSS.ELA-LITERACY.WHST.6-8.2.F, CCSS.ELA-LITERACY.RST.6-8.2, CCSS.ELA-LITERACY.RST.6-8.8, CCSS.ELA-LITERACY.RI.8.2, CCSS.ELA-LITERACY.RI.9-10.1

**Technology Integration:** Students can research and use video or newspaper clips to help argue and/or defend their positions in the debate. If class computers are available then groups can create Powerpoint presentations to enhance their debate.

### WAX MUSEUM

Students choose one of the scientists or people from the book that they found interesting or inspiring to showcase at the museum! Students will become this character, choosing props and clothing appropriate for this individual. They will write a few sentences about who this person is and what they accomplished. Create a “button” for peers to press as they walk around the museum. Invite other classes to learn about the people in *Radioactive!*

**Common Core:** CCSS.ELA-LITERACY.RI.8.3, CCSS.ELA-LITERACY.RI.9-10.1



# RADIOACTIVE



## DISCUSSION QUESTIONS

1. What was Marie Curie's nickname, and for which scientific discoveries is she known?
2. Marie Curie, Irene Curie, and Lise Meitner served during WWI. What contributions did they make, and how did this contribution affect the future of science and medicine?
3. The discovery of radium was both a blessing and a curse to the scientists who handled this element. Using specific examples from the text, in what ways was radium detrimental to Marie and Irène's health? In contrast, what impact did the discovery of radium have in the medical community in helping to cure deadly diseases?
4. Why was it enticing for advertisers and companies to use radium in their products? Which commercial products used radium, and what were the results of using this element?
5. Why did Irène and Frederick continue to publish and discuss their work as scientists, even after they were asked to stop in fear that countries would use their discoveries for evil? Do you think their reasoning was fair?
6. During WWII, conditions in Germany became dangerous. Lise Meitner decided to stay in the country to defend her labs and continue to work. Do you think this was a brave decision? At what point did Lise decide to leave, and how did she plan her escape?
7. Ida Noddak suggested the idea of fission but did not provide evidence to back her claim. Do you think she should be given any credit for her idea? Which scientists were able to describe and interpret fission for the first time? What events occurred after their discovery that took away the credit for the work they did?
8. After the atomic bomb was dropped on Hiroshima and ended the war, many sought Lise Meitner's opinion and wanted to attribute her name to the events. How did Lise Meitner feel about this?
9. At the end of the book, Lise Meitner writes Otto Hahn a letter that she had been wanting to write for years. What did Lise Meitner write to Hahn? Do you think what she wrote was reasonable, or do you believe it was better left unsaid?
10. If you could spend the day with either Irène Curie or Lise Meitner, who would it be and why? Please support your answer with examples from the book.

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