

Lesson Plan: Awesome Physics!

| Class level | Class Time | Materials |
|-------------|---|---|
| High School | <ul style="list-style-type: none"> • 3 min video • 30 min research • 20-30 min for presentations | <ul style="list-style-type: none"> • Computer & Projector • Internet access & computer for each group • Copies of questions during video • Copies of worksheets |

Objectives:

- Educate students about what 5 specific women are doing in Physics.
- Give students good role models and examples of people in the field.
- Engage students by showing them a variety of interesting topics and fields of research that physicists are making discoveries and coming up with ideas in.
- Students will educate each other on these women and their research in Physics.

Overview:

Briefly introduce women Physicists and the disparity between men and women in the field. Show the video. Break the students up into groups and assign each group a physicist to research. Students will answer questions about the Physicist and the field in which the Physicist studies. Then the group will give the class a short presentation about their physicist and their field.

Place in Course?

Middle For a substitute teacher; Between course units or after a test
 End Include an extension where students find connections between the material they studied in class and what the women discuss in the video

Background:

HERStories is a series of videos recorded at the 5th International Conference on Women in Physics at Waterloo, Canada, August, 2014. All interviewees were delegates to the conference. The project was supported by the National Science Foundation Grant #1419453 and presented by the American Physical Society, the American Association of Physics Teachers and the Society of Physics Students. The videos share experiences and wisdom from women in physics in order to encourage young girls to explore a career in physics.

Common Core Standards:

CCS.ELA-LITERACY.SL9.1(or 10.1)
 CCS.ELA-LITERACY.SL11.1(or 12.1)

Engage effectively in a range of collaborative discussions with diverse partners on grade 9-10 (or 11-12) topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.RST.9-10.2
 CCSS.ELA-LITERACY.RST.11-12.1

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

Teacher Guide:

1. Have students watch the video: <https://www.youtube.com/watch?v=GhUGnPVTfsQ> and then divide them into presentation groups to each research a physicist from the video and the field of physics that scientist works in.

2. Relevant links for each Physicist
 - a. Susan Blessing
 - i. <http://www.hep.fsu.edu/~blessing/>
 - ii. Overview and Links for additional guidance: Dr. Blessing is a High Energy experimentalist so she works with groups of people to build detectors to measure properties of the smallest constituents of nature. Her group worked on [calorimetry detectors](#) for an experiment at [Fermilab](#).
 - b. Renee Horton
 - i. <https://www.youtube.com/watch?v=QV7MO29BnME>
 - ii. <http://scitation.aip.org/content/aip/magazine/physicstoday/news/10.1063/PT>
 - iii. Overview and Links for additional guidance: Dr. Horton's area of research is [Materials Science](#) or [Condensed Matter Physics](#). Her work measures the properties of materials joined by [friction stir-welding](#), a process of joining metals without melting them.
 - c. Silvia Torres-Peimbert
 - i. http://en.wikipedia.org/wiki/Silvia_Torres-Peimbert
 - ii. Overview and Links for additional guidance: Dr. Torres-Peimbert is an astronomer who studies the chemical composition of gaseous [nebula](#) in order to help understand the formation of galaxies.
 - d. Petra Rudolf
 - i. http://uvacharge.virginia.edu/petra_rudolf.html
 - ii. <http://www.chem.uzh.ch/static/events/dch/2011/Rudolf.html>
 - iii. Overview and Links for additional guidance: Dr. Rudolf is an experimental condensed matter physicist studying the properties of [graphene](#) and synthetic molecular motors, part of current [nanotechnology](#) research.
 - e. Paola Ayala
 - i. <http://ths.univie.ac.at/group/prof-paola-ayala/>
 - ii. Overview and Links for additional guidance: Dr. Ayala is an experimental condensed matter physicist working on [tailored hybrid structures](#), [carbon nanotubes](#) with different materials added in the tubes.

Worksheet: Awesome Physics!

Name _____

Date _____

While watching the video, take a few notes about what she says about her research:

| | |
|---|--|
|  | |
| Susan Blessing | http://www.hep.fsu.edu/~blessing/ |
|  | |
| Renee Horton | https://www.youtube.com/watch?v=QV7MO29BnME http://scitation.aip.org/content/aip/magazine/physicstoday/news/10.1063/PT |
|  | |
| Silvia Torres-Peimbert | http://en.wikipedia.org/wiki/Silvia_Torres-Peimbert |
|  | |
| Petra Rudolf | http://uvacharge.virginia.edu/petra_rudolf.html |
|  | |
| Paola Ayala | http://ths.univie.ac.at/group/prof-paola-ayala/ |

Group Presentation

Name of physicist your group is researching: _____

Start with the link above for your physicist.

Possible questions to answer in presentation:

- a. Give a brief description of the Physicist, her career and her area of Physics.
- b. What category of research does this Physicist do (theory, experimental, computational, applied or a combination) support your claim.
- c. What is this Physicist's area of research, give a brief explanation of the study of this area.
- d. Why are scientists interested in this area of study?
- e. How do scientists investigate this topic, what are their experimentation or testing methods?
- f. Find at least two images that you feel represent the field that your chosen Physicist researches.