

# QUARKNET: CHANGING THE CULTURE

## TEACHER NOTES

### DESCRIPTION

#### Why STEP UP?

“STEP UP seeks to increase the number of women earning degrees in physics by dramatically increasing the number of women majoring in physics in college. Did you know that teachers are the reason that most undergraduate women in physics chose that degree? That’s right. You are key to encouraging women to pursue prosperous careers in physics! The STEP UP project provides access to downloadable research-based lessons about physics and a nationwide community of teachers engaged in changing the future of physics. Register to join our community or download these lessons and other pedagogical tools by visiting [www.STEPUPphysics.org!](http://www.STEPUPphysics.org!)”

This activity “includes strategies for reducing marginalization in the classroom and recognizing students as physics people.”

The research on the effectiveness of these materials has focused primarily on encouraging women to enter college as a declared physics major. Preliminary data indicates that these same techniques are effective in working with diverse groups including underrepresented populations.

### STANDARDS ADDRESSED

#### *Next Generation Science Standards*

##### Science and Engineering Practices

6. Constructing explanations
7. Engaging in arguments from evidence
8. Obtaining, evaluating and communicating information

##### Crosscutting Concepts

1. Observed patterns
2. Cause and effect

#### *Common Core Literacy Standards*

##### Reading

- 9-12.3 Follow precisely a complex multistep procedure . . .
- 9-12.4 Determine the meaning of symbols, key terms . . .
- 9-12.7 Translate quantitative or technical information . . .

### ENDURING UNDERSTANDINGS

Scientists make a claim based on data that comprise the evidence for the claim.

### LEARNING OBJECTIVES

Students will know and be able to:

- Explain the meaning of each of the *Guidelines for Conduct During Discussion*.
- Implement the behaviors described in the *Guidelines for Conduct During Discussion* during classroom discussions.

### PRIOR KNOWLEDGE

None required.

### BACKGROUND MATERIAL

Information about the STEP UP Everyday Actions curriculum is available at:

<https://engage.aps.org/stepup/curriculum/everyday>

## **RESOURCES/MATERIALS**

Students will have access to the following documents:

- Changing the Culture classroom slides
- Discussion Guidelines Student Page
- Poster paper or another method of presenting the group summaries

## **IMPLEMENTATION**

Introduce the guidelines to the class. Begin the activity with the class slides and divide the students into groups of two or three, assigning each group a guideline. Ensure that all guidelines are included in group discussions. Groups can use the *Guidelines for Discussion Student Page* to encourage sharing and recording ideas. Ask each group to prepare a presentation poster or slide for the class. After each group presents their summaries, conclude with a class discussion of the value in using these Guidelines for Discussion in class. You may want to include a discussion of how to enforce the guidelines in future discussions.

## **ASSESSMENT**

This activity lends itself to formative assessment in which the students pause after a classroom discussion to review the guidelines. Return to the questions in the original student page. Follow up with the following questions:

- What went well during the discussion?
- Did more students share their thoughts and answers with the class?
- What would the students do differently during the next classroom discussion?
- Did the students follow the guidelines during classroom discussions?
- Did the teacher follow the guidelines during classroom discussions?
- Has the climate changed in the classroom?
- Do more students share their thoughts and answers with the class?