

Electric Field Simulation

Teacher's Guide

Topic:

Static Electricity

The following information is provided to the student:

Question:

What variables do and do not effect the strength of the electric field intensity at a given location surrounding a source of charge?

Purpose:

To identify the variables which do and do not effect the strength of the electric field intensity at a given location surrounding a source of charge.

A complete lab write-up includes a Title, a Purpose, a Data section, a Conclusion and a Discussion of Results. The Data section should reveal a table of data which demonstrate a systematic approach to experimentation with the three possible variables and the resulting value of the electric field strength. Conclusion responds (as always) to the *question* posed in the Purpose. The Discussion of Results should describes specific data which serve as supporting evidence for the conclusion.

Materials Required:

A page from The Shockwave Physics Studios:
Coming in the Fall of 2009.

Description of Procedure:

Students log on to the above page and manipulate the variables of the animation in an effort to explore the answers to the given *question*.

Alternative Materials and Procedure:

A more thorough approach to this lab is provided at The Shockwave Physics Studios:
Coming in the Fall of 2009

The alternative exercise is a guided exercise with an extensive procedure.

Safety Concern:

There is always a higher than usual level of risk associated with working in a science lab. Teachers should be aware of this and take the necessary precautions to insure that the working environment is as safe as possible. Student *horseplay* and off-task behaviors should not be tolerated.

Suggestions, Precautions, Notes:

1. The background grid on the animation consists of squares which are 1 distance unit in length along each edge. The test charge can be moved to any desired location about the source charge but the grid can be used to more efficiently control the location.

The Laboratory

2. The controlled environment of this animation makes this activity a great means of assessing student understanding of variable control and manipulation. Students have an opportunity to experiment with changing variables and observing the outcome on a target variable without the added complication of manipulating and reading instruments.

Auxiliary Materials:

None

Scoring Rubric:

SE5. Electric Field Simulation	Score
<ul style="list-style-type: none">___ Included, labeled and organized all parts of the lab report.___ Data section includes a table of data with column headings and units.___ Documentation reveals the ability to conduct a controlled experiment in order to measure the potential outcome of one variable on a target variable.___ Conclusion answers the <i>question</i> posed in the Purpose; <i>answer</i> is correct.___ Discussion of Results makes explicit reference to specific data in order to describe the supporting evidence for the effect or non-effect of each variable upon the electric field intensity.	___/___

Connections to The Physics Classroom Tutorial:

The following readings are a suitable accompaniment to this lab:

<http://www.physicsclassroom.com/Class/estatics/u8l4a.cfm>

<http://www.physicsclassroom.com/Class/estatics/u8l4b.cfm>

Connections to Minds on Physics Internet Modules:

Sublevels 10 and 11 of the Static Electricity module are suitable accompaniments to this lab:

<http://www.physicsclassroom.com/mop/module.cfm>