A Tale of Two Charges: Scene 1

The year is 1798. The French revolution is nearing an end and much of France is still in shambles. French physicist Charles-Augustin de Coulomb spends his days at his estate in the French countryside. Having escaped the Jacobins “Reign of terror”, Coulomb is left to making precise measurements of the forces of attraction and repulsion between charged bodies in relative piece and quiet. With his torsion balance by his side, Coulomb is searching the World Wide Web for interesting Physics websites, when he receives an Instant Message from A. P. Worthingtonshire.

Aloysius P. Worthingtonshire, a writer from Encyclopedia Britannica, the world’s foremost authority on EVERYTHING, has been assigned to write an article on electricity and magnetism. Mr. Worthingtonshire has decided to contact Mr. Coulomb via the World Wide Web in hopes of learning a little more about his work in the field. Below are a series of instant messages exchanged between Coulomb and Worthingtonshire discussing Coulomb’s Law.

A. P. WORTHINGTONSHIRE: Hey!

COULOMB: Who r u?

A. P. WORTHINGTONSHIRE: I work 4 Encyclopedia Britannica. I m writing an entry about electricity and magnetism and I had some questions. Can u tlk?

COULOMB: Sure but make it shrt. I m a very busy scientist.

A. P. WORTHINGTONSHIRE: No prob. So whatzup w/ your law?

COULOMB: F=kq1q2/rsqrd?

A. P. WORTHINGTONSHIRE: Huh?

COULOMB: LOL! That’s the equation! That’s it! Thts all there is 2 it!

A. P. WORTHINGTONSHIRE: How boring…ZZZZZZ

COULOMB: Boring? OMG! IMO, ISLs are fascinating.

A. P. WORTHINGTONSHIRE: ISLs??

COULOMB: Inverse Square Laws…ever heard of them?

A. P. WORTHINGTONSHIRE: I thought they had something 2 do w/ gravity?

COULOMB: Exactly! Speaking of Newton, my law actually satisfies his 3rd law. Cool, huh?
A. P. WORTHINGTONSHIRE: eh….yeah….whateva…so can you help me understand what this whole $F=kqzds\text{liaewhjr12-9uelsf}$ business is all about?

COULOMB: Mr. Worthingtonshire….what kind of help would I be if I simply GAVE you all the answers? Try figuring it out for yourself. Hold on a sec….BRB

A few minutes later……

COULOMB: OK…..I can send you a list of resources that might help you unravel the mysteries of my law. What’s your e-mail address?

A. P. WORTHINGTONSHIRE  apworthingtonshire@yahoo.com

COULOMB: And your credit card number with expiration date?

A. P. WORTHINGTONSHIRE  4-3-5-6…hey, wait a sec!!

COULOMB: He he he…JK…help is on the way.
A Tale of Two Charges: Scene 2

The following day, while searching iTunes for the latest Physics Pholk Songs, Charles Coulomb receives another message from his new friend, A. P. Worthingtonshire.

A. P. Worthingtonshire: Chuck…u there?

Coulomb: Ahhh…Mr. Worthingtonshire…are you an expert in electromagnetic forces yet?

A. P. Worthingtonshire: I certainly know more than I did yesterday.

Coulomb: Goog

Coulomb: *Good*

A. P. Worthingtonshire: One quick question…didja ever hear of a little thing called the atom?

Coulomb: The atom?

A. P. Worthingtonshire: No…Sorry…THE *space* ATOM

Coulomb: Ahh…the atom…nope. Never heard of it.

A. P. Worthingtonshire: Well this guy Rutherford claims the “nucleus” of an atom is full of “protons” and “neutrons”.

Coulomb: Protons? Neutrons? Do you enjoy making up words, Mr. Worthingtonshire?

A. P. Worthingtonshire: Seriously, Charles…Aren’t there some serious problems with this model of the atom?

Coulomb: I might be able to help if I had any idea what u were talking about.

A. P. Worthingtonshire: I’ve been fiddling around with your law and If my math is correct…and if Rutherford’s model is right…and the diameter and charge of a proton are what I think they are…then two protons just touching each other in the nucleus…well that’s an awful lot of force…right?
WANTED: ENCYCLOPEDIA WRITERS

Shortly after his “conversation” with Charles Coulomb, Encyclopedia writer Aloysius P. Worthingtonshire exploded. The strong nuclear force holding Worthingtonshire’s atom’s together apparently weakened causing him to blow up. Worthingtonshire’s untimely death has created a major void in the pool of Encyclopedia writers. It is your job to finish the “Coulomb’s Law” entry started by Mr. Worthingtonshire. It’s nice to include a few links to websites illustrating the principles of Coulomb’s Law but they cannot make up all of your figures. You must draw a few diagrams as well. Don’t forget about those new-fangled “books”. Be as thorough as possible. Creativity is mandatory! All entries will be compiled into one massive, authoritative text that could be used in the future to teach the basics of Coulomb’s Law.
### A Tale of Two Charges: Box Chart

<table>
<thead>
<tr>
<th>Facts</th>
<th>Questions</th>
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<tbody>
<tr>
<td>(What we know right now)</td>
<td>(Based on current knowledge)</td>
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<tr>
<th>Hypotheses</th>
<th>Learning Issues</th>
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<tr>
<td>(Based on facts and questions)</td>
<td>(What we need to learn)</td>
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### A Tale of Two Charges: Grading Rubric

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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<tr>
<td><strong>Content - Accuracy</strong></td>
<td>All facts in the encyclopedia article are accurate.</td>
<td>99-90% of the facts in the encyclopedia article are accurate.</td>
<td>89-80% of the facts in the encyclopedia article are accurate.</td>
<td>Fewer than 80% of the facts in the encyclopedia article are accurate.</td>
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<tr>
<td><strong>Knowledge Gained</strong></td>
<td>All students in the group can accurately answer all questions related to facts in the encyclopedia article and to technical processes used to create the encyclopedia article.</td>
<td>All students in the group can accurately answer most questions related to facts in the encyclopedia article and to technical processes used to create the encyclopedia article.</td>
<td>Most students in the group can accurately answer most questions related to facts in the encyclopedia article and to technical processes used to create the encyclopedia article.</td>
<td>Several students in the group appear to have little knowledge about the facts or technical processes used in the encyclopedia article.</td>
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<tr>
<td><strong>Graphics/Pictures</strong></td>
<td>Graphics go well with the text and there is a good mix of text and graphics.</td>
<td>Graphics go well with the text, but there are so many that they distract from the text.</td>
<td>Graphics go well with the text, but there are too few and the encyclopedia article seems &quot;text-heavy&quot;.</td>
<td>Graphics do not go with the accompanying text or appear to be randomly chosen.</td>
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<td><strong>Writing - Grammar</strong></td>
<td>There are no grammatical mistakes in the encyclopedia article.</td>
<td>There are no grammatical mistakes in the encyclopedia article after feedback from an adult.</td>
<td>There are 1-2 grammatical mistakes in the encyclopedia article even after feedback from an adult.</td>
<td>There are several grammatical mistakes in the encyclopedia article even after feedback from an adult.</td>
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<tr>
<td><strong>Sources</strong></td>
<td>Careful and accurate records are kept to document the source of 95-100% of the facts and graphics in the encyclopedia article.</td>
<td>Careful and accurate records are kept to document the source of 94-85% of the facts and graphics in the encyclopedia article.</td>
<td>Careful and accurate records are kept to document the source of 84-75% of the facts and graphics in the encyclopedia article.</td>
<td>Sources are not documented accurately or are not kept on many facts and graphics.</td>
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Self/Group Evaluation

Date____________________

Your Name:__________________________    Group #_____________________

Instructions: Please circle the response with which you agree the most. This evaluation will only be read by your teacher and will not be shown to other students.

1. How would you rate your participation in group discussion and group work?
   5 Excellent  4 Very Good  3 Good  2 Fair  1 Poor

2. How would you rate your effort in completing the case:
   5 Excellent  4 Very Good  3 Good  2 Fair  1 Poor

3. Did you complete the assigned homework?         Yes   No
   If no, explain why:

4. How well did you work with everyone in your group:
   5 Excellent  4 Very Good  3 Good  2 Fair  1 Poor

5. Overall, how would you rate your performance in this case?
   5 Excellent  4 Very Good  3 Good  2 Fair  1 Poor

6. Your total score

7. Rate each group member on a scale of 1-5

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<thead>
<tr>
<th>Group Member</th>
<th>Participation in group discussion</th>
<th>Completed Assigned Task</th>
<th>Worked well within group</th>
<th>Overall performance</th>
<th>Total Score</th>
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