**Purpose**: To learn how about Boyle’s Law and Charles’ Law using the internet.

**Materials**: Computer, Windows, Microsoft Internet Explorer

**Procedures for Boyle’s Law**: Follow the procedures exactly as written.

1. Click the following URL: <http://pages.uoregon.edu/tgreenbo/boyles_law.html> or use <http://somup.com/cFXeDjn105> (4:16).
2. Choose a substance to test in the “Testing” dialog box. Start with “Air” if available.

|  |  |
| --- | --- |
| **Air** | |
| **Volume (ml)** | **Pressure (psi)** |
|  |  |
|  |  |
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1. Use the plunger to push the syringe up to the “10 ml” mark and let go. You should notice that the values of Volume and Pressure are precisely listed in the table.
2. Record these Volume and Pressure values in your data table to the right.
3. Now move the plunger to push the syringe to the “15 ml” mark and let go. Record these Volume and Pressure values in your date table below.
4. Repeat these procedures for the 20, 25 and 30 ml marks of the syringe. Record all values.
5. Make a graph of ONE of your substances.
6. Label “**Volume (ml)**” on the horizontal axis.

Boyle’s Law

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1. Label “**Pressure (psi)**” on the vertical axis.
2. Begin at “0” and use increments of “**5**” for volume & “**10**” for Pressure.
3. Plot your data using “X”s.
4. Draw a **CURVED** line graph to represent the points.

**Procedures for Charles’ Law**: Follow the procedures exactly as written.

1. Click on the following URL: <http://pages.uoregon.edu/tgreenbo/charles_law.html> or use <http://somup.com/cFXeDjn105> (4:16) ... second part of video.
2. Click on “Show Data Table”.
3. Move the “slider” (*at the bottom*) all the way to the right. A graph will appear as the piston goes up. Allow the piston to go all the way to the top … where it will stop.
4. Close the graph by clicking on “Close” at the lower left corner of the graph.
5. Record the Volume (cm3) and Temperature (K) in the data table to the right. The values are listed in the table on the internet site.

|  |  |
| --- | --- |
| **Air** | |
| **Volume (cm3)** | **Temperature (K)** |
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1. Now move the “slider” to the left about 2 cm (*it will be under the red dot*). The graph appears again. Once the plot stops, record your Volume and Temperatures in the table.
2. Move the “slider” to the left again about 2 cm so that is is under the “K”. Record the Volume and Temperature values in the data table.
3. Repeat these procedures two more times. Record all values in the data table.
4. Click on the “Show Plot” button of the internet data table.

Charles’ Law

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1. Make a graph of your substance.

a. Label “**Volume (cm3)**” on the vertical axis.

b. Label “**Temperature (K)**” on the horizontal axis.

c. Use increments of “**10**” for volume and “**100**” for temperature. Both axes should begin at “0”.

d. Plot your data using “X”s.

e. Draw a **STRAIGHT** “best fit” line to represent all the points.

ANSWERS

**Purpose**: To learn how about Boyle’s Law and Charles’ Law using the internet.

**Materials**: Computer, Windows, Microsoft Internet Explorer

**Procedures for Boyle’s Law**: Follow the procedures exactly as written.

Click the following URL: <http://pages.uoregon.edu/tgreenbo/boyles_law.html> or use <http://somup.com/cFXeDjn105> (4:16).

Choose a substance to test in the “Testing” dialog box. Start with “Air” if available.

|  |  |
| --- | --- |
| **Air** | |
| **Volume (ml)** | **Pressure (psi)** |
| **9.75** | **52.77** |
| **14.92** | **34.48** |
| **19.84** | **25.93** |
| **25.24** | **20.38** |
| **29.78** | **17.28** |

Use the plunger to push the syringe up to the “10 ml” mark and let go. You should notice that the values of Volume and Pressure are precisely listed in the table.

Record these Volume and Pressure values in your data table to the right.

Now move the plunger to push the syringe to the “15 ml” mark and let go. Record these Volume and Pressure values in your date table below.

Repeat these procedures for the 20, 25 and 30 ml marks of the syringe. Record all values.

Make a graph of ONE of your substances.

Label “**Volume (ml)**” on the horizontal axis.

Boyle’s Law

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Pressure (PSI)

Volume (ml)

10

40

10

50

0

0

30

20

30

20

X

X

X

X

X

Label “**Pressure (psi)**” on the vertical axis.

Begin at “0” and use increments of “**5**” for volume & “**10**” for Pressure.

Plot your data using “X”s.

Draw a **CURVED** line graph to represent the points.

**Procedures for Charles’ Law**: Follow the procedures exactly as written.

Click on the following URL: <http://pages.uoregon.edu/tgreenbo/charles_law.html> or use <http://somup.com/cFXeDjn105> (4:16) ... second part of video.

Click on “Show Data Table”.

Move the “slider” (*at the bottom*) all the way to the right. A graph will appear as the piston goes up. Allow the piston to go all the way to the top … where it will stop.

Close the graph by clicking on “Close” at the lower left corner of the graph.

Record the Volume (cm3) and Temperature (K) in the data table to the right. The values are listed in the table on the internet site.

|  |  |
| --- | --- |
| **Air** | |
| **Volume (cm3)** | **Temperature (K)** |
| **39.9** | **453.15** |
| **34.0** | **385.15** |
| **29.5** | **335.15** |
| **23.8** | **269.15** |
| **20.2** | **230.15** |

Now move the “slider” to the left about 2 cm (*it will be under the red dot*). The graph appears again. Once the plot stops, record your Volume and Temperatures in the table.

Move the “slider” to the left again abo ut 2 cm so that is is under the “K”. Record the Volume and Temperature values in the data table.

Repeat these procedures two more times. Record all values in the data table.

Click on the “Show Plot” button of the internet data table.

Temperature K

Charles’ Law

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0

500

4000

300

200

100

30

20

10

40

0

Volume

(cm3)

X

X

X

X

X

Make a graph of your substance.

a. Label “**Volume (cm3)**” on the vertical axis.

b. Label “**Temperature (K)**” on the horizontal axis.

c. Use increments of “**10**” for volume and “**100**” for temperature. Both axes should begin at “0”.

d. Plot your data using “X”s.

e. Draw a **STRAIGHT** “best fit” line to represent all the points.