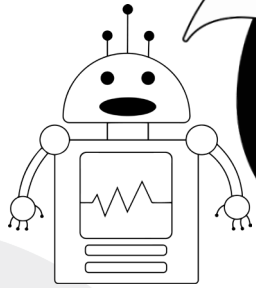


## Graphing in Code

This activity was created by Brenna.



Can you read code like a computer? Follow the instructions below and see what you end up with! People write code to give computers instructions on what to do. Coding involves lots of phrases like “while”, “for”, and “else”, as well as statements that can be true or false like “if”, “less than”, or “equal to”. To help make code clearer to follow, the instructions that depend on a certain initial statement are indented. Code can also include comments, which are italicized and start with “#”. The computer won’t read these, but the comments can help explain the code to the people looking at it.

```

if have a pencil and ruler == true:
    begin activity
else:
    go get a pencil and ruler

for each dot on the page:
    set pencil on the dot
    while length < 5 cm:
        draw vertical line down from the dot

    if length == 5 cm:
        stop drawing vertical line
        begin drawing horizontal line to the right
        if length == 5 cm:
            stop drawing horizontal line
            #go back to the top of this “for” loop and repeat!

for graph on the left:
    print “pressure” on the vertical axis
    print “volume” on the horizontal axis
    set pencil at the top of the vertical axis
    while pencil is within the graph boundaries:
        draw a curved line down and to the right
        #this line should be curved so that it looks like the left side
        of a ‘u’ shape

for graph on the right:
    print “temperature” on the vertical axis
    print “volume” on the horizontal axis
    set pencil at the bottom left corner of the graph
    while pencil is within the graph boundaries:
        draw a straight diagonal line to the top right corner

if both graphs complete == true:
    #congratulations, you just read and followed code!
    #continue activity and see explanation on the next page
  
```

Date: \_\_\_\_\_

Name: \_\_\_\_\_



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## → RESULTS

**Awesome, you just drew two graphs!** But what do they mean?

First, check the Answer Key to make sure you drew your graphs correctly.

These are pressure-volume and temperature-volume graphs for gases. They show the relationship of how a change in pressure or temperature will affect the volume.

Let's start with the pressure graph on the left! As pressure decreases, volume increases, assuming that the temperature stays the same. This is because lower pressure allows the gas particles to spread apart and expand, so they take up more space. A higher pressure will do the opposite and squish the gas, so it is compressed and takes up less space. With high enough pressure, you can even compress a gas to make it become a liquid!

For the graph on the right, assuming that the pressure is constant, you can see that as temperature increases, so does volume! This is because a hotter temperature gives the gas particles more energy, so they move around more and take up more space. With a cooler temperature, the particles have less energy, so they move around less and are closer together. If the temperature is low enough, the particles will condense and change from a gas to a liquid.