

### Overview:

In the 2 sessions for this activity, your aim is to reduce carbon emissions in a model of your school. Your teacher or leader may ask you to work individually, in pairs, or in groups for these activities. This is the Student Guide for Session 2.

#### Session 1



**Challenge 1:** Program Grover the Rover to collect school CO<sub>2</sub> data

#### Session 2



**Challenge 2:** Get Grover to collect your current school CO<sub>2</sub> data



**Challenge 3:** Get Grover to collect your ambition school CO<sub>2</sub> data



**Challenge 4:** Use the Boop! spreadsheet to create persuasive data

### Set up (10-20 minutes)

- **File download:** if not done already, your teacher or leader will demonstrate where you need to save / can find the student files on your school or setting system, so each computer user has a copy.
- **Step 1:** open the Student Guide (you'll have already done this if you're reading this on your computer!).  
(filename: **2 - Net Zero VEXcode Activity Session 2 Student Guide (ages 11+).pdf**)
- **Step 2:** open the VEXcode VR website using the MAGIC LINK:  
<https://hocdemo.vexcode.cloud/?classcode=PBDXH>
- **Step 3:** open your first saved program from Session 1 or the Session 2 coding template within VEXcode VR using 'File > Open', 'File > Load' or similar (this should be in the file you created in the file download step)  
(either '**xx My Net Zero VEXcode Program 1.vrblocks**' or '**2 - Net Zero VEXcode Program 2.vrblocks**').
- **Step 4:** open the virtual school – use 'Select Playground' button, and open the school playground. (**Playground: 'HOC Data Science'**)  
(use the Debugging Help at the end of this guide if it takes too long to open for everyone).
- **Step 5:** while you wait, have a think about what settings you would choose for your school (ignore school size for now as it's not currently working).  
(NB only use setting 1, the starting point, or setting 2 for each slider).

**Do not click 'Confirm and Close' just yet.**

### Challenge 2 - Collect your current school CO<sub>2</sub> data (10 minutes)

- **Initially:** confirm and close to generate the model representing your school as it is currently.



- **Step 1:** move the playground window by clicking the top and dragging, and open the data monitor and run the Grover the Rover program.



- **Step 2:** sense-check the data in the monitor – are there all 5 stations and 30 days of data there for each one? If needed, debug and test.



- **Step 3:** in the data monitor, click the 'save' button and save the data into the folder you created earlier. NB you MUST rename the file 'current.csv' (the end three letters are important), then click save. Open the current.csv file in Excel.



- **Step 4:** open our 'Boop!' Excel spreadsheet from the Session 2 folder, MAKING SURE you click 'enable' macros.



- **Step 5:** go to current.csv and highlight ALL the data there and copy it.



- **Step 6:** return to the Boop! spreadsheet's Current tab and paste into cell A1.



- **Step 7:** click on the Boop! button in the Current tab, and in pairs, groups or as a class, try and work out what it means.



- **Extensions:** if you have time, try out some of the extensions listed at the end (but make sure you save your working program to use for more data collection later!)

### Challenge 3 - Collect your ambition school CO<sub>2</sub> data (10 minutes)

- **Initially:** close the school 'playground' window, then open the playground again so you can set your new ambition sliders. Confirm and Close to generate the model representing your school as per your ambitions.



- **Step 1:** respawn if needed, clear the data monitor, run Grover the Rover and check the data.



- **Step 2:** click 'Save' on the data monitor, this time saving the file as ambition.csv into the folder you created earlier.  
NB you MUST rename the file 'ambition.csv' (the end three letters are important), then click save.

Open the ambition.csv file in Excel.



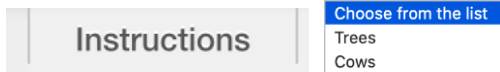
- **Step 3:** in ambition.csv, highlight ALL the data and copy it. Return to the Boop! spreadsheet's Ambition tab, paste the data into cell A1, and click on the Boop! button there.




- **Step 4:** compare the 2 sets of data you can now see (current and ambition) after clicking the Boop! button and discuss the differences between them in pairs, groups or as a class!
- **Extensions:** if you have time, try out some of the extensions listed at the end (but make sure you save your working program to use for more data collection later!)

### Challenge 4 - Use the Boop! spreadsheet to create and use persuasive data (10+ minutes)

- **Step 1:** go back to the Instructions tab on the Boop! spreadsheet, go to and select your output – trees or cows!




- **Step 2:** click the Boop! button to see your changes in a whole new way!
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- **Step 3:** discuss the data and outcomes in pairs, small groups, or as a class.
  - **Step 4:** decide how to use this data in conversations, posters or presentations, to encourage others to think seriously about the changes we can all make, to move us towards net zero!
  - **Extensions:** if you have time, try out some of the extensions listed below (but make sure you save your working program to use for more data collection later!)

### Extension Challenges

- **1) Quick extension:** drag and drop more coding blocks to add motion (drivetrain) code to the end of your first program, and program Grover to get back to the start!
- **2) Write Grover's block code yourself (with the help of some My Blocks):** first, save your code, then open the extension activity in the folder 'Student files - extension' (filename: [Net Zero VEXcode Extension Program 1 - reduced template with My Blocks.vrblocks](#))

Use trial and error to find your way and don't forget the map of the school which you can find in '[student files > Session 1 > Net Zero VEXcode Activity School Data Map.pdf](#)'

- **3) Try and reach the data stations in a particular order:** try reaching data stations in numerical order, or finding the fastest route to take. Is there a way to speed up Grover (it will also speed up the testing!)
- **4) Switch some of the block code to python-like code one block at a time:** try right clicking each block and choose 'convert Block to Switch Block' and see if you can still read your code – you could also try 'convert Stack to Switch Block'.
- **5) Switch all of your code to text and continue programming in python-like text code:** first, save your code so you don't lose it, then click on the code viewer button , near the data monitor button. Click the 'Convert to Text Project' button at the bottom – this will create a .vrpython file, which cannot be converted back into block code, so only make changes if you're sure you've saved the .vrblock file.

### Plenary / Summary:

So, in Session 2 what have you achieved?

- you've inputted your current settings to create a school modelled on your own, and ambition settings to explore your ambitions for your school.
- you've run the Grover the Rover program twice to collect this data.
- you've worked with this data, to create CO<sub>2</sub> emission, absorption and reduction calculations.
- you've compared the two data sets, reviewing them using either trees or cows.
- and finally, (and perhaps most importantly) you've created some persuasive data you can use in conversations, posters or presentations. These will encourage others to think seriously about the changes we can all make, to move us towards net zero ...and ultimately help us on our mission to save the planet!

### Debugging help

Sometimes in coding, things don't work out quite the way we'd planned, and this happens so often we have a term for it – debugging.

If you are having issues, please try the following:

#### VEXCode Activity

- If you're having trouble accessing the VEX Playground it may be due to network restrictions on your school computers.
- If you haven't already, your teacher or leader might like to try using a teacher's login and computer to access the playground, <https://hocdemo.vexcode.cloud/?classcode=PBBDXH>
- If this works, it suggests the issue may be caused by restrictions on the student logins or computers.
- Please share the following link with your IT department or specialist so they can ensure students have access to all the necessary domains.  
Domain Access Requirements for VEX Websites and Software: <https://kb.vex.com/hc/en-us/articles/30676963229204-Domain-Access-Requirements-for-VEX-Websites-and-Software>

If the above fails to solve the issue, please email us on [getintouch@getwiththeprogram.org.uk](mailto:getintouch@getwiththeprogram.org.uk) so we can send you instructions for how to raise a technical issue with our team.

### Debugging help (cont)

#### Boop! Spreadsheet

- Check you have macros enabled on your Excel spreadsheet – the Boop! spreadsheet won't work properly without it. You can just close and reopen it, enabling macros, if you didn't the first time.

Some schools/locations may not allow macros, so you might need to watch our Boop! Spreadsheet video instead.

- Once saved as a .csv file, the data should fall under the headings: station, day, value, and unit of measure and will probably have been converted to columns by Excel. If it doesn't look like this, it may be saved in the wrong format, as a .txt file for example. If so, click on the file to select it, then right-click on it to open the options menu and select **open with**. Choose Notepad or WordPad, then file, save as, and other formats. As in Challenge 2 and Challenge 3, save document as .csv with the appropriate title.

Alternatively you could save in the data monitor again, and ensure you type .csv at the end of the file.

- Make sure you've copied and pasted all of your data, including the headings and all the digits, into the current and ambition tabs of the Boop! spreadsheet.
- Check the program for Grover has collected the data correctly. You may need to change your VEXcode project, and re-collect the current and ambition data, remembering to put the correct input slider settings in before each run through.