



F12.5 Technology and the environment

Technology and society · GCSE · OCR J277 1.6.1, AQA 8525 3.8, Edexcel
1CP2 5.1.1 · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Making, running and disposing of devices: materials, data centres, e-waste and what helps.

- Making it
- Running it
- Throwing it away

Questions

5 marks in all

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1. When is most of a phone's carbon footprint created? [1 mark]
- ☐ A While it is being manufactured
 - ☐ B While it is charging
 - ☐ C While it is being recycled
 - ☐ D While it is in a shop
2. What is e-waste? [1 mark]
- ☐ A Discarded electrical and electronic devices
 - ☐ B Wasted electricity
 - ☐ C Spam email
 - ☐ D Unused files
3. Why are data centres an environmental concern? [1 mark]
- ☐ A They use a great deal of electricity, much of it for cooling
 - ☐ B They are noisy
 - ☐ C They take up farmland only
 - ☐ D They use no electricity
4. 15 devices of 60 W run for 3 hours. How many kWh is that? [1 mark]
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5. How does efficient code help the environment? [1 mark]
- ☐ A It does the same job with less processing, so less electricity
 - ☐ B It makes files smaller only
 - ☐ C It needs more servers
 - ☐ D It has no effect

The task: the classroom's footprint

For each device in `devices` (a name, its watts, and how many hours it runs a day), work out the energy for a 190-day school year across `count` of them. Print `<name>: <kwh> kWh` rounded to 1 decimal place, then at the end `total: <kwh> kWh`, `cost: £<n>` at 28p a unit rounded to 2 decimal places, and `carbon: <n> kg CO2` at 190 g a unit, rounded to the nearest whole number.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

days = 190
count = 15                                # how many of each device the class has
# name, watts, hours a day
devices = [("laptop", 50, 5), ("robot charging", 8, 1), ("projector", 220, 4)]
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f12-5-technology-and-the-environment/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. The projector is replaced with one using 120 W. How much carbon does that save in a year?
2. Which costs more over five years: making 15 new laptops, or running them? Look up a figure for making one.
3. Name three things a school could do to cut the footprint of its computers.