



Oide

Tacú leis an bhFoghlaim
Ghairmiúil i measc Ceannairí
Scoile agus Múinteoirí

Supporting the Professional
Learning of School Leaders
and Teachers



LEAVING CERTIFICATE
COMPUTER SCIENCE

Arduino Workshop

Professional Learning Booklet



Key Messages

Arduino can be used to help students experience learning outcomes relating to ALTs while also helping teachers to interweave the learning outcomes across all three strands of LCCS.

LCCS can be effectively mediated through the use of a constructivist pedagogical approach where group work and group dynamics are a key feature in the teaching, learning and assessment of LCCS.

Learning new programming languages can both build on and reinforce the prior learning of other coding languages.

The CanSat project can be used to help students experience many aspects of the LCCS specification, particularly but not exclusively those around the design process, group work, project work and computers in society.

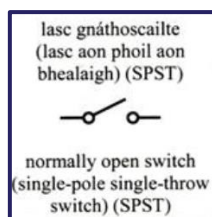
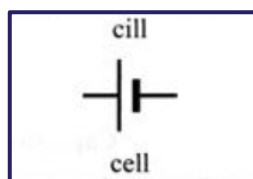
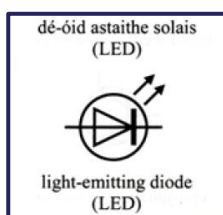
Session 0

Prompt Questions

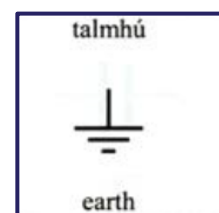
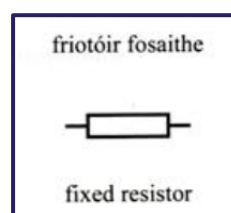
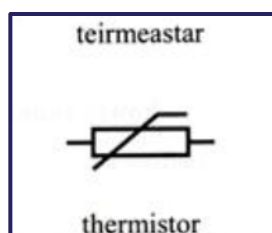
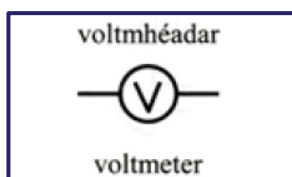
What are the parallels between Arduino and micro: bit/Raspberry Pi that I can use to help my students learn this new tool?

What are the main challenges they may encounter when using Arduino for the first time?

Common Circuit Symbols

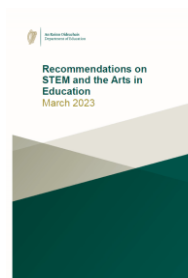


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Useful Links

1. Oide Digital Technology website
<https://oide.ie/digital-technology/home/>
2. CompSci website:
CompSci.ie is a portal site created by and for teachers and students in Ireland and is part of the Scoilnet portal. <https://www.compsci.ie/>
3. Computers in Education Society of Ireland (CESI)
<https://www.cesi.ie/cesi-cs/>
4. PHET online simulator tool:
https://phet.colorado.edu/sims/html/circuit-construction-kit-ac/latest/circuit-construction-kit-ac_en.html
5. Tinkercad
<https://www.tinkercad.com/>
6. WokWi
<https://wokwi.com/>
7. STEM Education Policy Statement
<https://www.gov.ie/pdf/?file=https://assets.gov.ie/43627/06a5face02ae4ecd921334833a4687ac.pdf#page=null>
8. STEM and the Arts Recommendations:
<https://assets.gov.ie/249003/0e73d94c-00ef-4fab-b929-4dc8d32d47df.pdf>

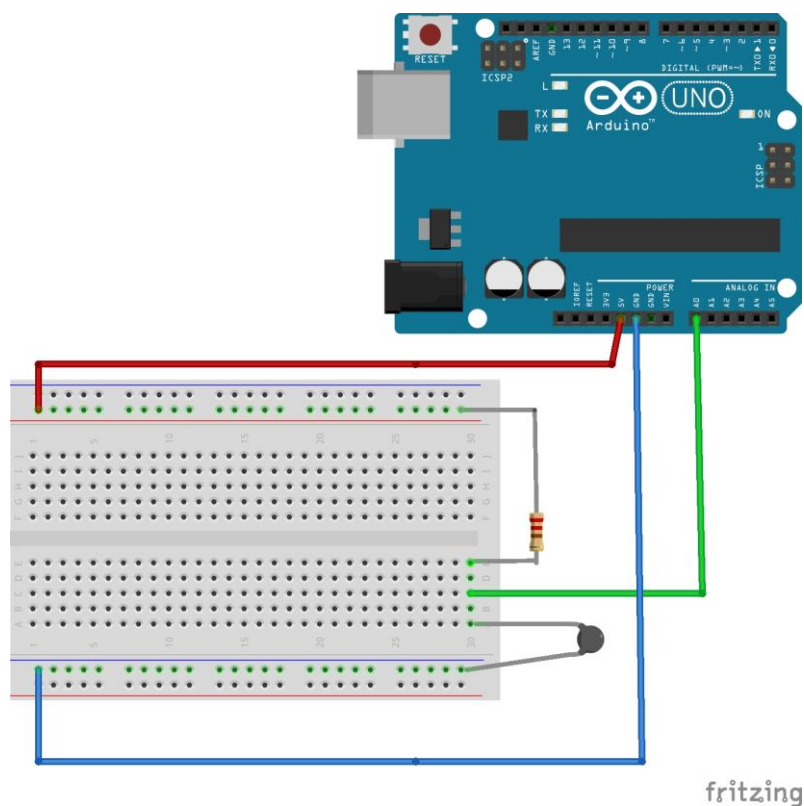


Session 1

Useful Links

1. To install the Arduino IDE on your computer go to: <https://www.arduino.cc/>
If using Chromebook navigate to: <https://create.arduino.cc/editor/>
2. Arduino Reference page: <https://www.arduino.cc/reference/en/>
3. Thermistor info: <https://www.electronics-tutorials.ws/io/thermistors.html>
4. Fritzing diagrams: <https://fritzing.org/>

Thermistor Connection



Reflection/Discussion

Reflect on what we have covered in this morning session:

- First steps with Arduino
- Basic Arduino programming
- Unboxing CanSat kit
- Introducing the Thermistor temperature sensor
- Connecting the temperature sensor

What teaching approaches would you use to introduce these concepts to your students?

What technical challenges would need to be overcome in the classroom?

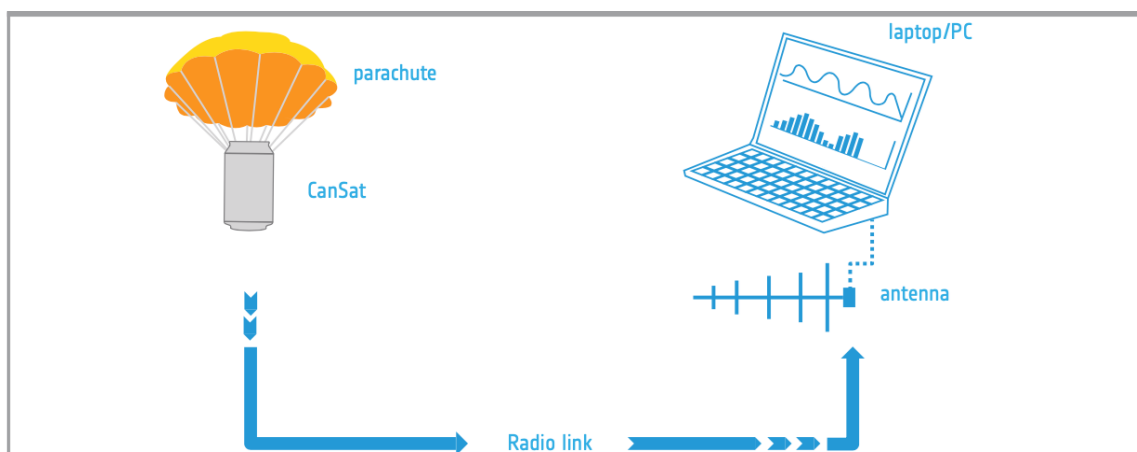
What are the benefits and/or disadvantages of using Arduino over micro:bit?

Session 2

Software to save serial data to computer:

1. CoolTerm:
<https://freeware.the-meiers.org/#:~:text=CoolTerm%20is%20a%20simple%20serial,GPS%20receivers%2C%20microcontrollers%2C%20etc>
2. RealTerm:
<https://sourceforge.net/projects/realterm/>
3. Terminal:
<https://sites.google.com/site/terminalbpp/>
4. USB-TTL drivers:
[https://www.dfrobot.com/wiki/index.php/APC220_Radio_Data_Module\(SKU:TEL0005\)#Communication_Test](https://www.dfrobot.com/wiki/index.php/APC220_Radio_Data_Module(SKU:TEL0005)#Communication_Test)

Radio Communication



Session 3

Reflection/Discussion

Reflect on what we have covered:

- Introducing concepts of serial USB and radio connections
- Displaying data in data monitor and logging in a CSV file
- Connecting the radio module from the CanSat kit
- Sending and receiving data over radio

What teaching approaches would you use to introduce these concepts to your students?

What technical challenges would need to be overcome in the classroom?

What elements of these tasks could be used during an ALT?

Useful Links

1. CanSat guidelines:
<https://www.esero.ie/cansat>
2. Direct link to guidelines document:
<https://drive.google.com/file/d/1AuEFrk0LScLqUdowFHi-Y4T6zbKhDD6J/view>
3. About CANSAT Ireland (including student experiences)
<https://youtu.be/6SvXFF9YxCQ>

Reflection/Discussion

Reflect on what we have done over the four sessions:

Which of your students would benefit from working with Arduino?

How would they benefit?

