Introduction to data collection and visualisation

# Introduction to data collection and visualisation

## Class Description

This is an introductory session that provides an entry level look at robotics, coding and data collection. Students will work collaboratively in groups through guided exploration, investigating their data collection tool and using basic skills in data visualisation using Excel. They will then present their learning and justify their decisions to develop communication and collaboration skills.

## Duration

90 minutes

## Attributes and skills developed

* The capacity to work fluently across a range of tools, platforms and applications to achieve complex tasks.
* An understanding of basic concepts in computing, coding, and information processing, software & app development
* The capacity to collate, manage, access and report on digital data in spreadsheets, databases and other formats
* The capacity to support and develop others in their learning and to be pro-active in peer learning.

## Room requirements

* Internet access
* Large room with plenty of floor space for the robots to move around

## Resources

* Handout for each group
* 3-6 Sphero SPRK+ robots
* 3-6 tablets/smartphones with the *Sphero edu* app installed
* 2-4 PocketLab Voyager devices with tablets/laptops/smartphones with the *PocketLab* app installed
* Each group should have 1 laptop for graphing in Excel. Preferably BYOD.

## Activities

* Work in groups to collect data using a robot, smartphone or sensor tool
* Make connections between the data collected and the real world
* Communicate their choices and what they have learned

## Preparation Checklist

* Print copies of handout
* Ensure all equipment is fully charged
* Ensure you have copied the following programs onto your Sphero account:
	+ Sphero Pong: <https://edu.sphero.com/remixes/630649>
	+ Toss & Catch: <https://edu.sphero.com/remixes/630631>
	+ Square: <https://edu.sphero.com/remixes/980252>

## Lesson Plan

|  |  |  |
| --- | --- | --- |
| Timing | Topic | Notes |
| 10 mins | **Introduction** | *Explain:** Outline the activities in the class.
* Introduce the equipment that is being used
* Remind students that they are expected to present for up to 5 minutes on what they have learned in the activity

*Activity:** Divide the class into 5 roughly equal groups
* Give each group a copy of the activity handout
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| 40 mins | **Group work** | *Activity:** Each group will work on one of the activities outlined on the handouts

*Focus for instructor:** Check in with groups to ensure they understand the task
* Ensure all group members are involved in the task
* Students should use whatever software/app and graph type they feel is most appropriate to graph the data, as long as they can justify their decision in their presentation
* After 30 minutes, ensure students have begun working on their presentations

*Explain and Write on the board:** The presentation should go for not more than 5 minutes
* Students should show the graphs they have worked on
* The focus is on telling the story of the activity using the data they have gathered and explaining the choices they have made about their graphs
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| 30 mins | **Presentation** | *Activity:** Each group presents for 5 minutes on the activity.
* Ideally every member of the group should contribute to the presentation

*Focus for instructor:** Ask students to explain their choices about the data they are showing
* Ask students about the type of graph they have chosen and get them to explain why it’s most appropriate for the story they are telling
 |
| 5 mins | **Wrap up** |  |

## Additional References

**Sphero & Data Collection Resources**

Sphero 2018, *Sphero edu: #Beyondcode*, viewed 6 February 2019, <<https://www.sphero.com/education/>>.

Myriad Sensors 2018, *Science for everyone*, PocketLab, viewed 6 February 2019, <<https://www.thepocketlab.com/educators>>.

Google n.d. *Inspire and empower with Science Journal*, viewed 6 February 2019, <<https://sciencejournal.withgoogle.com/>>.

**Data Visualisation Resources**

Violeta Ivanova. *EC.210 Visualization for Mathematics, Science, and Technology Education.*MIT OpenCourseWare, Massachusetts Institute of Technology, viewed 6 February 2019, <[https://ocw.mit.edu](https://ocw.mit.edu/courses/edgerton-center/ec-210-visualization-for-mathematics-science-and-technology-education-spring-2016)>.