



## National Workshop 3



LEAVING CERTIFICATE  
COMPUTER SCIENCE

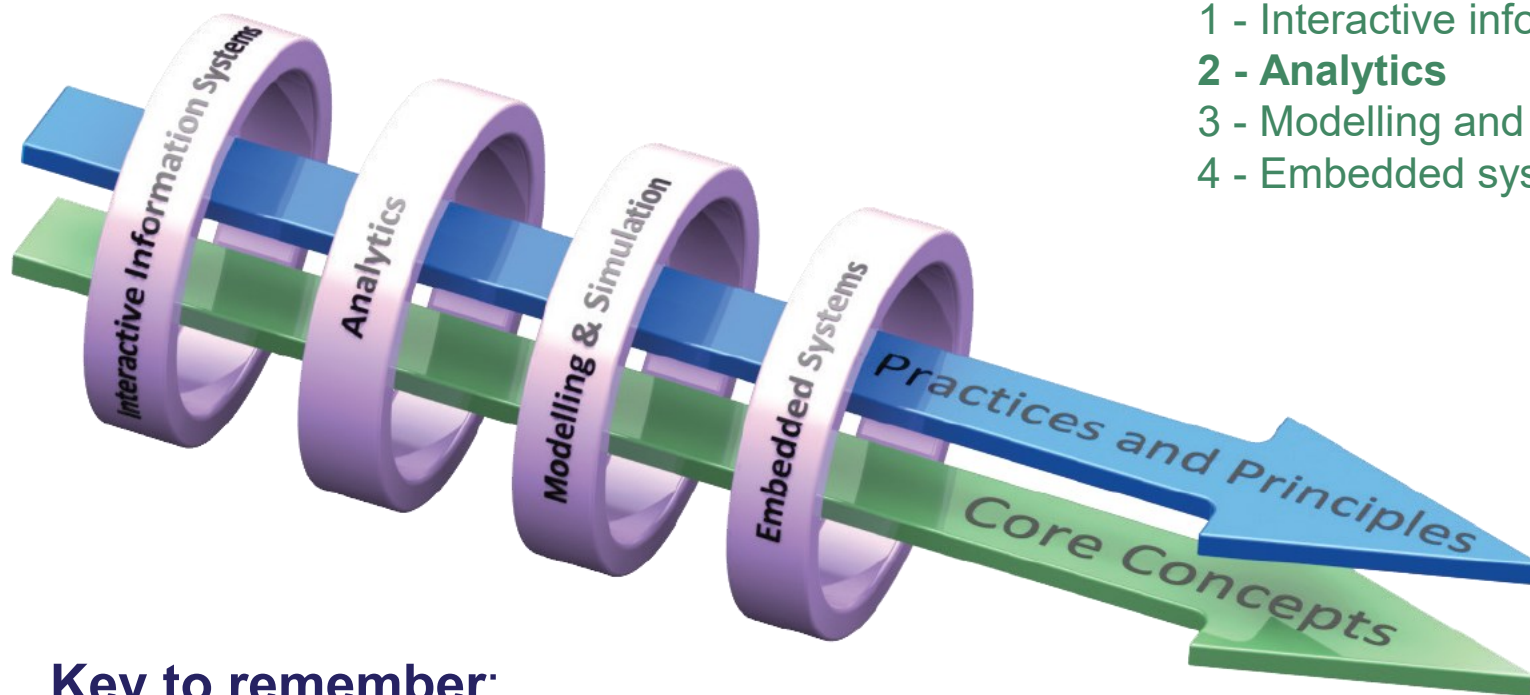
## Day 1 Session 2

### ALT2 – Investigation and Planning

# LCCS Interwoven

The four applied learning tasks explore the four following contexts:

- 1 - Interactive information systems
- 2 - **Analytics**
- 3 - Modelling and simulation
- 4 - Embedded systems.



**Key to remember:**

*Explore and teach the LOs through the lens of ALTs.*

# By the end of this session / Learning Outcomes / Learning Intentions

**Participants will be enabled to:**

- **Work in groups in developing an ALT, including approaching datasets**
- **Come up with and assess ideas for ALT2 (Analytics)**
- **Enhance their understanding of the Investigation and Planning stages of the Development Cycle, with particular focus on ALT2**

## Specification

“**Hypothesising**, making predictions, examining evidence, recognising patterns and reaching conclusions are at the heart of computer science. In this applied learning task, students will identify an interdisciplinary topic, develop a hypothesis and utilise existing resources to highlight the salient information and inform future decisions....” (LCCS Specification)

In this session, we'll

1. Run through an example using cryptocurrency datasets.
2. Experience other datasets from a wide range of areas.
3. Hypothesise from these datasets and work on the Investigation and Planning stages of an ALT2.

# Hypothesising

- \* Consider dataset of data on 100 biggest Irish towns  
Getting the mean population – or median?

NZ / Norway

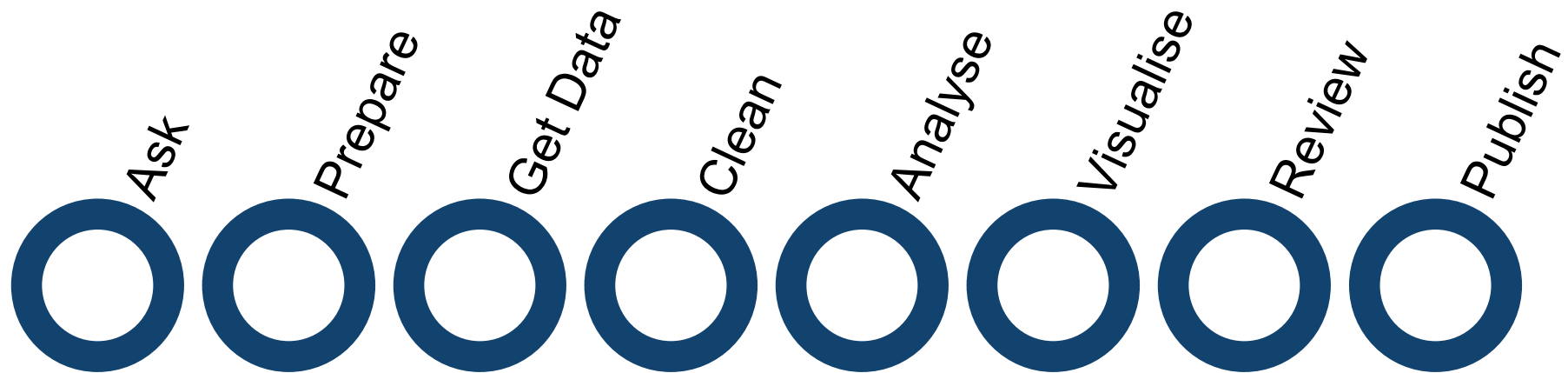
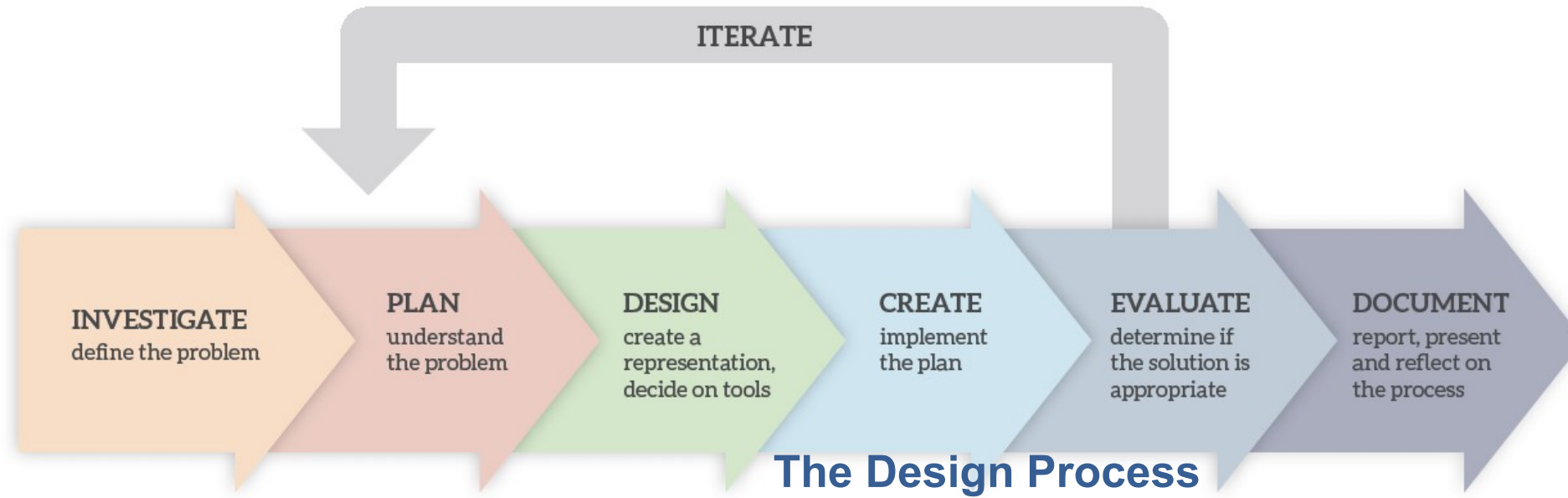
Planes, Trains,...

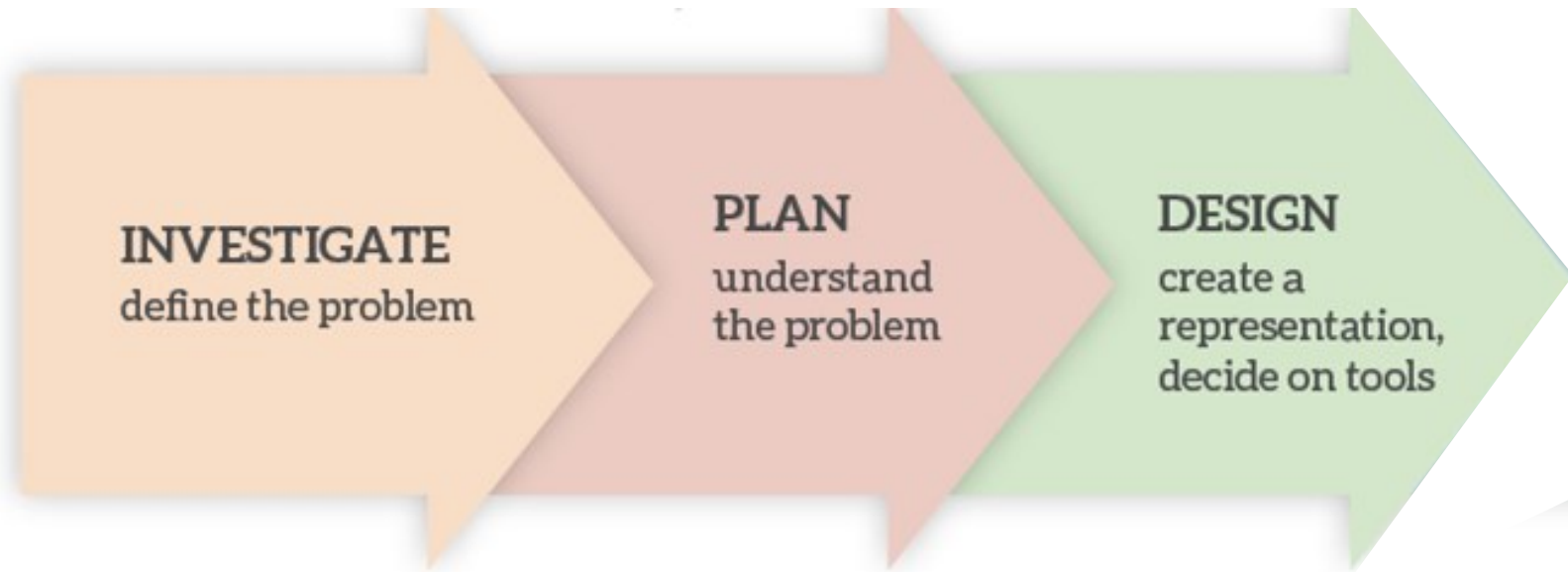
Secondary schools

- \* Digits (fingers...)

- \* VAR

- \* Earthquakes







# Cryptocurrencies



What are they?

a digital currency in which transactions are verified and records maintained by a decentralized system using cryptography, rather than by a centralized authority – eg *Bitcoin, Ethereum, Cardano*.

How can you get one?

buying or harvesting.

Why have they been in the news in 2021?

*Bitcoin* and others have rose dramatically and may be regulated in the future. US banks are interested in investing in them as an *inflation buffer*.

# Cryptocurrencies



Why have they been in the news recently (2022)?

*“Kazakhstan – Bitcoin price drops due to restrictions on Internet.”  
(2<sup>nd</sup> largest centre for data mining in the world.)*

*Links to other parts of the specification:*

*\* Computers in Society – Energy in Mining  
- Economics*

*\* Computational Thinking  
Semi-primes*

# Datasets – Cryptocurrencies

Bitcoin

Cardano

Ethereum

What useful information do you want?  
Which **hypotheses** will be tested?

[www.coindesk.com](https://www.coindesk.com)

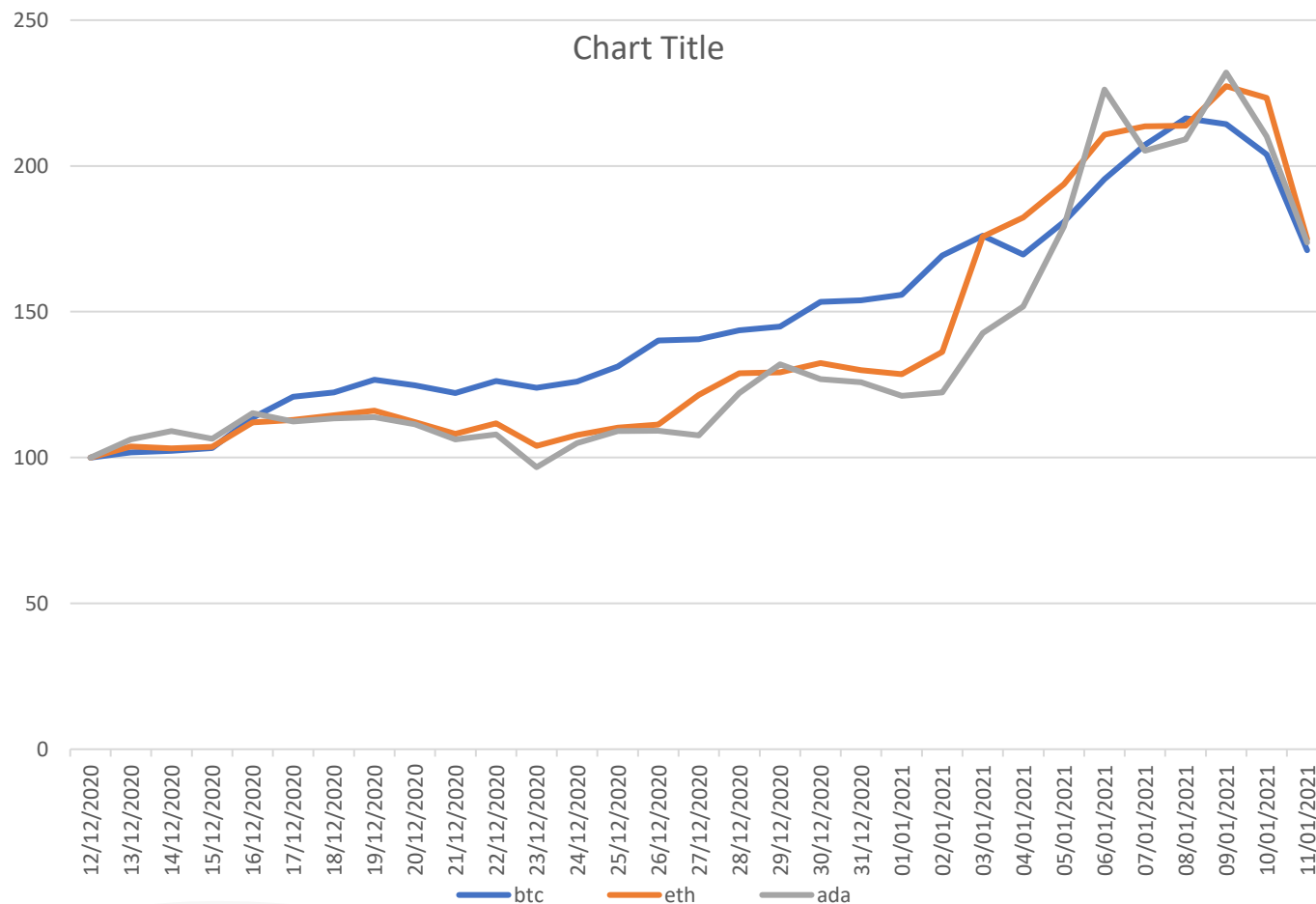


# Cryptocurrencies

1. Exporting data – csv
2. Tidying up info
3. Add weighting
4. Hypotheses –
  - a. Which has best potential?
  - b. Are two of them more correlated?
  - c. Is there a lag between movement in bitcoin and the others?
5. Get max, min, mean, mode, median, moving average.

Date	btc	eth	ada
12/12/2020	100	100	100
13/12/2020	101.765396	103.8401	106.2114
14/12/2020	102.341385	103.1209	109.089
15/12/2020	103.239395	103.7267	106.4593
16/12/2020	113.616989	112.0208	115.289
17/12/2020	120.808848	112.9179	112.3704
18/12/2020	122.307071	114.5191	113.405
19/12/2020	126.730059	116.0807	113.9004
20/12/2020	124.72809	112.1779	111.3772
21/12/2020	122.128346	108.188	106.1964
22/12/2020	126.309237	111.734	107.9156
23/12/2020	123.929427	103.97	96.7222
24/12/2020	126.005857	107.6699	104.9944
25/12/2020	131.19064	110.2233	109.0861
26/12/2020	140.170566	111.3668	109.2568
27/12/2020	140.582257	121.4466	107.5629
28/12/2020	143.671558	128.9558	122.0966
29/12/2020	144.865085	129.2697	131.9633
30/12/2020	153.371424	132.4585	126.9153
31/12/2020	153.891338	129.974	125.817
01/01/2021	155.824847	128.5494	121.1777
02/01/2021	169.255202	136.174	122.3569
03/01/2021	176.111443	175.795	142.7168
04/01/2021	169.597278	182.3069	151.7972
05/01/2021	180.879719	193.8034	179.2246
06/01/2021	195.415603	210.723	226.1815
07/01/2021	207.251537	213.5484	205.2413
08/01/2021	216.298737	213.7445	209.1134
09/01/2021	214.258502	227.299	231.962
10/01/2021	203.96606	223.3407	210.1116
11/01/2021	171.113618	174.8729	173.7655

# Cryptocurrencies



## Other datasets

- Worldometers – very brief overview / coronavirus
- CSO
- Soccer Stats
  
- Ag Science
- Kaggle - demo

## Ag Science datasets

1. Teagasc National Farm Surveys(lots of data already analysed but also contains datasets)

<https://www.teagasc.ie/search/?q=national+farm+survey>

2. Beef Price Watch (live app which allows you to generate data)

<https://publicapps.agriculture.gov.ie/bpw-ui/#/>

3. Agriculture Section of CSO Website (allows you to generate csv/xlsx files with whatever data you choose)

<https://www.cso.ie/en/statistics/agriculture/>

4. Agriland.ie (has a section with factory prices )

<https://www.agriland.ie/factory-prices/>

# kaggle

Searchable repository of user-generated datasets (and data challenges)

Detailed and user-friendly search function

Free courses on Python, Machine Learning, Pandas, SQL, etc.



## Data Science Communities

IBM Data Science Community - <https://community.ibm.com/community/user/datascience/home>

Open Data Science - <https://ods.ai/>

Data Science Central - <https://www.datasciencecentral.com/>

Driven Data - <https://www.drivendata.org/>

## Why use ready-made datasets?

Curated

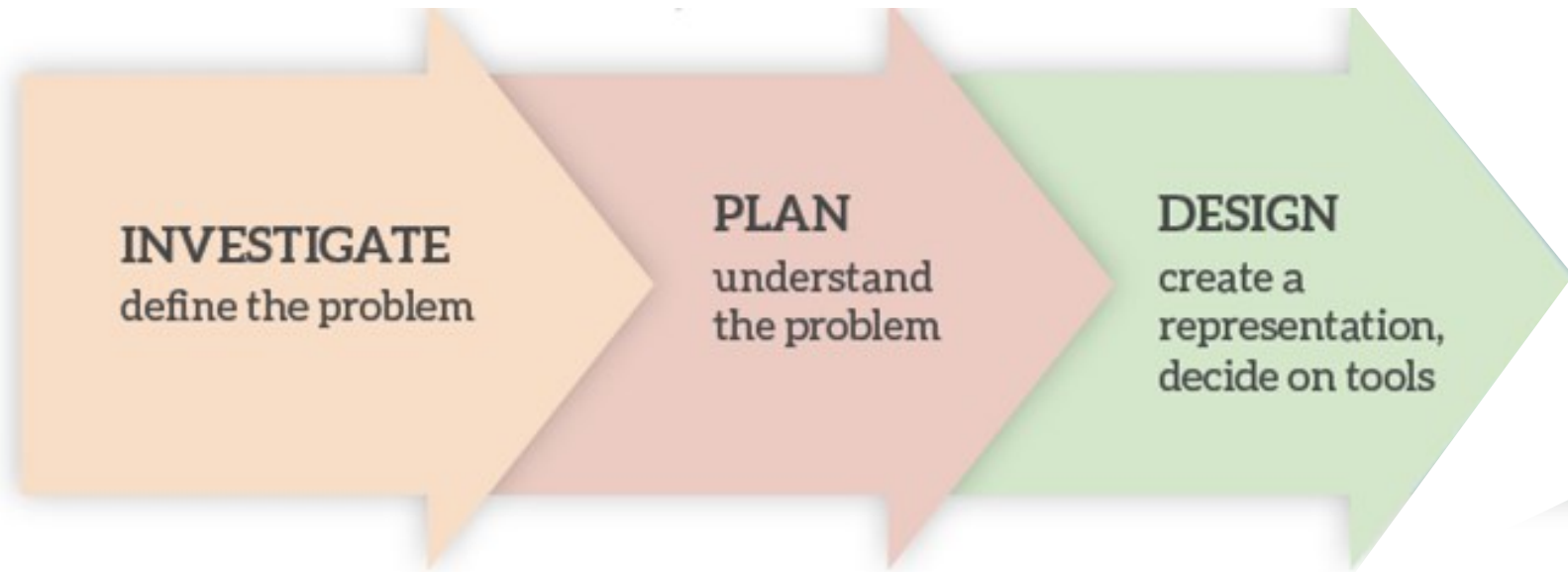
Differentiation

Scaffolding

Authentic

### Students should be able to:

- 3.4 develop algorithms that can find the frequency, mean, median and mode of a data set
- 3.5 structure and transform **raw** data to prepare it for analysis
- 3.6 represent data to effectively communicate in a graphical form
- 3.7 use algorithms to analyse and interpret data in a way that informs decision-making



# Activity - Investigation / Planning (Part 1 )

1. In your assigned groups start brainstorming as to possible hypotheses for your dataset.
2. Aim for as many ideas as you can.
3. Add your ideas to the Google doc – can be text / images / videos etc.

[https://docs.google.com/document/d/1sZ9GNhJpQouzBJ2IE\\_mMtngML7R3MsBVduGI9z85UoE/edit?usp=sharing](https://docs.google.com/document/d/1sZ9GNhJpQouzBJ2IE_mMtngML7R3MsBVduGI9z85UoE/edit?usp=sharing)



## Stretch Break

5 mins



# Activity - Investigation / Planning (Part 2)

**Choose one or two of the hypotheses.**

**What does your project do? And not do?**

*Aims? / Any Limitations?*

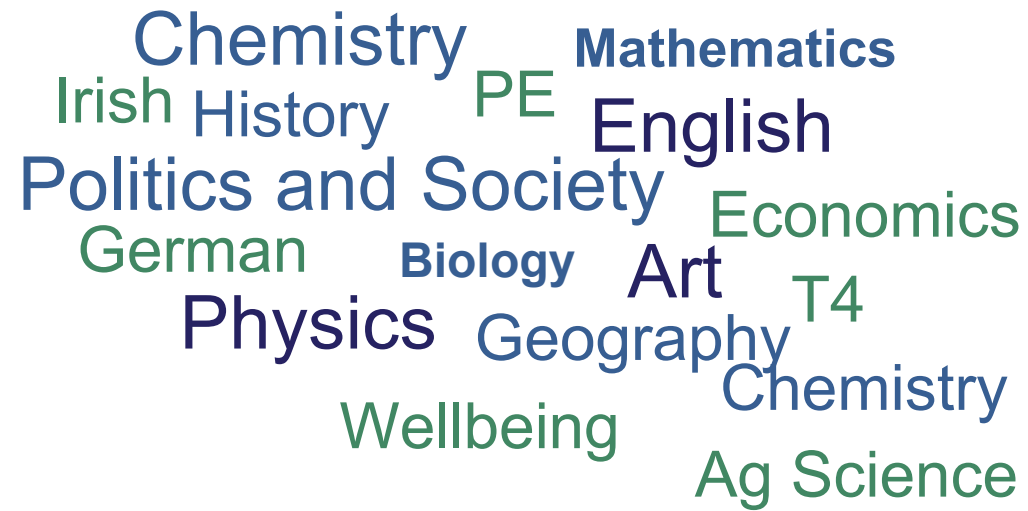
*Are there any ethical issues?*

*Who are the end users?*

*Tools / Materials required?*

*What are the roles and responsibilities?*

# Inter-disciplinary nature of data (LC)



A word cloud of school subjects, with 'Chemistry' and 'Mathematics' being the largest words. Other subjects include 'English', 'Politics and Society', 'Economics', 'Physics', 'Geography', 'Biology', 'Art', 'German', 'Irish', 'History', 'PE', 'T4', 'Wellbeing', and 'Ag Science'. The words are arranged in a cluster, with some overlapping.

Chemistry Mathematics  
Irish History PE English  
Politics and Society Economics  
German Biology Art T4  
Physics Geography  
Wellbeing Chemistry  
Ag Science





**What did you do?**

**How did you do it?**

**How would you support students  
to engage in a similar process**

**Roles & Group Dynamics**

**What has challenged your thinking?**

**Making Links**



**Problems**

**Presentation & Debrief**

## Additional Resources

# Data Sets





**COMPSCI.IE**

Each group will upload their work  
for sharing via Compsci.



**An Roinn Oideachais**  
Department of Education



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