

STATWARS[®]

A Primary Engineer and Secondary Engineer Production for the Institution of Primary Engineers[®], Institution of Secondary Engineers[®] and Institution of Tertiary Engineers[®].

STATWARS[®] Secondary School Scheme of Work

www.statwarscompetition.com www.onedotall.com www.primaryengineer.com

Primary Engineer Programmes
...the first step[®]



SECONDARY
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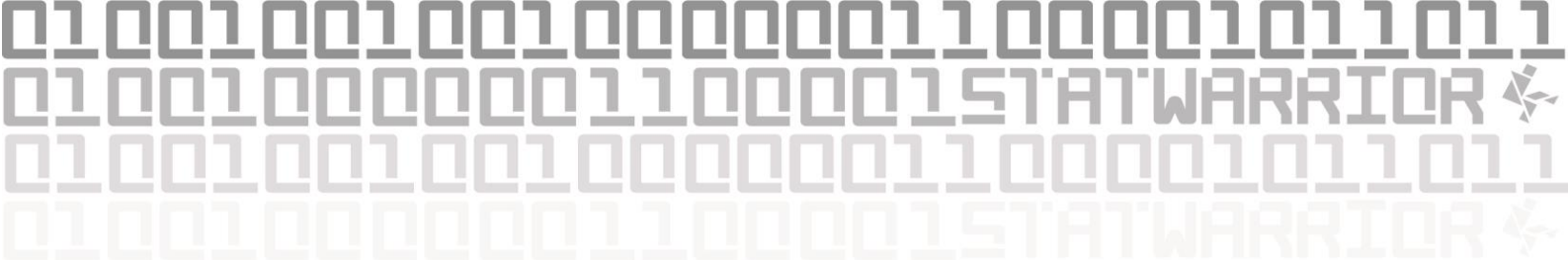


Primary Engineer
LEADERS AWARD
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institution of
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Terms and conditions

The aim of STATWARS® is to help young people develop their data literacy and critical thinking skills by using data to create their own film or TV series concept. We provide a classroom project that engages every pupil with data skills by bringing the enchantment of the entertainment industry to their doorstep!

Pupils work in teams to analyse a large dataset of TV series and films to produce an infographic poster, an advertisement poster and a 60-sec pitch video. The competition's structure encourages pupils to use their own creative spin and personal experiences to find meaning in, interpret and present the data.

Teachers are provided with whole-class resources alongside videos from industry professionals to ensure a real-world, careers driven context is provided for pupils. Teachers can request visits, or internet calls from data professionals to help support the project in school and answer the many questions pupils will have!

The competition requires teams of pupils to produce two posters (each, no larger than A2) one advertising the film or TV series, clearly designed to appeal to its demographic audience, and the other to communicate through infographics, the data used to influence the decisions made. Teams will also be required to produce a 60 second film to 'elevator pitch' their idea to the judging panel.

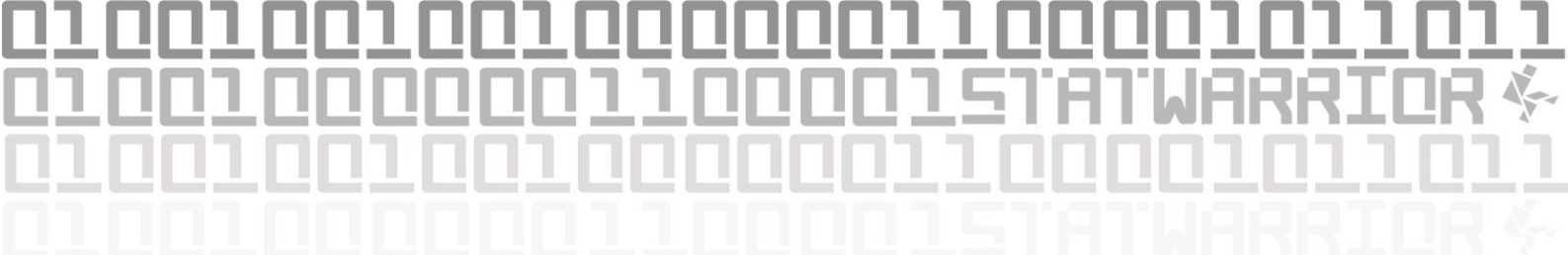
Shortlisted teams will be invited to an awards day to talk through their project with the judges and engage in fun data-related activities. The next awards event will be announced on the www.statwarscompetition.com website.

STATWARS® is an annual competition that has been developed by Primary Engineer Programmes for The Institution of Primary Engineers® and The Institution of Secondary Engineers®.

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For more information on any of our programmes please use the links below:

Links to: www.primaryengineer.com www.secondaryengineer.com www.leadersaward.com
www.onedotall.com



How to create a successful TV show or film using data



Overview

This project will follow the 6 key stages for managing a data project.

- 1. **Defining** – identifying the question being solved and why it is important 2
- 2. **Planning** – formulate a hypothesis to test and identify what data would be required 3
- 3. **Collecting** – accurately capturing, storing, securing and categorising the data 5
- 4. **Analysing** – pre-processing, exploring, modelling and validating 9
- 5. **Concluding** – inferring and communicating findings through reports and visualisations 18
- 6. **Implementing** – *real-world delivery/ongoing monitoring (not a requirement of this project)*

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All URL links were correct at time of writing – please ensure this is still the case before using any websites with pupils.

For full terms and conditions of the STATWARS® competition please visit www.statwarscompetition.com for the current competition rules and regulations as they will be subject to change.

The Awards

There are **4 possible awards** to be won as part of the S STATWARS® competition:

- ▶ **Best Data Analysis**
- ▶ **Best Communication**
- ▶ **Most Creative Presentation**
- ▶ **Overall Winner (based on the 3 requested outcomes of the project; infographic poster, advertising poster, sales pitch)**

You can submit up to 4 entries in total per class, who will be judged by our panel of experts!

Interview an Industry Professional

To support you and the young people completing this project, we will be running a series of online interviews with professionals from the data and entertainment industry!

Please access the **Eventbrite** links at <https://www.eventbrite.co.uk/o/statwars-competition-30258493092> and book yourself on as many of those as you like!

STATWARRIORS only print when they really need to!

The Project

1. Defining

1.1 The problem

Can you design a successful film or TV show based on available data?

Film and TV companies now use data to help them create the optimal TV show or film. STATWARS® are holding a competition to find the next successful TV show or film based on statistical analysis of available data. Pupils will be provided with a dataset of hundreds of films and TV shows to analyse, to help them understand what makes them successful. Pupils should search for additional relevant, accurate and valid data. The use of this data, alongside what they already know, can help pupils make an educated decision.

For example: What is successful – is it rating, money, awards, originality? why is Avatar the highest grossing film of all time? Why was ET such a hit in the 80's? Would it be a hit now? Do all book adaptations like Game of Thrones end up successful? What made the Harry Potter films so successful? Are animations more exciting than films? Why do certain films win Oscars?

Teacher video: Please watch the following video which highlights the importance of data but also your “gut instinct” in the TV/film industry –

https://www.ted.com/talks/sebastian_wernicke_how_to_use_data_to_make_a_hit_tv_show

STATWARS® wants to know, **which option(s) should be taken** for the actor/actress, genre, plot line etc? In other words, what would make the next hit TV show/film and why?

They would like the data to be presented in an easy to understand format to support your decision, with an accompanying poster illustration for the potential TV show/film. Due to the nature of the competition the poster illustration and the presentation of the data will have to fit on one side only of 2 separate sheets of A2 paper (maximum size).

Assessment will include a scenario where the team find themselves in a lift with Jeff Bezos (Amazon) or Reed Hastings (Netflix) and they have just one minute to tell them about their idea. This will provide pupils with an opportunity to demonstrate their understanding of the data and be persuasive in their suggestions.

In order to make that decision, pupils will need to find out:

- a) **What do we currently know about the best TV shows/films? What is success?**
- b) **What might the solution look like?**
- c) **What data is needed and where will it come from?**

Further important questions for them to consider here are:

- ▶ **Will there be enough data to provide a robust answer?**

- ▶ Will there be too much data to store easily?
- ▶ Are there any social, moral or security implications of collecting or using this data?
- ▶ Is any personal data being collected or processed? If so the privacy issues need to be addressed at an early stage of planning. For example, if pupils are collecting data from their classmates, will it be anonymous?

In order to help you complete the project, pupils will be able to interview data professionals and other industry professionals online, who will share their thoughts and ideas. Please access the Eventbrite links at <https://www.eventbrite.co.uk/o/statwars-competition-30258493092> and book yourself on as many of those as you like. Ideally you would complete Topic 1 prior to these interviews and then move on, after at least 1 interview but this element of the project is entirely up to you.

In preparation for this interview you should discuss with your pupils potential questions they might want to ask and let them come up with their own ideas. If they need help, some examples are:

- What can data tell us about things like how successful something is?
- How would you use data to solve this problem?
- Add in some of your own here

2. Planning

2.1 Data Types

Data can be quantitative (numerical; measurements, values) or qualitative (not numerical; text, images, opinion). Pupils will have to consider what type of data they can collect.

2.2 Project Teams

In order to solve the problem pupils can be allocated into project teams. These teams would essentially be a group of screenwriters working together and therefore should have a name and perhaps a logo. This planning stage is an important process as it can help them create a meaningful and robust solution to the problem. The age rating of the film will be determined here, by the youngest person in the group. ***You might consider allocating pupils into groups based on their initial ideas above. Alternatively, you can allocate pupils into project teams first then allow them to come up with a group idea for their solution.***

Consideration should be made for:

- ▶ What is being done
- ▶ By whom
- ▶ When by

Pupils can allocate these tasks themselves or this can be decided for them. This could be in groups of 3

for example:

Role	Key Responsibilities	Skills
The Translator	Communicates the project purpose Designs the experiment Interprets the findings Develops and manages the plan	Presentations Project management Data visualisation
The Engineer	Collects the data Stores the data safely & securely Checks the data quality Implements the solution Automates the ongoing monitoring	Coding Database design
The Analyst	Organises the data for analysis Carries out the analysis Tests the outputs Summarises the findings	Statistics Coding

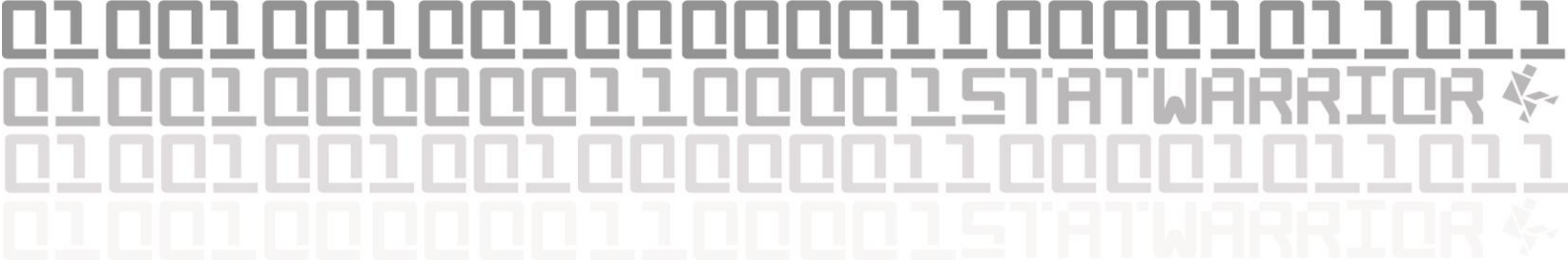
2.3 Deciding on a potential solution

At this point - in order to create an element of diversity in the outcomes, pupils should be encouraged to consider a range of solutions, for which they will **recommend a solution for just one**.

For example:

- How can I design a high grossing blockbuster with a big budget, which also has a high rating?
- How can I design a highly rated but low budget TV show or film?
- How can I design a TV show or film that will win an award?
- How can I design a TV show or film that only has a small budget, but makes lots of money?
- How can I design a TV show or film starring "INSERT ACTOR/ACTRESS" that would be their highest grossing movie?
- How can I design a TV show or film that will make headlines or have a strong message (political/challenging the norm etc.)?

This link may help pupils develop some ideas - <https://www.wikihow.com/Come-Up-with-a-Movie-Idea>



2.4 Protecting the data

Where and how the data is stored, and what are the risks (for example data or film poster being stolen or lost; and the importance of data security here, such as the use of passwords and how to back up work), their ideas being stolen. Pupils should be asked to consider the following:

Location	Pros	Cons
Laptop/local drive	No personal access issues Easy to limit external access	Could be lost or stolen Hard to share across the team Unlikely to be backed up Limited disk-space
Centralised drive e.g. school fileserver	Easy to share across the team	Limited disk-space Hard to limit access Backup process may not exist
Cloud-based drive e.g. Dropbox, Google drive, AWS	Automatic backups Easy to share and limit access Limitless disk-space, although maybe at a cost	Internet connection required
Removable media	No personal access issues Could share across team, though multiple copies may exist	Easy to corrupt/fail and then data lost Easy to lose Fixed disk-space

3. Collecting

3.1 Collecting useful data from the dataset

This project relies on **metadata** (data about data). So just like on the music player on a mobile phone, it can show the track name, artist, artwork, song length and album. This project requires pupils to be able to gather metadata about successful films such as main actors involved, money grossed, critic ratings, release dates, genre. They will then analyse it to understand why this may be and argue/present it accordingly. They may also need to collect data about what is not successful in order to support their decision. In order to do this they will be searching the internet/databases such as IMDb (Internet Movie Database).

More links are provided below.

Pupils will use the dataset provided, and if required, use the internet for further data. External links are provided if you wish to use them. It would be expected at this point, that pupils start to develop an idea of the data they need to look for in their data set. I.e. what will be valuable data to support their analysis/idea.

NB. Although the dataset provided is age appropriate, you may wish to filter the dataset further before you present it to pupils.

The following criteria are suggestions for what might make a successful/unsuccessful TV show or film:

- ▶ Based on video game, book, toy, play
- ▶ Original or sequel
- ▶ Rating
- ▶ Name
- ▶ Plot keywords
- ▶ Actors - awards, nominations, gender, age, percentage of these
- ▶ Budget v Gross
- ▶ Director - previous success, age, gender
- ▶ Language
- ▶ Release date
- ▶ Runtime
- ▶ Country made
- ▶ Genre

We have provided you with help videos to support you and your pupils in how to collect data using the datasets provided

- **Collecting data for Highly Rated Action Films** - <https://vimeo.com/420592098>
- **Collecting data on Low Budget but Highly Rated Films** - <https://vimeo.com/420592448>

3.2 Searching for data on the World Wide Web

Searching the world wide web for data and information can be difficult. This video on Google will help them to understand how web searches work. This can open a discussion in the class about what search terms should be used to help find data on successful TV shows/films.

<https://www.youtube.com/watch?v=BNHR6IQJGZs> (Other search engines are available)

At this point it will also be important to consider copyright law and the importance of acknowledging your sources/content. Pupils should document the websites they have visited and the sources they have used

(see 3.3).

3.3 Key links and sources table

Name	Information	Link
IMDb	Probably the most well-known site, which provides lots of data on TV shows, films, actors along with ratings and other useful data.	https://www.imdb.com/
The Open Movie Database	Is an open source website that allows you to search for a film title, year or plot and it will bring you back lots of data from various websites such as rating, director, Oscar nominations even the studio who made it	http://www.omdbapi.com/
Statista	Huge database of statistics about the film industry	https://www.statista.com/topics/964/film/
Guardian	Mixture of articles provided discussion and statistics	https://www.theguardian.com/news/datablog+film/film
Creative Industries	Overview of the creative industries, such as films, providing facts and figures	http://www.thecreativeindustries.co.uk/industries/tv-film/tv-film-facts-and-figures#
British Film Industry	Statistics about the British Film Industry	https://www.bfi.org.uk/education-research/film-industry-statistics-research
British film Industry yearbook	Includes almost everything you would want to know, such as gross by genre, age rating or studio.	https://www.bfi.org.uk/education-research/film-industry-statistics-research/statistical-yearbook
Unesco	Provides excellent coverage of global and cultural information such as amount of international films produced by country	http://uis.unesco.org/en/topic/feature-films-and-cinema-data

UK Government	Statistics for creative industries	https://www.gov.uk/government/statistics/creative-industries-economic-estimates-january-2016
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Source	Data Collected	Date Collected	Used for
www.IMDb.com	Highest grossing films of all time	10/10/2018	To see if there are any trends in the best films

3.4 Reliability of data

It will also be important to help pupils understand that they will only be gathering a selection of data in some instances, which leaves the data subject to **bias & reliability**. The following can also lead to poor quality results:

Accuracy/validity	The data measures what it is intended to measure and does so with a known level of uncertainty where the measurements are numerical in nature - Do numbers tell the whole story?
Reliability	The data are measured and collected consistently (with the same instrument or question) over time – What if you start comparing different data sets?
Completeness	The data contains the maximum amount of information that could be available, e.g. if survey questionnaires were to be completed by a defined set of people, that all questionnaires have been returned and that all questions were fully answered - Does everyone who watches a film log on to IMDb and rate the film? No...
Precision	The data have sufficient detail and that it correctly reflects the accuracy of the measurement device or technique.
Timeliness	The data are up to date and the required information is available when needed - Can we rely on data that is only based on a short period of time? E.g. do film ratings change from week 1 of release to week 10?
Integrity	The data does not contain bias or has been manipulated in any way -

	Using a dataset provided this should not be an issue, but what if the pupils search for data on the World Wide Web?
Confidentiality/Privacy	The required standards will be maintained

4. Analysing

Several detailed examples, and instructions on how to analyse the dataset have been provided for you in the STATWARS® resource folder. This will help you in understanding how to support the children in their analysis – We strongly recommend that you access the “Analysis support for teachers’ folder”

We have also provided you with help videos to support you and your pupils in how to analyse some example data

- Basic skills for analysing data and creating graphs - <https://vimeo.com/420592313>
- Advanced skills for analysing data and creating pivot tables - <https://vimeo.com/420591989>
- Creating Word Clouds to Help you Analyse Data - <https://vimeo.com/420592563>

Once the data is safely collected, stored, checked and understood, it can then be analysed. This part of the project can be controlled by the teacher. There is no “best” tool for analysing data, it is depending on current skills and willingness to learn new skills and tools. Microsoft Excel is a common software tool used in schools for data collection and analysis, but may not be as effective as a data mining piece of software such as [Orange](#). The quality of data analysis will depend on the tools used in this process.

Excel is not designed to be a data analysis tool; however, it is very popular for manipulating data owing to its availability. Many institutions such as schools and governments use it in order to analyse data. Excel may not be the best choice for reproducible analysis, since it is difficult to follow what is happening and mistakes can easily propagate, but it is very simple to use to create plots and graphs. There is also a maximum of just over 1 million rows in a spreadsheet, so for “big data” it may be used, but with limited effect. Other suitable software is listed in the Tools to Aid delivery section on page 20.

4.1 Data Preparation

As pupils will be provided with a dataset as a starting point, the main focus here is to ensure any data extracted remains “tidy”.

A dataset is a collection of values, either numbers or strings (text) and these are arranged in rows and columns. Rows contain the observations and columns contain the variables (or fields). Every value belongs to an observation (row) and a variable (column). Each variable will contain all the measurements (like rating, duration, genre) for every member of the dataset. An observation contains all values measured on the same member (like a film title). When data is structured like this it is referred to as “Tidy data”. Tidy data is easy to analyse, so one of the main goals of data preparation is to prepare the data needed, whilst keeping it tidy.

Characteristics of “Messy data” are:

- Multiple variables in a single column
- No column headers
- A single observation is stored in multiple datasets
- Rows and columns are confused with variables stored in both

Here is an example of a **messy** film dataset:

	IMDb	Time	
Bob goes to summer camp	5	1 hour 40 mins	Adventure, Action, Comedy
Strongman Adventures 1,2,3	Seven, 6, 7	Not sure	Sci-Fi, action, adventure
Princess and the Wizard	4	65	Fantasy, science fiction, Romance

It is important that the data is:

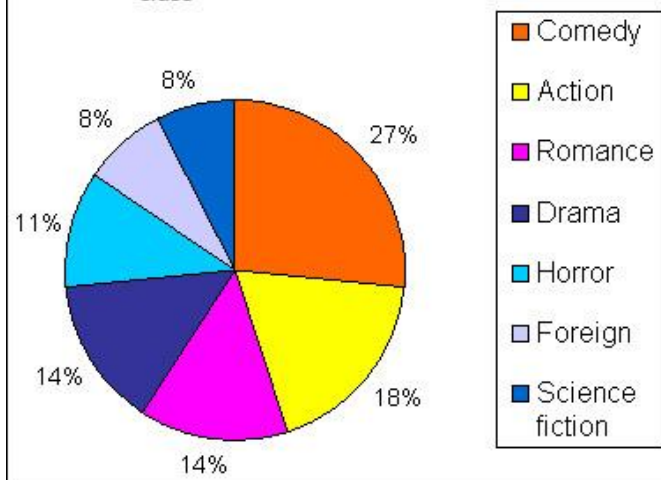
- ▶ **Tidy with only the data needed present**
- ▶ **Has no duplications**
- ▶ **Formatted correctly**

Here is **tidy** film dataset:

Film Title	IMDb Rating	Duration (mins)	Genre 1	Genre 2	Genre 3
Bob goes to summer camp	5	100	Adventure	Action	Comedy
Strongman Adventures 1	7	97	Sci-Fi	Action	Adventure
Strongman Adventures 2	6	102	Sci-Fi	Action	Adventure
Strongman Adventures 3	7	120	Sci-Fi	Action	Adventure
Princess and the Wizard	4	65	Fantasy	Sci-Fi	Romance

But they can be displayed in different ways:

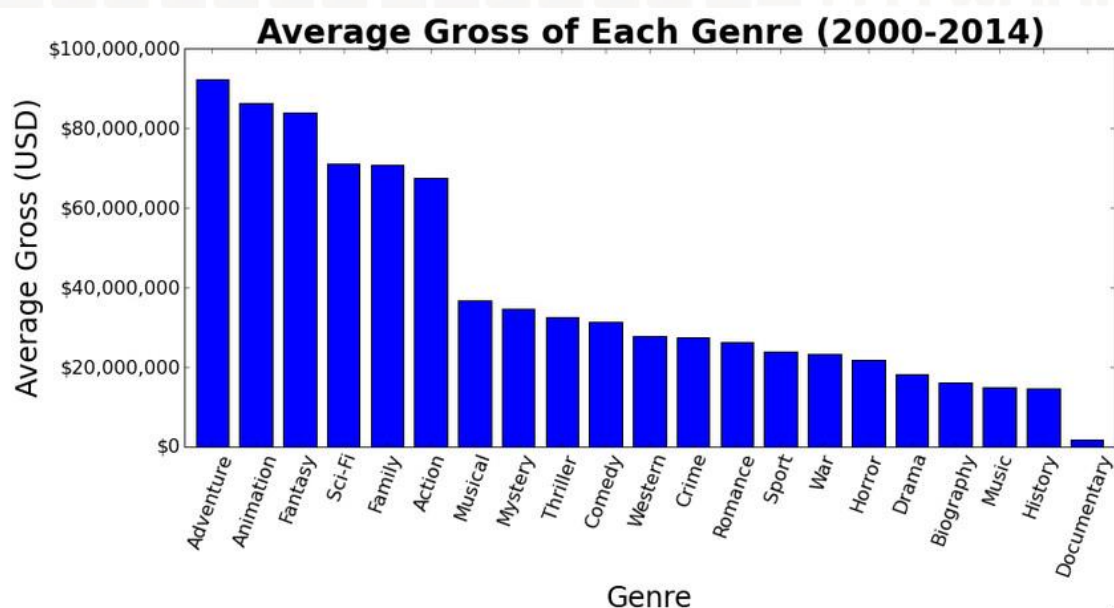
Figure 5. Favourite movie genres in Mrs. Smyth's Film class



Top Rated Film Categories



Challenge Task: At this point class teachers may provide pupils with some messy data and ask them to tidy it up. Pupils may already have organised their data, so this would be a good opportunity for them to go through it and tidy it up, if necessary.



4.2 Carrying out the analysis

Once the dataset has been prepared it is time to start the analysis. This can be as simple or as complex as required. The more experienced the pupil, the wider range of techniques that can be applied to the data.

In general, the analysis is split into two types: what has happened (descriptive analytics) and what will happen (predictive analytics). For example, what TV shows and films were successful and why? Can you spot trends and averages in the data? Netflix use this really well. They suggest films that a viewer may not have seen before but are similar to ones they've previously watched.

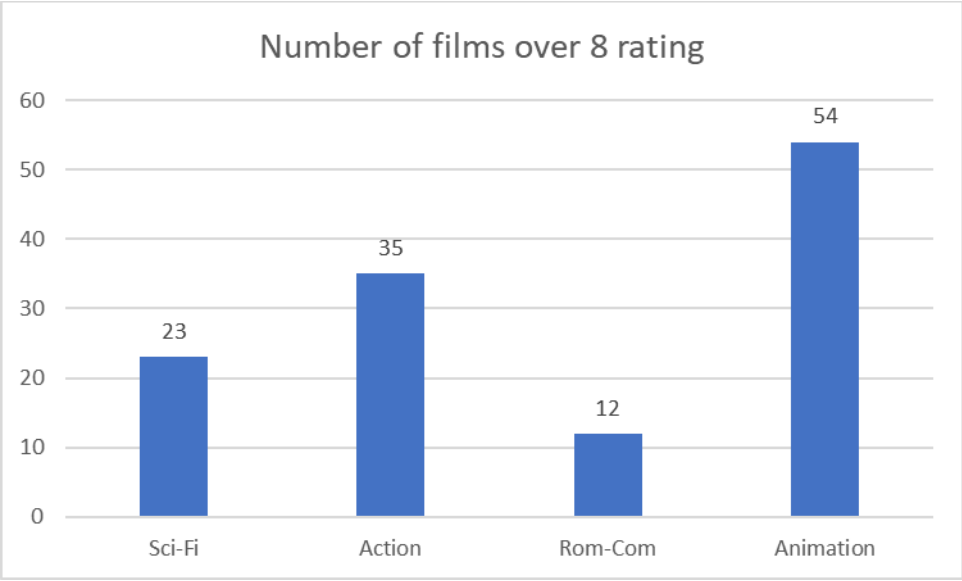
It is important to understand the objective of the analysis is to align to the original problem statement and ensure that the analysis carried out provides insights that help to answer that question - ***essentially, what would make the best film/TV show and why?***

4.2.1 Descriptive analysis

You can decide which of these is suitable or allow your pupils to decide.

The main techniques that are used are:

- **Counts and frequency distributions** – histograms or bar charts show the numbers of members of each category. *This approach could be used to display the number of TV shows or films from a certain category, like the example below:*



Pupils may also gather text from web searches on what they are investigating. Text data can also be summarised using a **word cloud**, where the most common words are larger.

These can be created using:

- ▶ <https://wordart.com/create>
- ▶ <http://www.wordle.net>. Wordle is best downloaded now, as it is not accessible through most web browsers.
- ▶ [ABCYa! Word Clouds](#)

(others are available)

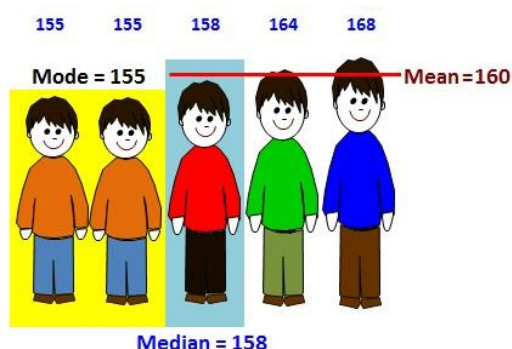
This was created using Wordart.com



Descriptive statistics

Calculate common statistics on variables in the dataset:

- mean/average/arithmetic mean - the sum of all values divided by the total number of values summed
- mode - the most commonly occurring value
- median - the middle value
- range - the difference between the largest and smallest value



They may consider which genre has the most shows rated 9 or above or the gap in ratings between certain types of films? What is the most popular genre with scores below or above a certain number?

For example: This table could allow pupils to collect the average score for Sci-Fi films and then focus on which were above average and look for what makes them more successful. The mean was 6.2 but the mode is 7, so should they focus on those films instead?

Genre	Rating
Robot Wars	3
Space Trek	6
Heroes Unite	8
Wizard Tales	7
Strongman Adventures	7
Average	6.2



► **Cross-tabulation** – this is when two variables are compared against each other, allowing initial insights

into patterns in the data.

The example below compares pet ownership and gender for a hundred respondents. A pattern can be seen that more men own dogs and more women own cats. However, the sample would need to be checked for bias and statistical significance before this insight could be firmly established.

	Dog	Cat	Total
Male	42	10	52
Female	9	39	48
Total	51	49	100

Pupils could look for successful films that contain certain actors, or genres that scored over 8 on IMDb and when they were released. They will be looking to see what the successful patterns in the data are, and whether they plot in a table or not, this is an important part of the data analysis that informs their decisions. Using this approach may allow pupils to gauge some thoughts from their classmates on combinations of actors, genres and plots etc.

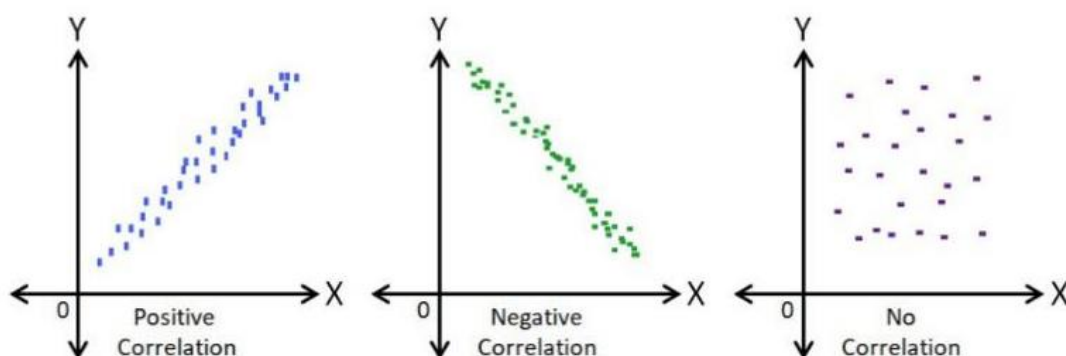
*This could even be in the form of a **class questionnaire** to see what options they prefer, so they are not just relying solely on the dataset, for example: Pupils can pick more than one option, which allows you to consider cross genre films as an option.*

	Action	Sci-Fi	Rom-Com	Total Votes
Girls	10	5	12	27
Boys	17	10	1	28
Total	27	15	13	55

In this instance, it appears that girls like an Action and/or a Rom-Com whereas boys like an Action and/or a Sci-Fi film. The next thing to do is see if this is true by testing some of your ideas. This leads nicely into predictive analysis (4.2.2).

- **Correlation scatterplot** – two variables can also be plotted together on a scatterplot to identify whether a correlation exists. A correlation is when there is a relationship between the two variables. Positive correlation is when one variable increases the other does too, negative correlation is when one variable increases the other decreases.

Scatter Plots & Correlation Examples



- This type of analysis would highlight a high level of understanding in the pupils. This could be used as an extension exercise, for example if they were analysing films: Do all films with Tom Cruise in do well? This could be a combination of critic ratings or simply user ratings on IMDB (or both plotted on the same graph). If this is cross referenced with the data of the film release, does this suggest he is still a positive influence on film ratings, has this changed over the years, how?

4.2.2 Predictive analytics

This focuses on **forecasting and hypothesising what will happen**, to allow decisions and changes to be made which would then affect future behaviour and actions.

- At this point it may be useful for pupils to create a quick survey to gather some data on their potential choices to see what pupils of a suitable age rating think. This offers some basic validation of the choices made, as it considers the real life view on their choices, rather than just relying on data and potentially unwanted bias.

So, based on our cross tabulation analysis above, some logical suggestions would be:

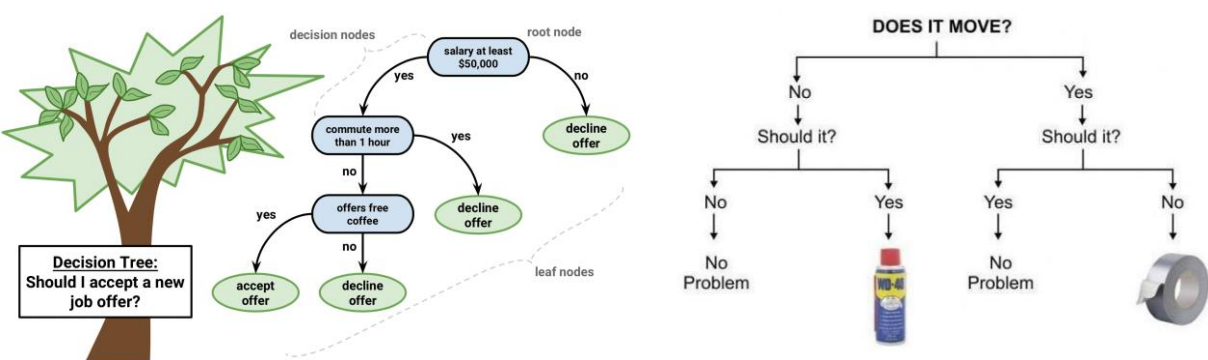
Ideas	Number of thumbs up in class
Idea 1 – an action rom com set in New York starring both a male and female lead	14
Idea 2 – an action genre, set in space, with a female lead, and a male cyborg as the bad guy	20
Idea 3 – an animation about garden gnomes, who can only come alive when no one is looking at them	7

This also helps us test the validity of the class survey we did earlier.

Using this approach – even with a simple “thumbs up” survey – can help determine whether initial ideas might work or not rather than spend lots of time on uninteresting ideas.

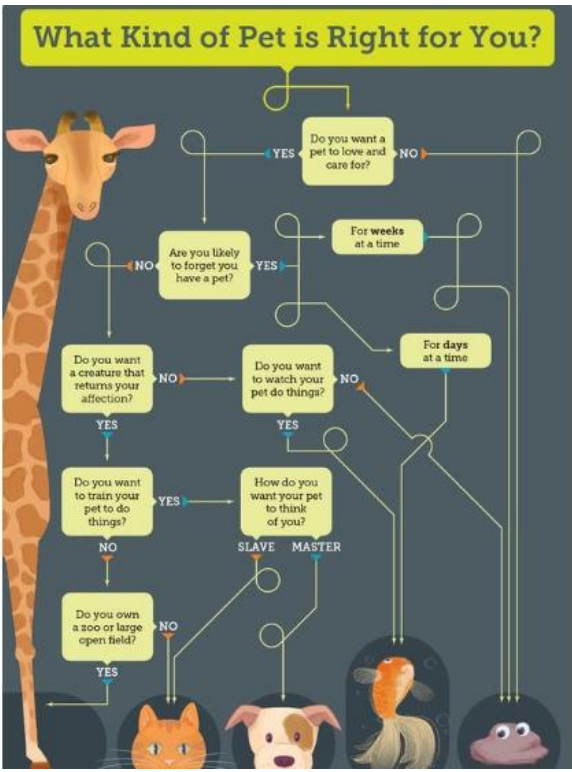
II. Decision trees are also very helpful if they can help you to answer the question. This can be used as a predictive check-list for a potentially successful TV show/film. For example, once they have gathered data on the most successful criteria they can create a decision tree that leads to combinations of those factors.

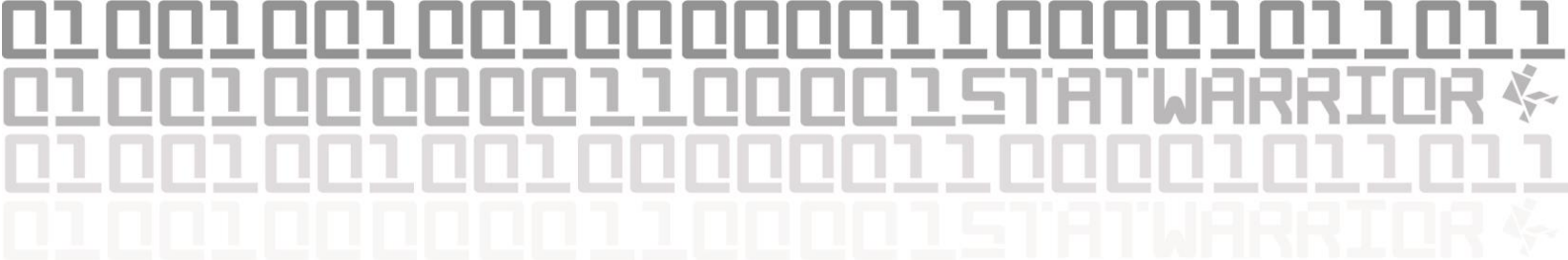
Decision trees can be used to help us make all kinds of decisions:



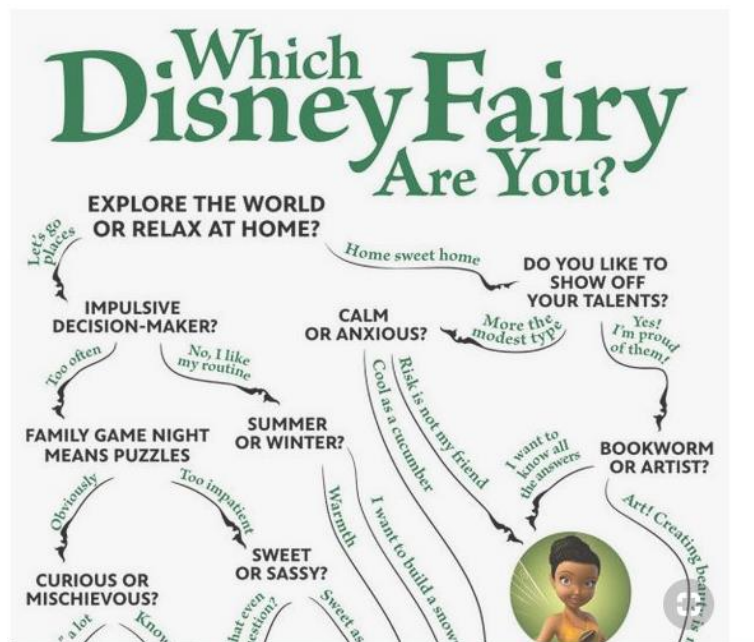
These might be more engaging for students to look at.

What kind of pet is right for you? - <https://itstillworks.com/what-kind-of-pet-is-right-for-you-13558224.html>





Which Disney Fairy are you? - <https://ohmy.disney.com/movies/2014/02/15/which-disney-fairy-are-you/?cmp=SMC%7Cblgmd%7COMDFebruary%7CPin%7CFairy-OMD%7CInHouse%7C021514%7C%7C%7Csocialmedia%7C%7C%7C>

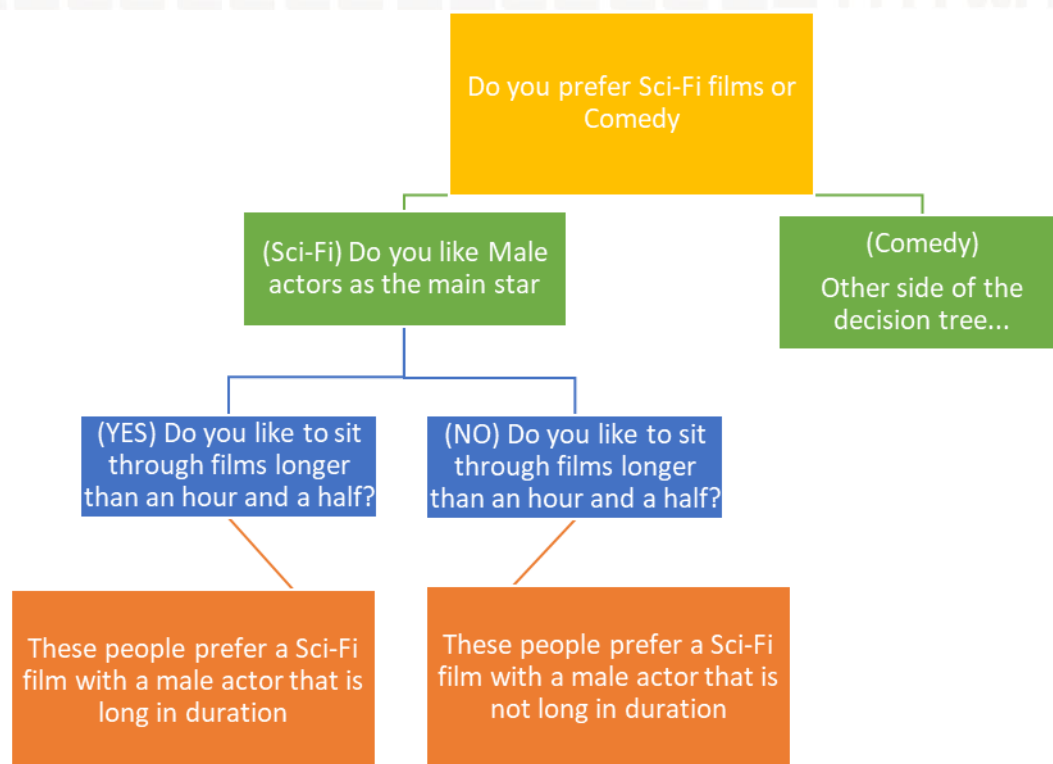


Once they understand the benefit of a decision tree they might use some of the following questions to come up with their own to test out their ideas:

For example:

1. Do you prefer (pick genre) films/shows?
2. Do you like male or female actors as the main star?
3. Do you like to sit through films longer than an hour and a half?
4. Do you like shows with more than 10 episodes?

Using these questions, an example could look something like the example below:



PUPILS SHOULD SAVE ANY WORK/GRAPHS THEY PRODUCE HERE TO DISPLAY ON THEIR POSTER

5. Conclusion and Delivery

Once pupils have gathered the data and considered its use, they need to make a decision on what TV show/film they want to run with. This section will help them justify that decision, **which should be based on sound data analysis**.

Pupils then need to report their findings firstly by producing two A2 posters that would be sent to the production companies, and secondly in an elevator pitch to Jeff Bezos or Reed Hastings.

Examples of what pupils could produce for their infographic, advertising poster and pitch are shown below:

From the STATWARS Team, what good looks like

- What Good Looks Like 1 - <https://vimeo.com/425092993>
- What Good Looks Like 2 - <https://vimeo.com/425098231>

Some Pupil Examples

- Brilliant Billboards Example Video - <https://vimeo.com/420592669>

- Comedy Action Kids Example Video - <https://vimeo.com/420592790>
- Cool Cast Example Video - <https://vimeo.com/420592731>
- Stat Squad Example Video - <https://vimeo.com/420593145>

5.1 - Poster 1: The film choice

5.1.1 Displaying the data

This section is all about showing off the data they have collected and analysed in order to produce their recommendation. This poster should summarise the approach, the findings and any decisions made during the project. It should present the **relevant data that supports the answering of the question**.

Groups can choose to use any software here that they find suitable (See [Tools to Support Delivery](#) section)

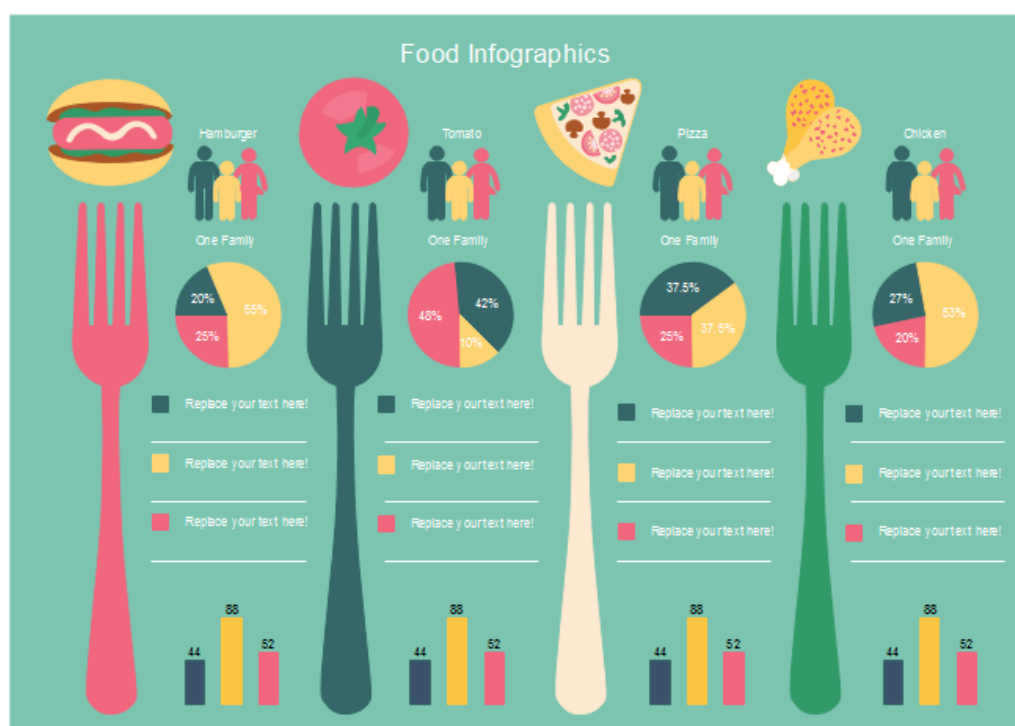
Some simple ideas would be:

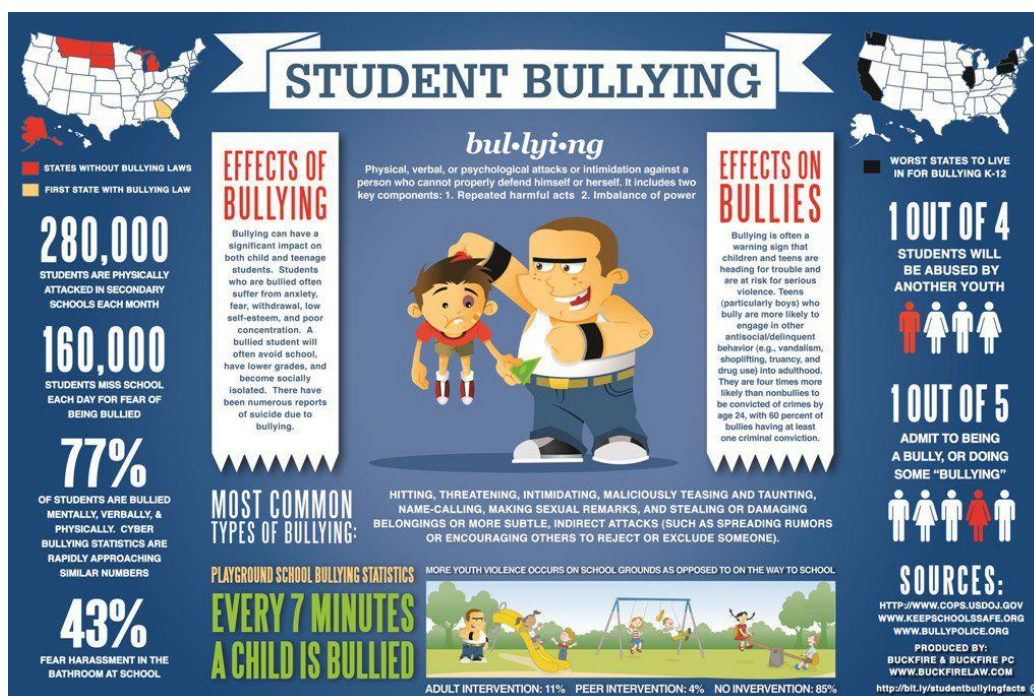
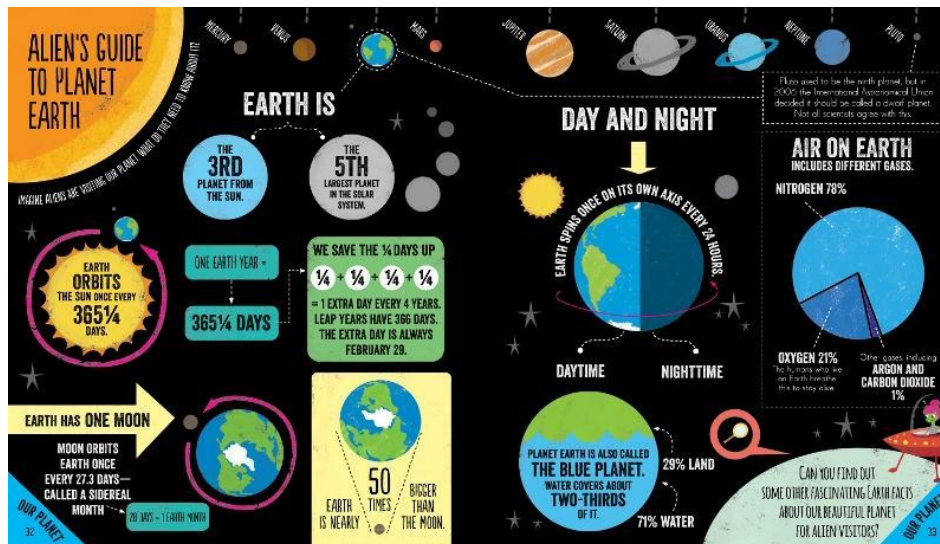
- ▶ Using the graphs created in analysis and put them onto MS Publisher or even Word with some supporting text explaining the data. You can do the same using Google Docs or Slides

Another way of displaying the data is using Infographics

Infographics are simply another way of visually representing the data, instead of just using a regular chart/graph.

Using infographics allows us to simplify complex information, for example:





a) MS PowerPoint even has templates that support infographics – please check your schools’ version.

For example:



b) You can use free online software to produce similar results, many have built in tutorials, but there are many help videos online:

Here are some useful links:

Infogram: www.infogram.com –tutorial link example <https://support.infogram.com/hc/en-us/articles/203063586-Video-tutorial-Get-started-with-Infogram->

Vengage: <https://venngage.com/>

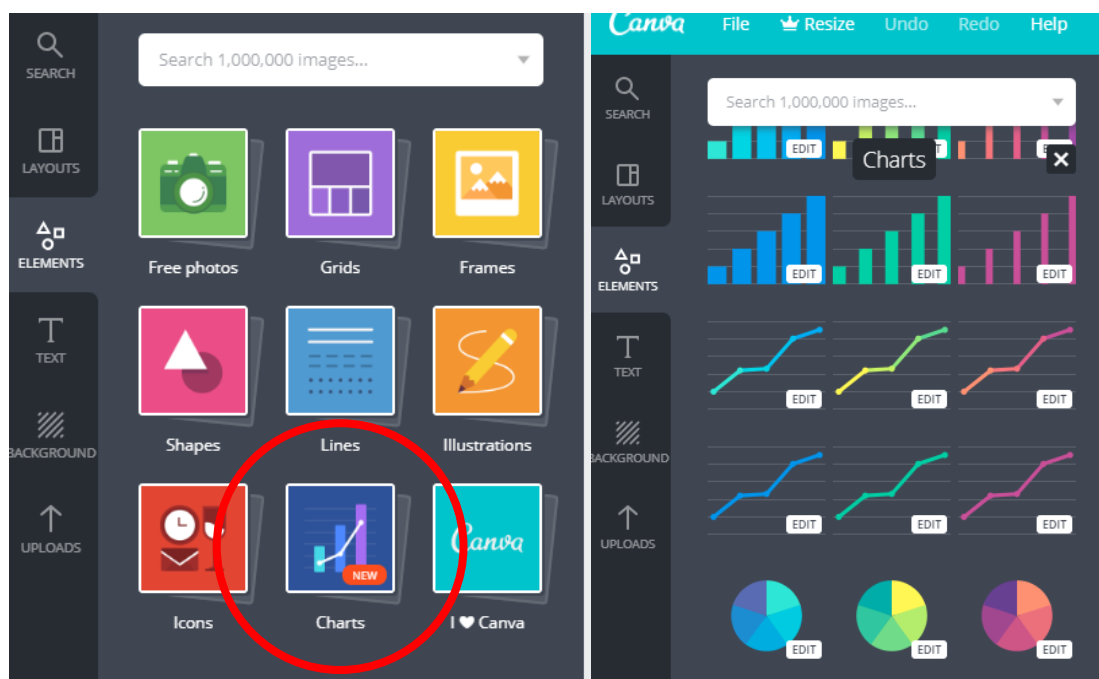
Visme <https://www.visme.co/make-infographics/>

Canva: <https://www.canva.com/>

- **Canva** - is simple to use, allows you to use interesting templates, as well as add in your own charts and graphs. It is free to download your finished poster

Click on <https://www.canva.com/design/DADJgz4TMBM/DMAUIMe->

[y3FPqZrjxO2fkQ/edit?category=tACFahzNhT4](https://www.canva.com/press/y3FPqZrjxO2fkQ/edit?category=tACFahzNhT4) - pick an infographic template (no need to start from scratch) then once you have started you can edit everything including the existing graphs by double clicking on them **OR** click on **elements**, then **charts** (pick one that says “edit” on it) and enter your data, it is that simple.

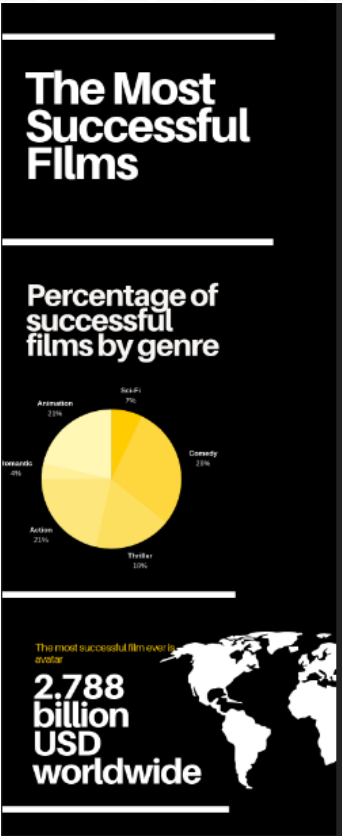


- You can add in other creative elements like images and text to make it more eye catching.



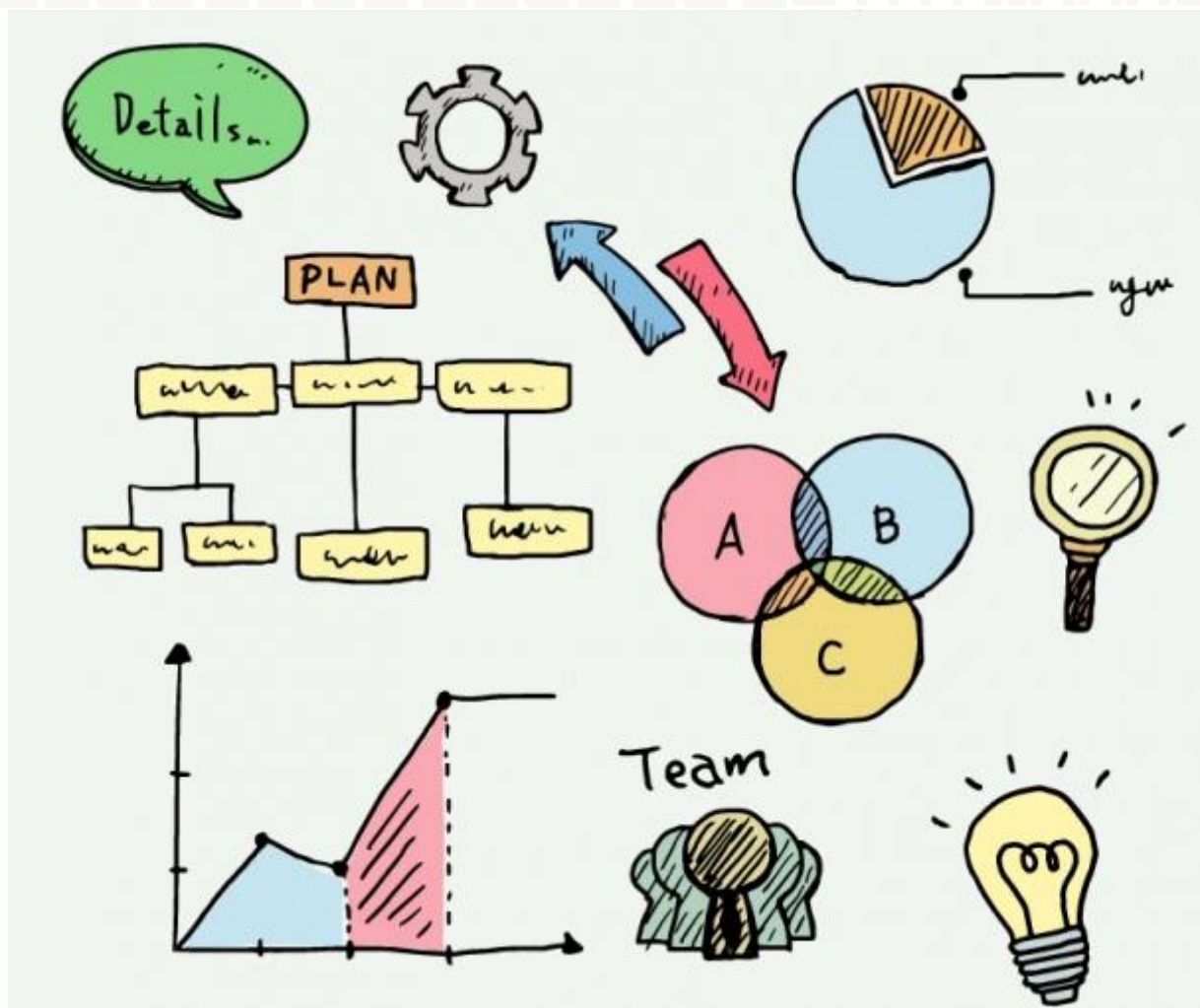
- There are Canva guides to support you - <https://www.canva.com/learn/tutorials/>

You will aim to produce something like the examples below:



c) Hand drawn display - You may choose to have pupils print off graphs produced on the computer or incorporate some hand drawn graphs and create a handmade data poster.

You can make this look like an infographic too if you wish (see example below):



When diagrams or graphs are presented, ensure that they are **clearly explained** and are not open to misinterpretation.

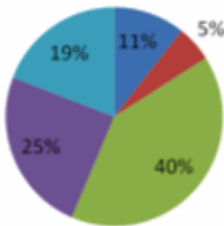
It is often said that “a picture paints a thousand words”. This is very true, especially with data, where visualisations are often the only way to communicate data. They show straight away whether data are grouped together, spread out, have high or low values or are clustered together in the centre. They can highlight outliers and explain findings.

There are many different types of graphs, each suitable for certain situations, but special mention must be made of pie charts. There is almost no situation where a pie chart is the best choice for displaying data. Pie charts are good at showing relative proportions, however so are bar charts, and the labels and colours for bar charts make them look cleaner.

Below is some data captured from students at the beginning (PRE) and end (POST) of a programme designed to improve the perception of science in schools. This data is displayed using pie and bar charts. The choice of colours and the use of bars in the bar chart versions allows the reader to much more clearly see the message in the data.

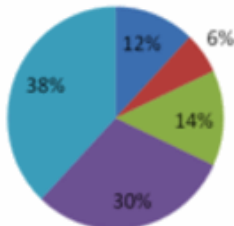
PRE: How do you feel about doing science?

Bored Not great OK Kind of interested Excited



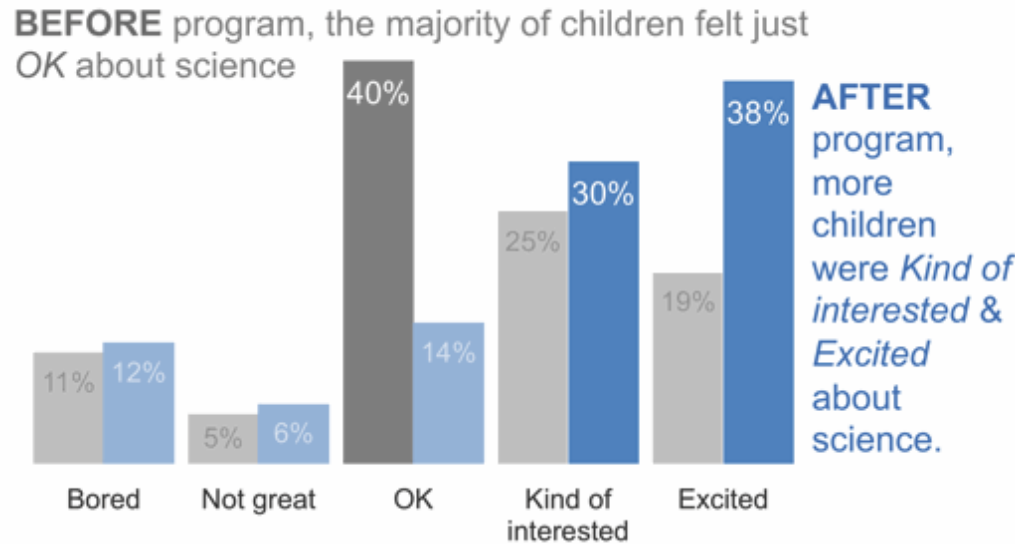
POST: How do you feel about doing science?

Bored Not great OK Kind of interested Excited

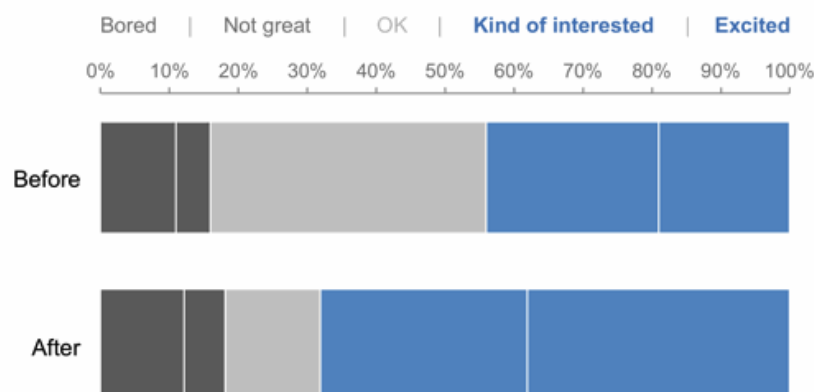


Here the pie charts show the relative proportions but are difficult to compare.

How do you feel about science?



How do you feel about science?



In both the simple bar chart and the horizontal stacked bar chart it is much easier to see the change in relative proportions. Like the pie chart, the stacked bar chart helps to see the numbers in relation to the whole. However, the bar chart also has annotation, so the message it is aiming to convey is clear to the reader. The use of bold and muted colours also helps to bring out the key message.

When visualising data it is very important to get into the mind of the viewer. Make sure the message that is portrayed is clear and unambiguous. Help the viewer to extract the message with colours and text.

Want to show something different?

Below is a link to a recent New York Times article with beautiful animated interactive visualisations, demonstrating income inequality in America across gender, class and race.

<https://www.nytimes.com/interactive/2018/03/27/upshot/make-your-own-mobility-animation.html>

Extension and Challenge:

If groups wish to enhance the presentation of their findings, they can produce a written report or presentation alongside their poster. This allows some additional challenge and differentiation.

5.1.2 Reviewing the poster

Before pupils present their findings, they should be review their work, making sure it explicitly **answers the following questions**:

- ▶ **How does the data answer the original problem statement?** *E.g. Does it present a convincing argument for a successful TV show or film with supporting data? Is the data presented in a way that makes it easy to understand/interpret?*
- ▶ **How does the data help defend against any objections?** *E.g. Does it help rationalise the solution, by suggesting why that choice is the most suitable?*
- ▶ **What are the conclusions and does it have any limitations?** *E.g. What led you to this point? Can we categorically say that this film would be successful? Are there potentially other solutions? Does your solution support what you originally thought?*

Further possible questions that might be considered are:

- ▶ **What could be done differently next time?**
- ▶ **What additional data would have been helpful?**
- ▶ **What should happen next?** *Could we use this data to propose a sequel, or 'spinout' to the TV show/film? How might the data you have influence the decisions on things like budget, actors, plot line for this? Does this data allow us to tap into other markets?*
- ▶ **Where else could this type of analysis of data be useful?**

5.2 - Poster 2: Marketing the Idea

5.2.1 What makes a good poster?


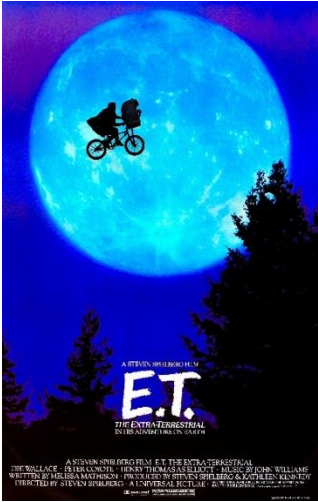
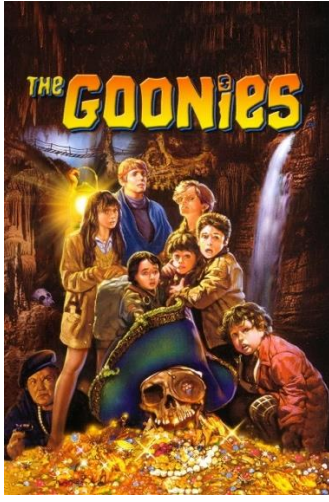

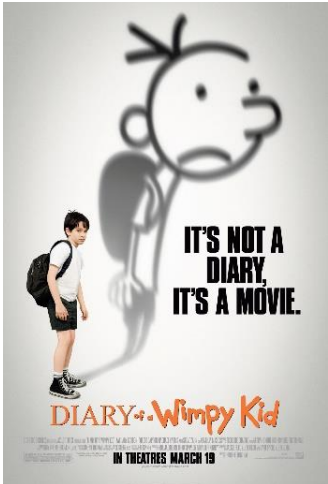
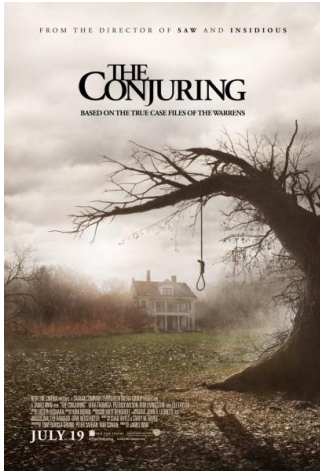


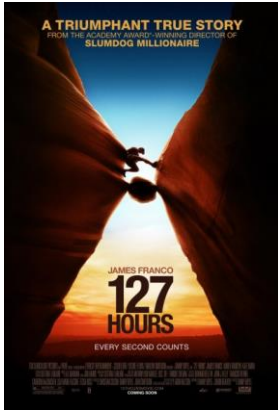
This will support the advertisement of the chosen TV show/film. What they include on the poster must support the choices they have made above.

A good film poster should:

- 1. Grab your attention, evoke an emotional response, e.g. fear, love, laughter, suspense**
- 2. Show you the film without telling you too much**
- 3. Create interest and incentive to go see the film**
- 4. Appeal to fans and non-fans alike**
- 5. Styling that would be consistent with the films content/audience**
- 6. Suit other formats - such as billboard, DVD, sides of public transport**
- 7. Be recognisable if you were to make a sequel**

Here are some examples of effective film posters in the modern era. Click on the link below to see how they have changed through the decades, what has changed? For example, hand drawn to computer generated. Many people still believe that the posters of films such as Metropolis (1927), Gone with the Wind (1968), Jaws (1975), Jurassic Park (1993) are more memorable than modern day efforts.
<https://www.shortlist.com/entertainment/films/the-40-coolest-movie-posters-ever/103777>

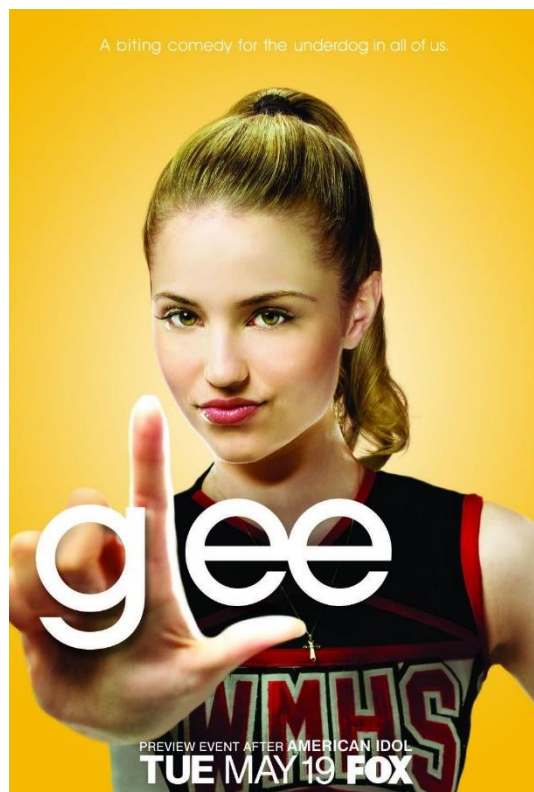
These are just example, you do not need to display them to the class. Pick your own if you wish.

<p>Harry Potter Deathly Hallows part 2 (2011)</p> 	<p>ET (1982)</p> 	<p>Goonies (1985)</p> 
<p>Incredibles (2004)</p> 	<p>Diary of a Wimpy Kid (2010)</p> 	<p>The conjuring (2013)</p> 
<p>The Dark Knight (2008)</p> 	<p>X-Men: Days of Future Past (2014)</p> 	<p>127 Hours (2010)</p> 

Pick some examples yourself if you want...

More examples here - <https://stg.empireonline.com/movies/features/best-posters> be aware that some of the films will be for children older than the age of the pupils in the class.

You might ask pupils to consider the differences or similarities in film and tv posters – such as information given.



5.2.2 Creating the poster:

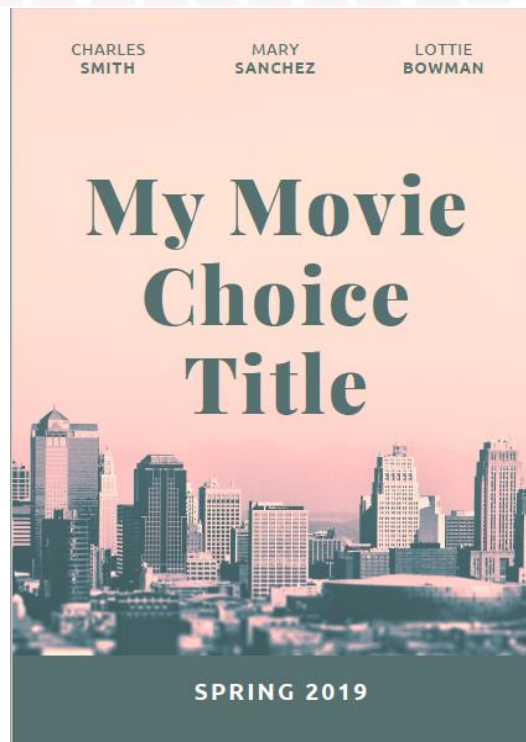
a) Digital Poster

Groups can again choose to use any software here that they find suitable, such as PowerPoint, Publisher, Fireworks, Photoshop, or an online poster builder such as:

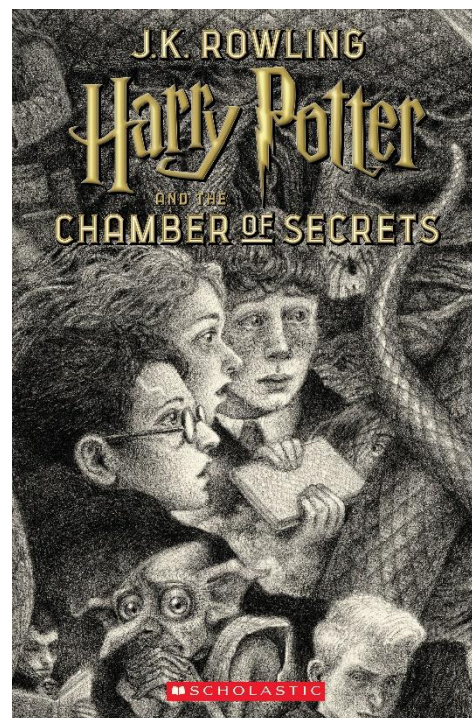
Canva - <https://www.canva.com/create/posters/>

Please refer to the Canva guides to support you - <https://www.canva.com/learn/tutorials/>

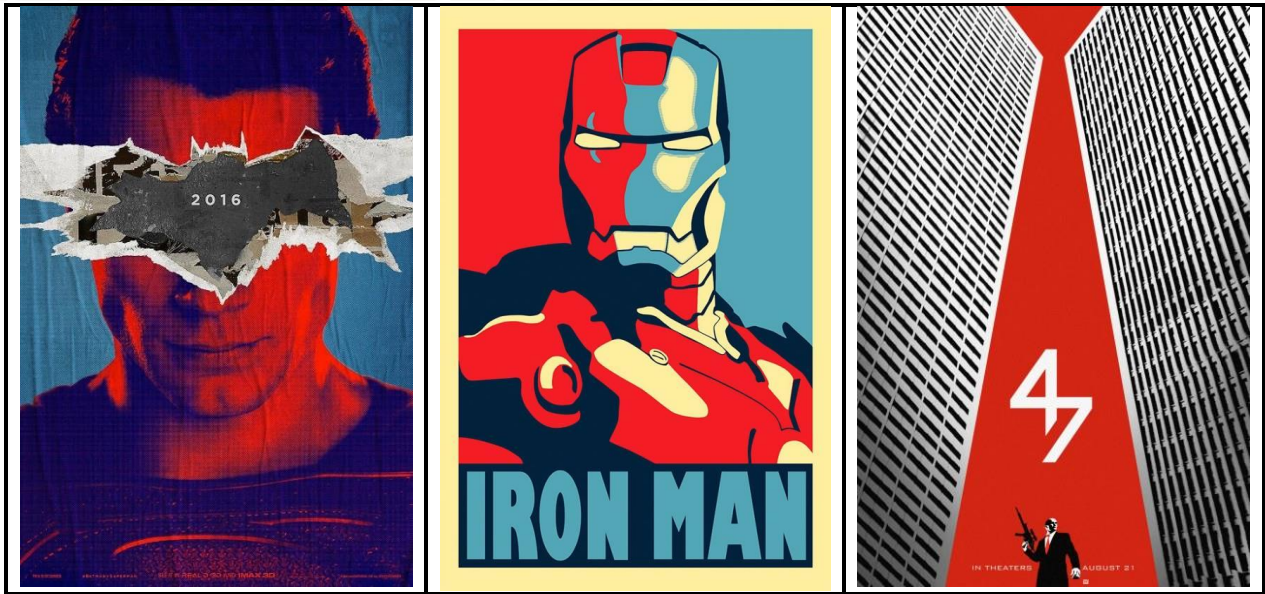
The example below was produced using Canva in less than 2 minutes, using one of the templates. So hopefully all pupils can produce something at least this simple with minimum fuss.



b) A hand drawn poster design, like the Goonies poster above, or:



c) **Pop culture style** <http://www.popculturemonster.com/movies/alternative-movie-posters>. Many modern films are taking this approach so it as an acceptable approach for this project.



- d) **Saul Bass style** <http://www.saulbassposterarchive.com/> popular in the 50' s & 60' s - again this could be hand drawn, done using coloured paper or on the compute



Play around with combination's and be creative

The Pitch

The final task is to allow pupils to develop a 60 second pitch or similar that will convince a film or TV company that their idea is a good one. They should aim to explain **WHY** they should make your movie/TV show, **using the 2 posters they have created**, which highlight the supporting data and concept design.

This can be produced as:

- A piece to camera (smart phone/tablet)
- A still of their two posters with narration (recorded using a phone/microphone)
- News style report using green screen
- An animation

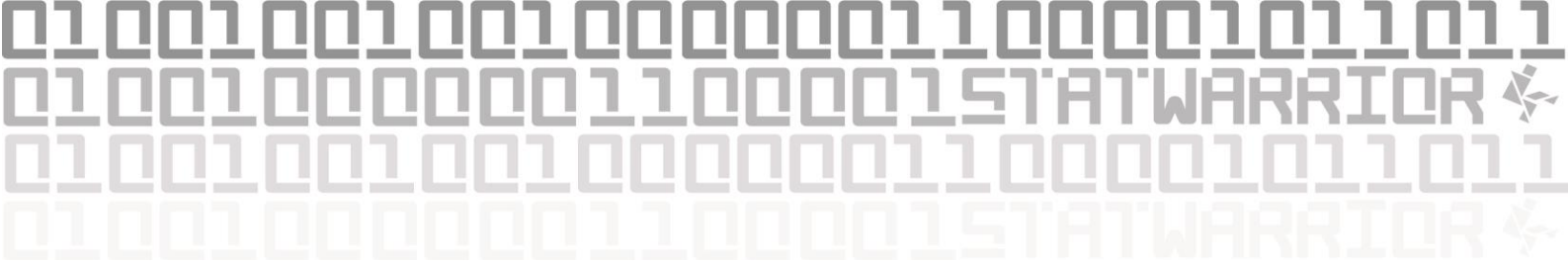
There is no correct way of doing this, as the aim is for pupils to deliver their message in whatever way they see fit in just 60 seconds!

There is plenty of help online on how to go about speaking to camera. Some simple tips for pupils are:

- Practice with a camera
- Pretend they are talking to a friend
- Write down their speech and learn it
- Enunciate properly (don't mumble)
- Speak slowly
- Use short, clear sentences
- Look at the camera and not the floor
- Use body language
- Use a suitable background – for example, your posters or a green screen to edit on the computer

There is much more to this than simply recording what they think. Ask pupils to take a look at the link below (or share parts of it with them, such as the example pitches) to help them pitch the best they can!





<https://www.scriptreaderpro.com/how-to-pitch-a-movie-idea/>

Some extension work for the groups could be:

- I. Consideration should be given to posters that 'fronted' poorly reviewed films that where initially box office hits – did the poster influence choice? This could be a good survey for the pupils to make – did the film poster persuade them to go to the film? What elements of that poster enticed you the most? How would you 'rate' the film out of 5 stars?
- II. Explore how infographics can be used to communicate complex information into easily understood visuals (see www.infogram.com for example).
- III. Come up with a checklist of what to avoid when making a poster.

Once you have finished make sure all work is saved, organised and ready to submit through your STATWARS dashboard

6. Tools to support delivery

There are many tools available for storing, manipulating, analysing and visualising data available. Many of them are free, whilst many of the paid tools are actually free for schools and educational institutions. A summary of the more common and popular tools is given below:

Tool	Summary	Links
Excel	Popular spreadsheet package from Microsoft	https://products.office.com/en-gb/academic/compare-office-365-education-plans
R	Statistical programming and visualisation language. RStudio is a free development environment for R	https://cran.r-project.org/mirrors.html https://www.rstudio.com/products/rstudio/download
Python	General purpose programming language. Anaconda-spyder is a free development environment for Python.	https://www.python.org/downloads https://www.anaconda.com/download
Orange	Free easy to use widget-based visual programming software package for data visualization, machine learning, data mining and data analysis, also included in Anaconda	https://orange.biolab.si https://www.anaconda.com/download
Matlab	Mathematical programming language, similar to but not quite as extensive as python	https://uk.mathworks.com/academia/student-version-b.html
KNIME	Free GUI-based analytics and reporting environment	https://www.knime.com
Alteryx	A data-mining workbench, good for quick data manipulation and transformation	https://community.alteryx.com/t5/custom/page/page-id/Alteryx-for-Good
SAS	Statistical analysis programming suite	https://www.sas.com/en_gb/software/university-edition.html
AWS	Broad range of cloud-based solutions to store, manipulate, analyse and visualise large datasets	https://aws.amazon.com
MySQL	Free downloadable open source database	https://dev.mysql.com/downloads/mysql
RapidMiner	Data science platform focused on machine learning	https://rapidminer.com
Trifacta	A platform for exploring and preparing data	https://www.trifacta.com/products/wrangler

Power BI	Interactive data visualisation platform from Microsoft. Included and integrated into Office 365 in the cloud	https://powerbi.microsoft.com
Tableau	Visualisation platform for dashboard and data investigation	https://www.tableau.com/academic
Qlik	Visualisation platform for dashboard and data investigation	https://www.qlik.com/us/company/academic-program
Plotly	Web-based graphical package to create and share graphs	https://plot.ly/education

Note – when selecting a tool it is important that consideration is given to the security requirements and that these are addressed as part of the tool selection and configuration process. Always read the terms and conditions of use.

7. The importance and relevance of this project

Digital Scotland



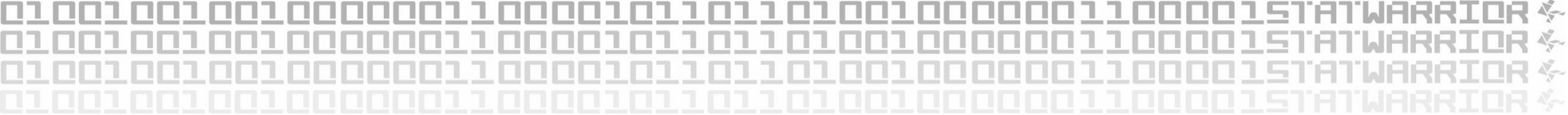
Scotland's Digital Technologies: Summary Reportⁱ

The “tech sector” contributed £3.9bn to the Scottish economy in 2015 and over 90,000 people were employed across all sectors, and it is forecast to be the fastest growing sector in Scotland to 2014, growing twice as fast as the economy as a whole. The 80,000 tech business in Scotland account for 5% of the total business base. Over 60,000 people are employed by tech businesses in many different roles. People who work in tech businesses are more likely to be employed full-time (89%) compared to Scotland's overall workforce (67%). Women are under-represented in the tech sector (around 19%), compared to other skilled roles (39%) and the workforce as a whole (48%). The average salary for tech jobs is around £37,500 over 30% higher than the Scottish average of £28,000, and growing up to 9% faster.

This is great news for young people. Scotland has up to 12,800 tech job opportunities each year, well above forecasts. As the number of young people studying and passing computer science increases, the number of young people with the transferable skills knowledge and understanding needed to gain employment in the tech sector also increases. Students who go on to enrol in computer science courses has remained steady, representing a continued focus on study at the higher levels employers are looking for. However, again this is dominated by males (75%). Regardless, 86% of these students enter further full time study compared to 69% across all other disciplines. 9% enter direct employment, which is lower than the 14% average, supporting the view that employers are looking for those with higher level qualifications (69% of the sector have a degree). As a result, there has been a 46% increase in tech modern apprenticeships to help employers develop their workforce.

Over half of all employers (51%) recruited tech skills in the year 2015/16 with 27% of companies hiring someone with data skills, which is one of the fastest growing in order of importance to businesses. However, there is a clear workforce skill issue with 82% of businesses reporting that technical skills or experience is a problem (32% stating it as a significant one).

Businesses are aware of the problems this may cause in the future and 79% anticipate the ability to recruit people with the right technical skill or experience as an issue. Therefore, a well-balanced technology based curriculum can help young people develop the skills to support this growing economy. This data project aims to do just that.



Key Links to The Technologies Impact Report (2014):ⁱⁱ

The project taps into the strong tradition Scotland has for excellence in innovation and technological research, recognising that “children and young people are developing important skills for learning, life and work”. Learning in the technologies provides a strong foundation for the development of skills and knowledge which are, and will continue to be, essential in maintaining Scotland’s economic prosperity.’ (Technologies Principles and Practice, 2009).

The Impact Report highlights that “technologies make a significant contribution to young people’s growing abilities as informed, active and responsible citizens, able to play a full, creative part in developing their careers and communities.” This project supports the development of key skills, knowledge, understanding and acceptance of data handling as a key part of everyday life. This project taps into the open ended, hands on, real world/life setting that the report noted secondary school pupils think positively about, whilst supporting the two central purposes of technology in the curriculum - creativity and problem-solving. These links are highlighted throughout the Scottish curriculum for Excellence Technologies: experiences and outcomes (see below). The report also highlights that “the natural inquisitiveness and exploratory spirit of children and young people fit well with the theme of technological developments in society” so using a current, open ended, non-gender specific topic supports this message.

There is also huge scope for this project to consider cultural and societal issues in film success, such as the gender of the director or fees for male actors compared to their female counterparts. This project will promote the highlighted areas of discussion, group work, interaction with multiple software, communication and can support the delivery of an E-safety curriculum.

Possibly the most important message that this project looks to address is that ICT has not yet had enough impact on young people’s learning across the curriculum. ICT can be seen as outdated, and stagnant since the original guidance for ICT was issued for Curriculum For Excellence, and so whilst the key learning areas can be achieved, this project can address the failures raised which were to: promote an ambitious, accurate, forward-looking and creative role for the digital technologies across the curriculum areas.

8. Good Career Guidance – [Gatsby Benchmarks](#)

Number	Benchmark	Description
1	A stable careers programme	Every school and college should have an embedded programme of career education and guidance that is known and understood by pupils, parents, teachers and employers.
2	Learning from career and labour market information	Every pupil, and their parents, should have access to good-quality information about future study options and labour market opportunities. They will need the support of an informed adviser to make best use of available information.
3	Addressing the needs of each pupil	Pupils have different career guidance needs at different stages. Opportunities for advice and support need to be tailored to the needs of each pupil. A school's careers programme should embed equality and diversity considerations throughout.
4	Linking curriculum learning to careers	All teachers should link curriculum learning with careers. For example, STEM subject teachers should highlight the relevance of STEM subjects for a wide range of future career paths.
5	Encounters with employers and employees	Every pupil should have multiple opportunities to learn from employers about work, employment and the skills that are valued in the workplace. This can be through a range of enrichment activities including visiting speakers, mentoring and enterprise schemes.
6	Experiences of workplaces	Every pupil should have first-hand experiences* of the workplace through work visits, work shadowing and/or work experience to help their exploration of career opportunities, and expand their networks.
7	Encounters with further and higher education	All pupils should understand the full range of learning opportunities that are available to them. This includes both academic and vocational routes and learning in schools, colleges, universities and in the workplace.
8	Personal guidance	Every pupil should have opportunities for guidance interviews with a careers adviser, who could be internal (a member of school staff) or external, provided they are trained to an appropriate level. These should be available whenever significant study or career choices are being made. They should be expected for all pupils but should be timed to meet their individual needs.

STATWARS® promotes engagement of all pupils in a project that has curriculum links to many subject areas, including those under the STEM or STEAM umbrella. The project highlights the relevance of STEM subjects for a wide range of future career paths which are explored throughout STATWARS® such as Data Scientists! The engagement with existing Data Scientists allows pupils multiple opportunities to learn from employers about work, employment and the skills that are valued in the workplace, such as collecting, analysing and presenting data, and this in turn supports them in completing the project. As part of the [Institution of Primary and Secondary Engineers](#), the STATWARS® competition potentially allows pupils to expand their networks and further develop their understanding of the workplace, in a relevant, but enjoyable and engaging manner.



9. Curriculum Links

Please access the STATWARS® Scotland Curriculum for Excellence Mapping document for detailed information on how the project maps to Numeracy & Mathematics and Technologies areas

Individual lessons plans for each topic also highlight the relevant curriculum links

10. Medium Term Plan



The recommended teaching time to STATWARS® is 1 term, based on a minimum of 1 hour a week

Task no:	Topic	Lesson content (this is the minimum content to be covered to support the success of the project) See relevant project overview section for more details.	Challenge (to extend the learning process beyond the minimum content and create a more in depth solution)	Recommended Teaching time	Outcome and assessment
1	Defining the problem - This topic is aimed at providing context to the project and helping pupils understand what needs to be done to provide a solution to the problem. They will be able to do some initial data gathering and planning here.	<p>STAT Wars® are holding a competition to find the next TV show or film based on statistical analysis of available data.</p> <p>1.1 The problem: At the end of the project they would like the data to be presented in an easy to understand format to support the pupils' decision, with an accompanying poster illustration for the potential TV show or film.</p> <p>Pupils should be asked to think/write/discuss their ideas on what makes a successful TV show/film individually then as a group to feed back to the class. For example, why is Game of Thrones so successful? Why is Avatar the highest grossing film of all time? Some possible questions are below:</p> <p>a) What do we currently know about the best TV shows/films? This will require pupils to consider the plot, genre, actors, release dates, age ratings etc. of the most</p>	<p>Further important questions for them to consider here are:</p> <p>Will there be enough data to provide a robust answer?</p> <p>Will there be too much data to store easily?</p> <p>Are there any social, moral or security implications of collecting or using this data?</p> <p>Is any personal data being collected or processed? If so the privacy issues need to be addressed at an early stage of planning</p>	1-2 hours	<p>Lesson objective: Be able to develop ideas on what makes a successful TV show or film and understand what data we could collect to investigate those ideas</p> <p>Pupils should have documented information on successful TV shows and films and begun to make preliminary decisions about what categories they need to gather data for. They should be able to discuss what a potential solution might need to consider.</p>

		<p>successful films</p> <p>b) How will you find out what the most successful films/shows are? What will you be looking for? Pupils will need to investigate suitable places for data gathering such as IMDb and the internet. How might we find suitable data? Can we always trust what we read? Students should begin to write down the main headings for the data they wish to gather, such as top grossing actors, most successful film genres etc.</p> <p>c) What might your choice look like? This will require some discussion and initial data gathering from the class, this gauges opinion and is useful for comparison with the final decisions made. What is successful – is it rating, money, awards, originality? What do the most successful films have in common? Does that mean they will always be successful? Does the age of the actor matter for example?</p> <p>Technology plays a huge part here, helping companies collect and analyse data to develop their products. The following video may be used to help contextualise the discussion, and help them think if it is just data or gut feeling as well that makes a good idea become a successful product...</p> <p>https://www.ted.com/talks/sebastian_wernicke_how_to_use_data_to_make_a_hit_tv_show</p> <p>At this point pupils can consider some of the extension questions and begin to search the internet for some initial data on “successful TV shows/films” which can lead to another discussion.</p> <p>In order to help you complete the project, pupils will be able to interview data professionals and other industry professionals online, who will share their thoughts and ideas. Please access</p>			
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		the Eventbrite links at https://www.eventbrite.co.uk/o/statwars-competition-30258493092 and book yourself on as many of those as you like			
2	Planning - This topic allows pupils to work in project teams to determine the best approach to their solution. They will understand what data is and the varying forms it can take.	<p>2.1 Data Types: Help pupils understand the difference between data and information (data with meaning) and that data can be quantitative (numerical; measurements, values) or qualitative (not numerical; text, images, opinion). Pupils will have to consider what type of data they can collect.</p> <p>2.2 Project teams: In order to solve the problem pupils can be allocated into project teams. This is an important process as it can help them create a meaningful and robust solution to the problem. The age rating of the film solution will be determined here, by the youngest person in the group.</p> <p>Consideration should be made for:</p> <p>What is being done - this can be things like collecting the data, storing the data, the design of the solution, data quality checks, implementing the solution.</p> <p>By whom - Each job can be completed individually or shared.</p> <p>When by - This will be determined by the time-frame for the delivery of the project</p> <p>Pupils can allocate these tasks themselves or this can be decided for them.</p> <p>2.3 Deciding on a potential solution: Encourage pupils to consider different outcomes not just the highest grossing films:</p> <p>For example (see overview for more): How can I design a high</p>	<p>The level of sophistication for the planning and job allocation will allow for independent challenge and differentiation. For example:</p> <p>The Translator - Communicates the project purpose, Designs the experiment, Interprets the findings, Develops and manages the plan.</p> <p>The Engineer- Collects the data, Stores the data safely & securely, Checks the data quality, Implements the solution</p> <p>The Analyst - Organises the data for analysis, Carries out the analysis, Tests the outputs, Summarises the findings</p>	1-2 hours	<p>Lesson Objective: Understand that data can take many forms and how that data can help you create a suitable, data driven solution</p> <p>Pupils will produce a design of their table that will be used to collect data, it will include suitable headings that can be populated. This can be hand drawn or computer based.</p> <p>Pupils will create a checklist for jobs that they need to carry out during the project and accept responsibility for their completion</p>

		<p>grossing blockbuster with a big budget, which also has a high rating? How can I design a highly rated but low budget film?</p> <p>2.4 Protecting the data: Where and how the data be stored, and what are the risks - Pupils should be asked to consider how to keep data safe and secure, for example: Data or a film poster design being stolen or lost; and the importance of data security, such as the use of passwords and how to back up work, their ideas being stolen. (See overview section 2.4)</p> <p>At this point pupils can decide how they want to set out their work. This will inform their data collection decisions. Examples can be provided here to support pupils. For example, headings on a spreadsheet which they can find data for: Genre, Rating, Total Gross, Budget, IMDb score etc. You may want to introduce them to the dataset at this point.</p> <p>A decision on the most suitable software to use for the data analysis should be considered, if not decided here. This can always evolve and change depending on the rigour of the project data analysis. You may leave this open ended for the groups to decide or utilise your own skill sets on a particular piece of standard software such as Excel (See overview and Tools to support delivery section for more information)</p> <p>It might be helpful to get pupils to sign a project contract, accepting responsibility for their roles in the project – provided in topic 2 folder. You may also want them to start considering a sources table here rather than in topic 3 (see below).</p>			
3	Collecting - This topic helps pupils understand the importance of	<p>3.1 Collecting useful data from the dataset: Recap data that might be important in the project, and using the dataset explain the importance of metadata. Pupils will use the dataset provided, and unless they wish to do so, no data searching is</p>	The natural challenge for this part of the project is how reliant they are on the sources provided or whether they independently seek	1-3 hours	Lesson Objective: Be able to understand where data comes from and the importance of scrutinising & organising data that

	<p>collecting, and scrutinising data. They will be able to use given sources and the WWW to find relevant data for the project and organise it accordingly.</p>	<p>required, but should be encouraged. This project encourages pupils to gather metadata about successful (and possibly unsuccessful) TV shows/films such as main actors involved, money grossed, critic ratings, release dates, genre.</p> <p>NB. Although the dataset provided is age appropriate, you may wish to filter the dataset further before you present it to pupils. (if they have not started already).</p> <p>3.2 Searching for data on the World Wide Web: Before you ask students to search the World Wide Web make sure they appreciate how it works - https://www.youtube.com/watch?v=BNHR6IQJGZs</p> <p>Open up a discussion about the best possible search terms and document them.</p> <p>3.3 Key links and sources table: They may search for the more data not in the dataset, and the more they use, the greater depth their analysis will have. This is a natural way to differentiate the data collection, for example:</p> <ul style="list-style-type: none">▶ Based on video game, book, toy, play▶ Original or sequel▶ Plot keywords <p>Please refer to the project overview (section 3.3) for relevant external links to use if you do not want the pupils to search the WWW freely.</p> <p>Once pupils begin to collect information you may want to get them to set up a sources table (Source, Data Collected, Date Collected, Used for) to keep their data collection tidy. A sources table is provided in the lesson resources.</p> <table><tr><td>Source</td><td>Data Collected</td><td>Date Collected</td><td>Used for</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Source	Data Collected	Date Collected	Used for					<p>out further data.</p> <p>The depth of data collected will also be very open ended here so this session can be run over one or multiple lessons.</p> <p>Pupils can write a short report on the importance of considering data bias & reliability</p>	<p>we collect</p> <p>Pupils can search for and store data effectively.</p> <p>They will be able to search the WWW independently for suitable sources and store them effectively in a sources table.</p> <p>They will be aware of the importance of considering data bias & reliability</p>
Source	Data Collected	Date Collected	Used for									

		<table><tr><td>www.IMDb.com</td><td>100 Highest grossing films of all time</td><td>10/10/2018</td><td>To see if there are any trends in the best films</td></tr></table> <p>They can use this alongside any initial data collection, for example out of the 100 top grossing films of all time according to IMDb, 20 were Sci-Fi, 50 Thrillers, 10 comedies etc...</p> <p>3.4 Reliability of data: It will also be important to help pupils understand that they will only be gathering a selection of data in some instances, which leaves the data subject to bias & reliability. The following can also lead to poor quality results. They must be aware of:</p> <ul style="list-style-type: none">▶ Accuracy/validity▶ Reliability▶ Completeness▶ Precision▶ Timeliness▶ Integrity▶ Confidentiality/Privacy	www.IMDb.com	100 Highest grossing films of all time	10/10/2018	To see if there are any trends in the best films			
www.IMDb.com	100 Highest grossing films of all time	10/10/2018	To see if there are any trends in the best films						
4	Analysing - This topic asks pupils to consider the data they have gathered and make informed	<p>This can be as simple or as complex as required depending on what you want to achieve. Choose the software that you feel is appropriate for your class. See “Tools to support delivery section”</p> <p>4.1 Data preparation: Using the resources provided, you should explain to them why “tidy” data is important for when</p>	<p>Challenge: Provide pupils with a messy version of the dataset and ask them to tidy, and/or give them time to evaluate their collected data and tidy it, if necessary</p>	1-3 hours	<p>Lesson Objective: Understand that we can analyse data in different ways and how this can help us make informed decisions</p> <p>Pupils will be able to use at least one form of data analysis to</p>				

	<p>decisions as a result of this. They will be able to use more than one form of analysis.</p>	<p>they are organising and presenting their own analysis. You may choose to show them the messy data set in the overview compared to the tidy dataset and ask them to spot the differences.</p> <p>4.2 Analysis: Analysis can be split into two types: what has happened (descriptive analytics) and what will happen (predictive analytics). At this point pupils are expected to be able to say what they think would be successful and why, based on the data they have gathered.</p> <p>4.2.1 Descriptive analysis:</p> <p>Pupils will analyse the data in multiple ways here for example (see overview section 4.2.1 for more):</p> <ul style="list-style-type: none"> ▶ Counts and frequency distributions – histograms or bar charts to display the number of films from a certain category. As well as charts, frequency word clouds could be created using sites like Word Art - https://wordart.com/create ▶ Descriptive statistics - Such as the mean score for a genre of a show/film or the (mode) genre for over 9/10, trends over time ▶ Cross-tabulation/contingency table - You are looking for patterns here. So for example <i>Pupils can look for successful shows that contain certain actors, or genres that scored over 8 on IMDb and when they were released. Are there any inconsistencies in the patterns? This could even be in the form of a class questionnaire to see what options they prefer</i> 	<p>The level of sophistication will add natural challenge here. Students can choose to produce simple bar charts and graphs, but some may look to do further analysis using scatterplots (see project overview 4.2.1) and create a survey to support their analysis.</p>		<p>support their decision.</p>
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		<p>4.2.2 Predictive analysis:</p> <p>This focuses on forecasting and hypothesising what will happen. What you want pupils to be able to do here is discuss what they think worked and why, and then utilise this information to inform their own decision, taking into account their own experiences and gut feelings.</p> <p>See link below for some guidance.</p> <p>https://www.wikihow.com/Come-Up-with-a-Movie-Idea</p> <p>This could take the form of a hypothesis or forecast.</p> <ul style="list-style-type: none"> ▶ They could create a basic survey to gauge “audience” feedback on their potential choices, or a decision tree that helps them determine if it would be successful or not, based on the data they have (see overview section 4.2.2). It is important here that you emphasise the decisions taken here should be logical and based on sound data analysis. ▶ The use of a decision tree will help pupils filter their ideas and gauge class preferences ▶ Be sure to save any graphs or diagrams produced here, ready to present on their poster. 			
5	Conclusion and Delivery 1: Here Comes The Pitch. This topic allows pupils to develop their analysis into a visual	<p>PLEASE NOTE: Conclusion and Delivery topics 1 & 2 are interchangeable or can run alongside each other through allocated group tasks.</p> <p>Once pupils have gathered the data and considered its use, they should have made a decision on what TV show/film they want to run with.</p>	If groups wish to enhance the presentation of their findings, they can produce a written report or presentation alongside their poster. This allows some additional challenge and differentiation.	1-2 hours	<p>Lesson Objective: To be able to present data in a way that is suitable for your target audience and appropriate for your chosen solution</p> <p>Pupils will produce a visual</p>

	<p>representation of the data and communicate it effectively using suitable software.</p>	<p>They will create 2 posters (A2 size maximum). Show them the provided examples of what good looks like if you wish.</p> <p>Poster 1: The film choice</p> <p>5.1.1 Displaying the data</p> <p>Their first poster should summarise the approach, the findings and any decisions made during the course of the project. It should present the relevant data that supports the answering of the question. They will have to pitch their idea using this poster to Jeff Bezos or Reed Hastings.</p> <p>Software choice here is up to you. Some ideas are provided to you in the overview:</p> <ul style="list-style-type: none"> ▶ Using PowerPoint, Publisher, Google Docs/Slides to display the data (graphs/images) with some supporting text. ▶ Creating infographics via <ul style="list-style-type: none"> a) PowerPoint infographics template (if available) b) Canva: https://www.canva.com/ Infogram: www.infogram.com - www.infogram.com - Visme https://www.visme.co/make-infographics/ Vengage: https://venngage.com/ c) Hand Drawn Display <p>When diagrams or graphs are presented, ensure that they are clearly explained and are not open to misinterpretation. Special consideration should be taken for the types of charts</p>	<p>Further possible questions that might be considered are:</p> <p>What could be done differently next time?</p> <p>What additional data would have been helpful?</p> <p>What should happen next? <i>Could we use this data to propose a sequel, or 'spinout' to the TV show/film? How might the data you have influence the decisions on things like budget, actors, plot line for this? Does this data allow us to tap into other markets?</i></p> <p>Where else could this type of analysis of data be useful?</p> <p>Pupils can consider a more eco-friendly way of advertising, i.e. alternatives to printed posters that would be more sustainable.</p>		<p>representation of the data they have analysed to communicate their decision and answer the question posed at the beginning of the project.</p> <p>They will select/use suitable software.</p> <p>They will be able to discuss their findings coherently and succinctly in an elevator pitch scenario.</p>
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		<p>used as outlined in the project overview.</p> <p>5.1.2 Reviewing the poster</p> <p>Before pupils present their findings, they should make sure it explicitly answers the following questions:</p> <p>How does the data answer the original problem statement? <i>E.g. Does it present a convincing argument for a successful TV show or film with supporting data? Is the data presented in a way that makes it easy to understand/interpret?</i></p> <p>How does the data help defend against any objections? <i>E.g. Does it help rationalise the solution, by suggesting why that choice is the most suitable?</i></p> <p>What are the conclusions and does it have any limitations? <i>E.g. What led you to this point? Can we categorically say that this film would be successful? Are there potentially other solutions? Does your solution support what you originally thought?</i></p> <p>Once they have completed both topic 5/6 tasks, they can then pitch their idea</p>			
5	<p>Conclusion and Delivery 2: Marketing The Idea - This topic allows pupils to consider the creative aspects their finished product and how</p>	<p>PLEASE NOTE: Conclusion and Delivery topics 1 & 2 are interchangeable or can run alongside each other through allocated group tasks.</p> <p>► Poster 2: Marketing the Idea</p> <p>Once pupils have created their idea for a successful film they need to consider how they would sell it. A key step is to advertise it effectively and appreciate the impact advertising has on the success of a film or TV show. You</p>	<p>Consideration should be given to posters that ‘fronted’ poorly reviewed films that were initially box office hits – did the poster influence choice? This could be a good survey for the pupils to make – did the film poster persuade them to go to the film? What elements of that poster enticed</p>	1-2 hours	<p>Lesson Objective: Consider the importance of including relevant data when advertising products, in order to communicate your message effectively</p> <p>Pupils will create a suitable and effective poster that highlights key</p>

	<p>they could market it. It allows them to consider the real world applications of creating a product and then trying to make it successful.</p>	<p>may wish to get pupils to consider the cost of advertising and how that may affect things like profits.</p> <p>5.2.1 What makes a good poster?</p> <p>Show the pupils examples of good posters and what they think makes an effective poster? (See overview section 5 for more information and examples)</p> <p>https://www.shortlist.com/entertainment/films/the-40-coolest-movie-posters-ever/103777</p> <ul style="list-style-type: none"> ▶ Get pupils to write a checklist for what they want to include on their poster, consider the hints and tips below on what a good film poster should do and discuss with the class: ▶ Grab your attention, evoke an emotional response, e.g. fear, love, laughter, suspense ▶ Show you the film without telling you too much ▶ Create interest and incentive to go see the film ▶ Appeal to fans and non-fans alike ▶ Styling that would be consistent with the films content/audience ▶ Suit other formats - such as billboard, DVD, sides of public transport ▶ Be recognisable if you were to make a sequel ▶ Display relevant data <p>5.2.2 Creating the poster:</p> <p>a) Digital poster</p> <p>Ask pupils to create the poster. Groups can present their poster in numerous ways:</p>	<p>you the most? How would you ‘rate’ the film out of 5 stars?</p> <p>Come up with a second or series of alternative posters - such as a pop culture or Saul Bass style poster, or featuring different information</p> <p>Come up with a checklist of what to avoid when making a poster.</p> <p>(See project overview section 5 for more information)</p> <p>Pupils can consider a more eco-friendly way of advertising, i.e. alternatives to printed posters that would be more sustainable.</p>	<p>aspects of their TV show/film.</p> <p>They will select/use suitable software.</p> <p>They will be able to discuss and justify the decisions they have made.</p>
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		<ul style="list-style-type: none">a) Digital poster - Using PowerPoint, Publisher, Fireworks, Photoshop, or online poster creator such as Canvab) Hand Drawn Designc) Pop Culture Styled) Saul Bass Style <p>Examples/support links are on overview, pupils may access the WWW for images etc they wish to use.</p> <p>Once completed pupils can update their progress using the “Checklist for completed work” document</p> <p>Once they have completed both topic 5/6 tasks, they can then pitch their idea</p>			
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11. Appendix

ⁱ <https://www.skillsdevelopmentscotland.co.uk/media/43306/scotlands-digital-technologies-summary-report.pdf>

ⁱⁱ <https://education.gov.scot/parentzone/Documents/TechnologiesImpactReport.pdf>

