Sample virtual program: Stage 5 IST, hardware – processing power and storage of data

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| Guiding question |  |
| What are your students going to learn? (Objectives) | A student:  **5.2.1** describes and applies problem-solving processes when creating solutions  **5.3.2** acquires and manipulates data and information in an ethical manner  **5.4.1** analyses the effects of past, current and emerging information and software technologies on the individual and society  **5.5.2** communicates ideas, processes and solutions to a targeted audience |
| How are they going to learn it? (Resources and Strategies) | **Resources**  An introduction to binary: <https://youtu.be/b82kHMdEM4g>  Counting in binary on your fingers: <https://www.youtube.com/watch?v=apCLHmPsC68>  Early Computing: <https://www.youtube.com/watch?v=O5nskjZ_GoI&t=19s>  How did NASA Steer the Saturn V?- Smarter Every Day <https://www.youtube.com/watch?v=dI-JW2UIAG0>  Shared read-only google doc with table of data quantities: <http://bit.ly/3aS2QQB>  **Strategies**  Using video tutorials and resources students compare and contrast binary and other number systems to develop a better understanding of the use of binary digits to represent data.  Using the table provided and online resources and research students design and develop infographics to communicate the progress in computing processing power and storage.  Students develop an appreciation of privacy as well as predicting future developments in the use and processing power of computing and data. |
| Target date for completion | 4-5 X 60 minute lessons |
| How are you going to know that they learned it? (Success criteria) | **Specific tasks**  Lesson 1   1. review the video “[An introduction to binary](https://youtu.be/b82kHMdEM4g)” and create a definition of binary as a number system that represents data. 2. watch and practise [how to count in binary on your fingers](https://www.youtube.com/watch?v=apCLHmPsC68) 3. compare and contrast binary number system with the decimal number system. 4. research and describe other number system commonly used in computing. (for example hexadecimal or octal) 5. Extension: Design an algorithm in pseudocode or a flowchart that describes how to add using any number system   Lesson 2   1. complete the table <http://bit.ly/3aS2QQB> 2. if we were to represent data as pages of text, consider and describe what:    * a kilobyte of data looks like?    * a megabyte of data looks like?    * a gigabyte of data looks like?    * a terabyte of data looks like? 3. watch the video: [How did NASA Steer the Saturn V?- Smarter Every Day](https://www.youtube.com/watch?v=dI-JW2UIAG0) 4. research past and present data storage hardware and design an infographic to visualise the amount of data stored on these devices. For example devices could include:    * Saturn V memory module    * floppy disks    * zip disks    * hard disk drives    * DVD-ROM    * Blu-ray discs    * USB flash drives 5. research and compare the processing power of the computers used in the space missions of 1950s-1960s with the computing power of your mobile phone and predict the processing power available in fifty years and the potential use of these devices.   Lesson 3   1. present information in a timeline that illustrates the key differences in the processing speed and amount of data used by the technology since the Saturn V rocket and compare your findings to Moore’s law.   Lesson 4   1. List the data and information that could already be stored about you. For example:    * Medical records    * School reports    * Browser history    * Purchase history 2. Extension: estimate how much data could already be stored about you. |
| Collecting evidence of student learning (Verification) | Using the schools online platform of choice, students will be required to submit the following:   * Answers to questions in lesson 1 * Completed table. * Infographic on quantities of data. * Graphs of various storage devices. * Timeline of processing power and storage of data since the Saturn V rocket. * An comparison of the timeline with Moore’s law * List of data that the student recognises has been collected on them. |
| Feedback (Evaluation) | Format to be communicated clearly by teacher, whether it is by emailing comments or annotations on documents, upload of media/audio via online platforms or a blended approach. |
| Communication | Teachers are able to gauge the progress of the tasks via the schools online platform. Submission dates for each task may be useful as opposed to one final due date.  Students can pose questions/clarifications directly to teacher via email or online platform  Scaffolds for each task may be posted by the teacher to help clarify specific requirements for each activity. |

**Resources**:

Counting in binary on your fingers: <https://www.youtube.com/watch?v=apCLHmPsC68>

Early Computing: <https://www.youtube.com/watch?v=O5nskjZ_GoI&t=19s>

How did NASA Steer the Saturn V?- Smarter Every Day <https://www.youtube.com/watch?v=dI-JW2UIAG0>