CreateBase

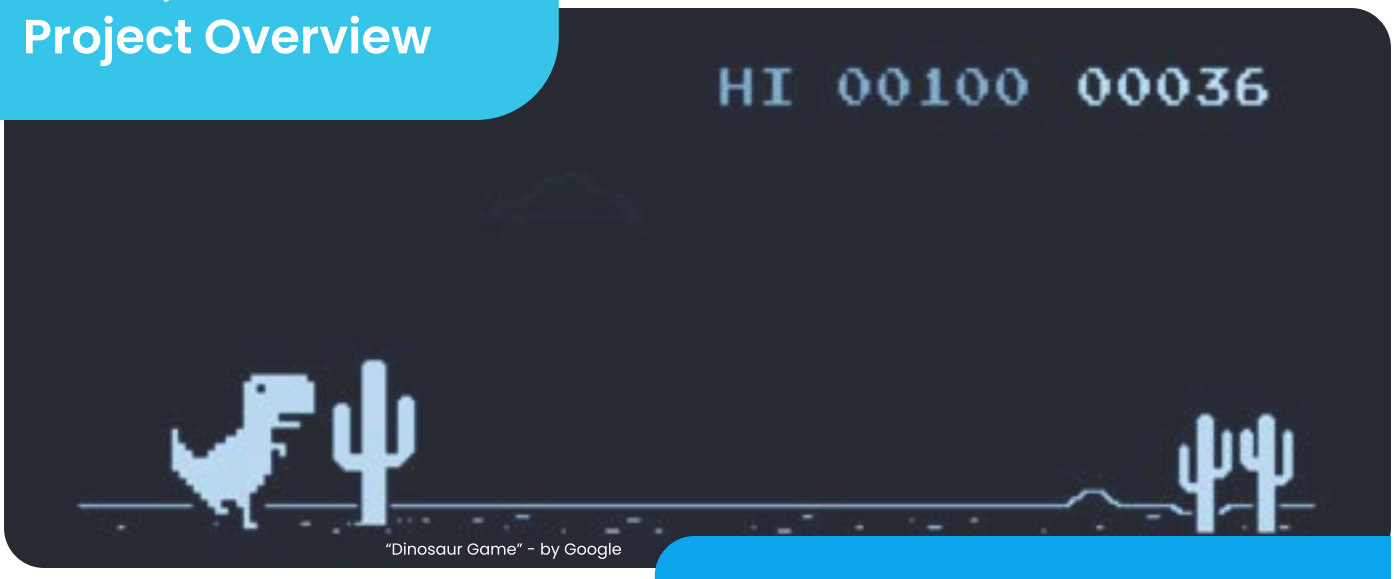
SAMPLE

Teacher Guide

Send It

Send it Project •

Project Overview



"Dinosaur Game" - by Google

Background

In a jumping game, a character is endlessly running at an infinite amount of obstacles. The player must decide when the character jumps to avoid running into an obstacle for as long as possible.

Synopsis

In this project, users will be aiming to automate our version of this game by creating an "AI" that is able to exceed human capabilities and achieve as high of a score as possible. This AI will be controlling a robot with the task of delivering a package as fast as possible, automatically jumping over any obstacles that get in its way.

Themes of this Project include **automation** and **algorithms**, including thinking about potential use-cases and moral dilemmas.

Sub-themes also include congestion and the delivery of goods using autonomous robots.

This project is divided into six lesson plans

01. Let students **Imagine** the situation by playing and discussing a situation video. Students will work in groups to explore the Project theme to accurately **Define** the situation.

02. Facilitate a class discussion around the topics and questions that students previously covered in **Define**. This lesson will end with an explicit definition of the problem and the tools available to solve it.

03. Students will get a chance to **Research** the tools available on our platform that they will need to use to construct their solution. Students will then **Plan** how they will build their solutions, either as a class, in groups or as individuals.

04. Students will get to use our platform to **Create** and test their own solutions inside our 3D simulated environment.

05. Students will use our platform to **Improve** upon their previous solutions, applying the skills that they have learnt and the knowledge they have gained to solve more advanced problems.

06. Students will continue using our platform to **Improve** upon their solutions, before taking the time to **Review** their entire work on the Project.

Project Overview

Subject Areas

- Technology
- Engineering
- Computer Science
- Automation
- Artificial Intelligence (AI)
- Ethics

Learning Outcomes

In this Project, **learners** will:

1. Learn how to formalize the logic occurring in their head into logical code to allow them to automate a task they would normally do manually.
2. Learn how to use flow control/branching capabilities (If, else if, else).
3. Learn how to use comparisons and comparison blocks (<, >, <=, >, ==).
4. Learn how to read and act on sensor data: distance to next obstacle, height of next obstacle, obstacle type, obstacle velocity etc.

Equipment List

Learners require:

- Access to our digital platform through a laptop, PC or tablet (no account needed at this stage)
- Learning journal

Educators require:

- Situation video (included in lesson plan)
- Printed Assessment worksheets (file included in lesson plan)
- Easy access to help sheets, either printed or digitally (files included in lesson plan)

Curriculum Standards

Curriculum standards that this Project aligns with.

Covered | Moderately covered

Achievement objectives (tasks)				
Technological practice	Level 1	Level 2	Level 3	Level 4
Planning for practice	Outline a general plan to support the development of an outcome, identifying appropriate steps and resources.	Develop a plan that identifies the key stages and the resources required to complete an outcome.	Undertake planning to identify the key stages and resources required to develop an outcome. Revisit planning to include reviews of progress and identify implications for subsequent decision making.	Undertake planning that includes reviewing the effectiveness of past actions and resourcing, exploring implications for future actions and accessing of resources, and consideration of stakeholder feedback, to enable the development of an outcome.
Brief development	Describe the outcome they are developing and identify the attributes it should have, taking account of the need or opportunity and the resources available.	Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available.	Describe the nature of an intended outcome, explaining how it addresses the need or opportunity. Describe the key attributes that enable development and evaluation of an outcome.	Justify the nature of an intended outcome in relation to the need or opportunity. Describe the key attributes identified in stakeholder feedback, which will inform the development of an outcome and its evaluation.
Outcome development and evaluation	Investigate a context to communicate potential outcomes. Evaluate these against attributes; select and develop an outcome in keeping with the identified attributes.	Investigate a context to develop ideas for potential outcomes. Evaluate these against the identified attributes, select, and develop an outcome. Evaluate the outcome in terms of the need or opportunity.	Investigate a context to develop ideas for potential outcomes. Trial and evaluate these against key attributes to select and develop an outcome to address the need or opportunity. Evaluate this outcome against the key attributes and how it addresses the need or opportunity.	Investigate a context to develop ideas for feasible outcomes. Undertake functional modelling that takes account of stakeholder feedback in order to select and develop the outcome that best addresses the key attributes. Incorporating stakeholder feedback, evaluate the outcome's fitness for purpose in terms of how well it addresses the need or opportunity
Technological knowledge				
Technological modelling	Understand that functional models are used to represent reality and test design concepts and that prototypes are used to test technological outcomes.	Understand that functional models are used to explore, test, and evaluate design concepts for potential outcomes and that prototyping is used to test a technological outcome for fitness of purpose.	Understand that different forms of functional modelling are used to inform decision making in the development of technological possibilities and that prototypes can be used to evaluate the fitness of technological outcomes for further development.	Understand how different forms of functional modelling are used to explore possibilities and to justify decision making and how prototyping can be used to justify refinement of technological outcomes.
Technological products	Understand that technological products are made from materials that have performance properties.	Understand that there is a relationship between a material used and its performance properties in a technological product.	Understand the relationship between the materials used and their performance properties in technological products.	Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for the purpose of a technological product.

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Covered Moderately covered

Technological systems	Understand that technological systems have inputs, controlled transformations, and outputs.	Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems	Understand that technological systems are represented by symbolic language tools and understand the role played by the "black box" in technological systems.	Understand how technological systems employ control to allow for the transformation of inputs to outputs.
Nature of technology				
Characteristics of technology	Understand that technology is purposeful intervention through design.	Understand that technology both reflects and changes society and the environment and increases people's capability.	Understand how society and environments impact on and are influenced by technology in historical and contemporary contexts and that technological knowledge is validated by successful function.	Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines.
Characteristics of technological outcomes	Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.	Understand that technological outcomes are developed through technological practice and have related physical and functional natures.	Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	Understand that technological outcomes can be interpreted in terms of how they might be used and by whom and that each has a proper function as well as possible alternative functions.

Curriculum Standards

Curriculum standards that this Project aligns with.

Covered Moderately covered

Progress outcomes (assessment)				
	Level 1	Level 2	Level 3	Level 4
Computational thinking for digital technologies	In authentic contexts and taking account of end users, learners use their decomposition skills to break down simple non-computerised tasks into precise, unambiguous, step-by-step instructions (algorithmic thinking). They give these instructions, identify any errors in them as they are followed, and correct them (simple debugging).	In authentic contexts and taking account of end users, learners give, follow and debug simple algorithms in computerised and non-computerised contexts. They use these algorithms to create simple programs involving outputs and sequencing (putting instructions one after the other) in age-appropriate programming environments.		In authentic contexts and taking account of end-users, learners decompose problems into step-by-step instructions to create algorithms for computer programs. They use logical thinking to predict the behaviour of the programs, and they understand that there can be more than one algorithm for the same problem. They develop and debug simple programs that use inputs, outputs, sequence and iteration (repeating part of the algorithm with a loop). They understand that digital devices store data using just two states represented by binary digits (bits).
Designing and developing digital technologies	In authentic contexts and taking account of end users, learners participate in teacher-led activities to develop, manipulate, store, retrieve and share digital content in order to meet technological challenges. In doing so, they identify digital devices and their purposes and understand that humans make them. They know how to use some applications, they can identify the inputs and outputs of a system, and they understand that digital devices store content, which can be retrieved later.		In authentic contexts and taking account of end-users, learners make decisions about creating, manipulating, storing, retrieving, sharing and testing digital content for a specific purpose, given particular parameters, tools, and techniques. They understand that digital devices impact on humans and society and that both the devices and their impact change over time. Learners identify the specific role of components in a simple input-process-output system and how they work together, and they recognise the "control role" that humans have in the system. They can select from an increasing range of applications and file types to develop outcomes for particular purposes.	

Lesson 1 45 mins

Overview

Imagine (15 mins)

Introduce and discuss the Project with your learners with a video that showcases the situation.

Define Part 1 (15 mins)

Let your learners work in groups to explore the Project theme, with the goal of being able to accurately define the situation.

Lesson Resources

Situation cutscene

Presentation slides for Define

Glossary

1. **Artificial intelligence (AI):** Broadly speaking, artificial intelligence (AI) is all about creating programs and machines that can carry out human behaviours like critical thinking and decision making. Generally, the realism of an AI is judged by how closely it acts like a human.

   AI can be as simple as an automatic light switch or as complicated as an autocorrect in a text document.

2. **Automation:** Automation is all about using technology to carry out tasks that would have traditionally been carried out by a human. Humans are good at critical thinking whereas most technology is good at performing the exact same action repeatedly. Therefore, routine tasks (tasks that involve performing the same action repeatedly) are normally the first to be automated as little or no critical thinking is needed.

   Examples include robots in car manufacturing assembly lines and self-driving trains.

3. **Ethics:** Ethics are all about how a person determines which actions are good and bad. What is the reasoning behind their decision? There is not always a right and a wrong answer when it comes to ethics, as different people place different amounts of value on different concepts. Ethics are important as they can help us understand why other people make and justify their decisions, as well as understand ourselves.

   For example, would you lie to convict a criminal that you know is guilty? Whether or not a person values truth or justice more is likely to influence their answer to this question.

4. **Congestion:** Congestion occurs when a location is so crowded that it becomes difficult to move. This normally happens when a large amount of something is trying to move through a small opening.

   For example, cars on a motorway or water down a drain.

Lesson 1 •

Imagine 15 mins

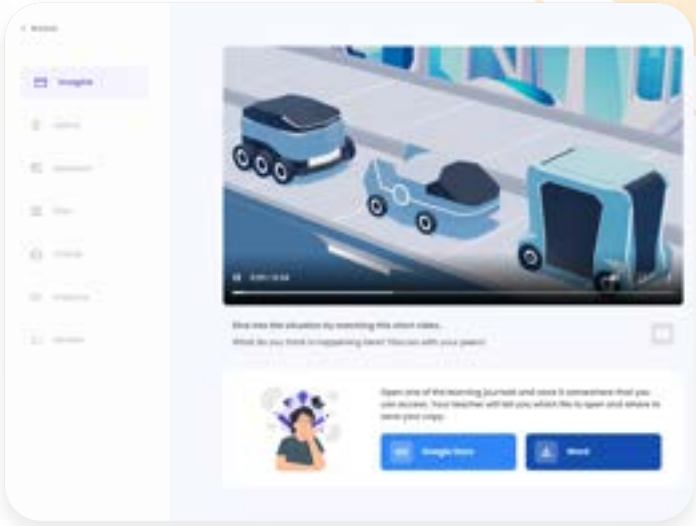
1

Follow these steps

1. Bring all of your learners to the front of the class if possible.

2. Welcome the class and tell them that over the next three lessons they will be completing a Project where they will get to plan, build, test and improve a solution to a problem.

3. Tell the class that we will begin by playing a cutscene of the situation to set the scene, then play the following video:



https://alpha.createbase.co.nz/overview/send-it

4. Discuss with the class what happened in the video.

   Discussion points could be based on:

   - What the main character is doing
   - The problem he encounters
   - What he is trying to get the robot to do.

   If they understand the problem, you might want to ask learners what they would do in the same situation.

Tips for Educators

For your reference, here is a quick explanation of what is happening in the video:

- On route for package delivery, there are major delays during transit.
- To ensure that the package arrives in time, you resort to sending out your delivery robot to beat the traffic.
- In a rush, you must code the robot to navigate the obstacles before it gets hit and loses the package.

Helpful Examples

If you are finding it difficult to get the kids to talk about it, replay the video to the class with pauses and ask questions about what is happening in specific scenes.

Here are some example discussion points to get you started:

0:00-0:05 seconds

Q What do you think is happening here?

A Cars stuck in traffic.

0:14 seconds

Q What is happening here?

A Package to deliver but delays due to traffic mean that we can't deliver it on time.

0:32-0:39 seconds

Q What do you think this is?

A A humanoid robot/delivery bot

0:47-0:49 seconds

Q What is he doing here?

A About to code his robot.

Summarise the video

Q What has happened?

A The human character is stuck in traffic so can't deliver a package in time. Luckily, he has a humanoid robot that he can program to deliver his parcel.

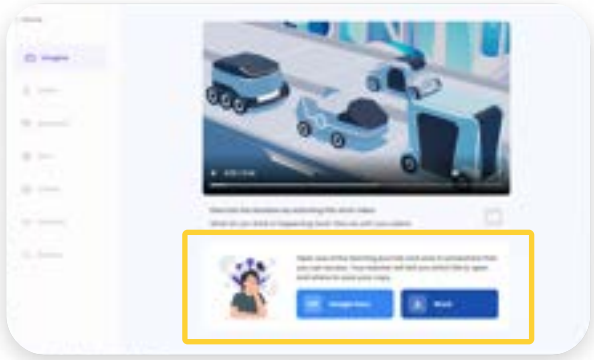
Define Part I 30 mins

Now that you have watched the video with your class and you are happy that they understand what has happened, your learners will have an opportunity to explore some of the wider topics that could stem from an autonomous delivery robot.

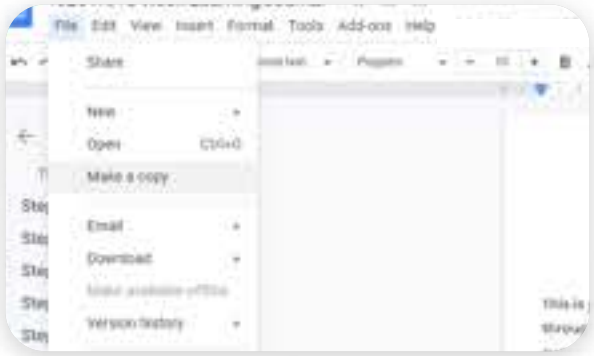
1. To get started, create small groups of 3-4 learners. And send them to their computers. Learners should be seated next to their group members.

2. Tell your learners to go to https://alpha.createbase.co.nz/ and start the SEND IT Project.

3. Ask them to rewatch the Situation video and tell them to download either the Google Docs or Microsoft Word **learning journal**.



If you want your students to work from Google Docs, they must choose the Google Docs option and then click ***File*** -> Make a copy and save it somewhere that they can access.



4. Once downloaded, the learners should fill out their names and then move to the Define section on the website.

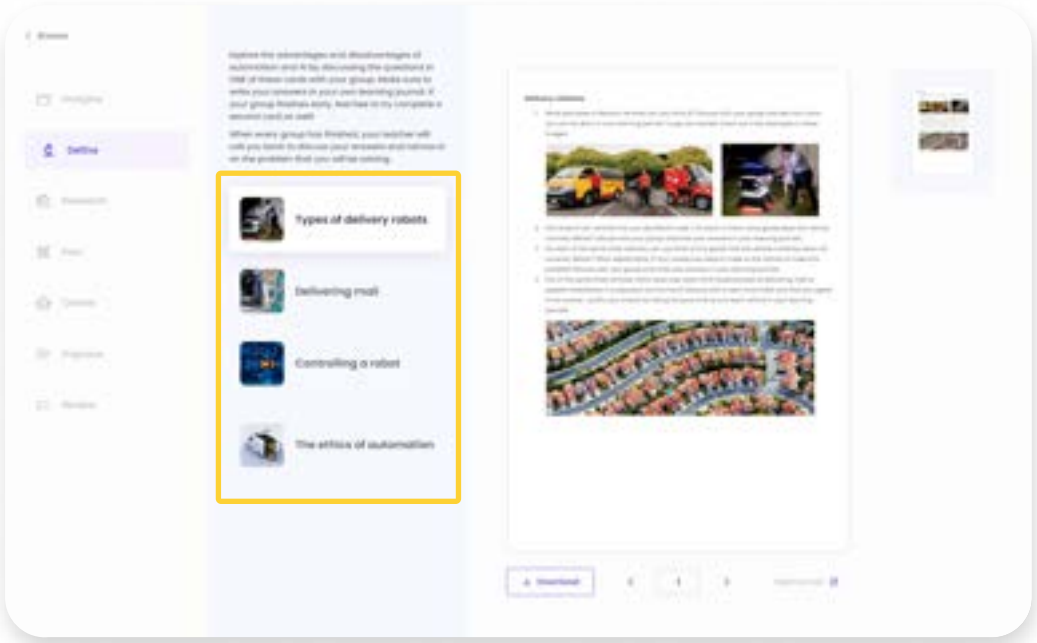
Tips for Teachers

To reduce confusion, it is recommended that you tell your learners exactly where to save their files. If you want to access these files later to check on their progress, tell them to save them in a location that you can also access.

Define Part I 30 mins

5. Once in the Define section, AS A GROUP, tell them to select any one of the sections and discuss the questions as a group. For each question, each learner needs to write an answer in their learning journal. Wander the room while this is happening and ask learners questions to help them start thinking.

   If a group finishes early, let them answer a second section.



6. With 5-10 minutes to go, remind the class that they must have answers for every question in at least one card in their individual learning journals by the end of the lesson.

7. At the end of the lesson, make sure that each learner has their copy of the **learning journal** saved somewhere that they can easily access at the start of the next class.

Homework

For homework, inform each learner that if they haven't already done so, they must have answers for every question in at least one of the Define cards written out in their individual learning journals by the start of the next lesson.