

This unit of work was created in collaboration with teachers from St Francis of Assisi Primary School, Mill Park, Victoria.

Unit Overview

The following lessons incorporate parts of the Digital Technologies Curriculum into a unit on Sustainability. The focus of the lessons is collecting and exploring patterns in data that relate to be more energy efficient. They will use the data they have collected to write algorithms (explicit instructions) to be energy efficient. Robotics has been introduced (if applicable to your school) as another way to follow sequence of steps to move the robot to turn off lights.

Other Curriculum Targeted Areas

Other curriculum areas can be targeted and assessed within this unit. Areas of interest may include:

- Mathematics (Data)

Further investigation into these areas is required to ensure they align with the following activities. Activities may need to be modified to ensure Content Descriptions and Achievement Standards are met.

Australian Curriculum Alignment

The following sessions have been created using the Australian Curriculum: Digital Technologies Curriculum. Activities may need to be modified to ensure state Digital Technologies Curriculum Standards/Syllabus are met. ACS has support and documents to help align this unit to other Digital Technology Curricular.

Session

'Session' has been used to define the order of tasks to complete the unit. It does not define a set time required to complete the task. Time allocated to complete a session is the teacher's discretion. This allows for flexibility for to drive the duration of the task and make modifications if necessary. Sessions can be merged into one allocated class period or may run over multiple periods.

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Key Preparation

Robotics

Bee-Bots have been included within these lessons however it is not essential for assessment. If access to robotics is not available for your school, completing lessons up to Session 5 will suffice the F-2 assessment standards.

ACS Resources

Resources have been created to help teachers and students unpack and understand topics found within the Digital Technologies Curriculum. These give brief explanations of the topic and the expectations to teach the topic at the curriculum year level. It is intended the information is presented in a way that will set the foundation for further research.

You can access these resources via: <https://www.acs.org.au/ict-educators.html>.

Key Understandings

Students will:

- Collect data about the types of electrical equipment they have in the homes.
- Collate the data (using simple software) and discuss their data.
- Write a sequence of steps to demonstrate how to be sustainable users to energy.
- Use Bee-Bots to program their sequence of steps.

Key Questions

- How is energy used?
- How do we become more sustainable users of energy?
- Why is it important to use energy sustainably?
- What did you find out the data you collected?
- How are you going to present your data?
- How can you program the Bee-Bot to turn off all the lights?

Key Vocabulary

Data, Venn diagram, sort, compare, mind map, sequence, sequence of steps, instructions, algorithms

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Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher instruction	Whole class activity
1.	Collecting and sorting data	<p>Learning Intention Students will use a table to record data about the electrical appliances found in two classrooms.</p> <p>Success Criteria I can collect data using a table.</p>	<p>Look around the classroom and ask the students to point out some of the things in the room that use electricity to work. Explain that they are going to collect data in order to make a comparison between the number of electrical devices in their classroom and another classroom in the school (their buddy classroom). Model how to record data on the table.</p>	<p>Students will visit their buddy classroom and will record all the different electrical devices they can see in the room. They will record this information in the table provided (see student resources). Make sure they are recording the electrical item and how many there are, e.g. 2 ceiling fans.</p> <p>Then, repeat this same activity in their own classroom.</p>
Session Resources	<ul style="list-style-type: none"> • ACS Teacher Topic Resource: Data • Table for recording data 			
2.	Representing data as pictures, symbols and diagrams	<p>Learning Intention Students will complete a Venn diagram, representing the data in pictures and symbols.</p> <p>Success Criteria I can explore and sort data using pictures, symbols and diagrams.</p>	<p>Ask students to look at their data. Get them to make generalisations about their data, e.g. both classrooms had the same number of ceiling lights, one classroom had more power points than the other. Explain to student to that they are going to use the data they collected in the previous lesson and represent this on a Venn diagram. Model how to do this.</p>	<p>Students will get a blank Venn diagram printed on A3 paper. They will then sort and represent the data on electrical devices in each room using symbols and numbers, e.g. lightbulb image for lights and 6 to represent how many.</p> <p>Once the Venn diagrams are complete they can compare and make generalisations as to which classroom has the most electrical devices (and therefore possibly uses the most electricity).</p>
Session Resources	<ul style="list-style-type: none"> • ACS Teacher Resource: Data • A3 blank Venn diagram 			

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Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher instruction	Whole class activity
3.	Visualisation software for representing information	<p>Learning Intention Students will recognise and explore patterns in the data they have collected.</p> <p>Success Criteria I can make comparisons and generalisations about the data I have collected.</p>	Discuss why it is important not to waste electricity. Ask students to share ideas of ways that we could be more energy efficient in the classroom. Demonstrate how to use 'Show Me' app or another visualisation software.	Students will use Show Me to create a mind map of ways they can be more energy efficient in the classroom.
Session Resources	<ul style="list-style-type: none"> • ACS Teacher Resource: Data • 'Show Me' app/visualisation software. 			
4.	Different digital systems for capturing data.	<p>Learning Intention Students will use visualisation software (e.g. Kidspiration, Book Creator) to create a mind map about ways to be more energy efficient.</p> <p>Success Criteria I can use visualisations software to represent data visually</p>	Explain to the students that they are going to record themselves talking about the mind map they have created in the previous lesson. Model how to do this, following a set of visual instructions that has been written for them (annotated images of record, stop and play buttons)	<p>Students will follow the instructions given to record themselves talking about their mind map and explaining ways they can be more energy efficient in the classroom.</p> <p>These can then be emailed to parents or shared through parent communication portals such as seesaw.</p>
Session Resources	<ul style="list-style-type: none"> • You will need to write the instructions to be followed based on the format you choose to record the videos, e.g. app, tablet, camera, etc 			

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Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher instruction	Whole class activity
5.	Writing simple instructions to sequence actions.	<p>Learning Intention Students will write a simple set of instructions to sequence energy efficient actions taken when leaving the classroom.</p> <p>Success Criteria I can write simple instructions to sequence actions.</p>	Model writing a procedure for how to leave the house in order to ensure energy efficiency. E.g. turn off all lights, close blinds.	Students will write a simple procedure to detail the sequence of steps needed to leave the classroom, ensuring you are being energy efficient.
Session Resources	<ul style="list-style-type: none"> ACS Teacher Resource: Sequence of Steps 			
6.	Creating simple digital solutions	<p>Learning Intention Students will program a robot to perform a task</p> <p>Success Criteria I can program the Bee-Bot to perform a task.</p>	Introduce the students to the Bee-Bots. Let them have a play with the functionality of the buttons, exploring what happens when you push a button twice, three times etc. Using large laminated printouts of the different buttons on the Bee-Bots, lay out the coded instructions for a path that you want the Bee-Bots to travel on and then have the students make the Bee-Bots move to the same coded instructions.	<p>Students are given the task of coding a Bee-Bot to 'turn off the lights'. Use the blank grid and place a lightbulb image on one of the squares. The students must then code their Bee-Bot to travel to the light bulb to 'turn it off'. Challenge high achieving students by placing more than one light bulb on the grid or placing obstacles in the way of the Bee-Bot so it has to travel a more complex path.</p> <p>Students can then complete the worksheet requiring them to cut and paste coded instructions in a sequence to get the Bee-Bot to 'turn out the light'.</p>
Session Resources	<ul style="list-style-type: none"> ACS Teacher Resource: Sequence of Steps Bee-Bots Large blank Bee-Bot grid mat Bee-Bot worksheet 			

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Assessment – Australian Digital Technologies Curriculum			
Content Description	Session Number	Assessment Piece	Assessment Statement
Recognise and explore digital systems (hardware and software components for a purpose (ACTDIK001)	N/A		
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002)	2	Venn diagram	Students created a Venn that was used to explore and represent data.
Collect, explore and sort data, and use digital systems to present the data creatively (ACTDIP003)	3	Use of visualisation software used to present their data.	Students used a digital software program to represent the data they had collected about ways to be more energy efficient.
Following, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004)	5 & 6	Written procedure Use of Bee-Bots	Students wrote algorithms (instructions) to sequence actions to be more energy efficient in their homes. Students programmed the Bee-Bot robotics to correctly follow a set of instructions.
Explore how people safely use common information systems to meet information, communication and recreation needs (ACTDIP005)	N/A		
Create and organise ideas and information using information systems independently and with others, and share them with known people in safe online environments (ACTDIP006)	N/A		

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Assessment – Victorian Digital Technologies Curriculum			
Content Description	Session Number	Assessment Piece	Assessment Statement
Identify and explore digital systems (hardware and software components) for a purpose (VCDTDS013)	N/A		
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (VCDTDI014)	2	Venn diagram	Students created a Venn that was used to explore and represent data.
Collect, explore and sort data, and use digital systems to present the data creatively (VCDTDI015)	3	Use of visualisation software used to present their data.	Students used a digital software program to represent the data they had collected about ways to be more energy efficient.
Independently and with others create and organise ideas and information using information systems, and share these with known people in safe online environments (VCDTDI016)	N/A		
Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)	5 & 6	Written procedure Use of Bee-Bots	Students wrote algorithms (instructions) to sequence actions to be more energy efficient in their homes. Students programmed the Bee-Bot robotics to correctly follow a set of instructions.
Explore how people safely use common information systems to meet information, communication and recreation needs (VCDTCD018)	N/A		

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Assessment – New South Wales Science and Technology Syllabus

Outcomes and Objectives	Session Number	Assessment Piece	Stage Statement
observes, questions and collects data to communicate and compare ideas (ST1-1WS-S)	4		Students observed the changings of living things and compared these to nonliving things. They collected data to help them make valid conclusions and they communicated these ideas with their peers.
collect, sort, organise and present data to communicate information (ACTDIP003)	1, 2 & 3	Digital presentation of their data	Students collated data to demonstrate how living things grow and change. They used cameras on a digital device to collect photos. Students used software to digital represent data that depicted growth and change of living things.
Identifies digital systems and explores how instructions are used to control digital devices (ST-e7DI-T)	5		Students explored the hardware of a digital camera to take photos to collect data.

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Assessment - Western Australian Digital Technologies Curriculum			
Pre-Primary Syllabus	Session Number	Assessment Piece	Assessment Statement
Digital systems (hardware and software) are used at home, in the school and in the community (ACTDIK001)	N/A		
Data can have patterns and can be represented as pictures and symbols (ACTDIK002)	2	Venn diagram	Students created a Venn that was used to explore and represent data.
Collect and use data of any kind (ACTDIP003)	3	Use of visualisation software used to present their data.	Students used a digital software program to represent the data they had collected about ways to be more energy efficient.
Use data to complete a task (ACTDIP003)	N/A		
Engage with information known people have shared in an online environment, and model strategies to stay safe online (ACTDIP006)	N/A		
Explore needs for design (WATPPS01)	N/A		
Generate and record design ideas through describing, drawing, modelling and/or a sequence of written or spoken steps (WATPPS02)	5 & 6	Written procedure Use of Bee-Bots	Students wrote algorithms (instructions) to sequence actions to be more energy efficient in their homes. Students programmed the Bee-Bot robotics to correctly follow a set of instructions.
Use given components and equipment to safely make simple solutions (WATPPS03)	5 & 6	Use of robotics	When using robotics, students ensured they used the Bee-Bots safely and correctly when programming their sequence of steps.
Use personal preferences to evaluate the success of simple solutions (WATPPS04)	N/A		
Work independently, or with others when required, for solutions (WATPPS05)	5 & 6	Working in small groups to program Bee-Bots	Students worked in small groups to program the Bee-Bots to complete a sequence of steps.

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Assessment - Western Australian Digital Technologies Curriculum			
Year 1 Syllabus	Session Number	Assessment Piece	Assessment Statement
Digital systems (hardware and software) are used in everyday life and have specific features (ACTDIK001)	N/A		
Data can have patterns and can be represented as pictures, symbols and diagrams (ACTDIK002)	2	Venn diagram	Students created a Venn that was used to explore and represent data.
Present data of any kind using a variety of digital tools (ACTDIP003)	3	Use of visualisation software used to present their data.	Students used a digital software program to represent the data they had collected about ways to be more energy efficient.
Use data to solve a simple task/problem (ACTDIP003)	N/A		
Share and publish information with known people in an online environment, modelling strategies to stay safe online (ACTDIP006)	N/A		
Explore opportunities for design (WATPPS06)	N/A		
Develop and communicate design ideas through describing, drawing, modelling and/or a sequence of written or spoken steps (WATPPS07)	5 & 6	Written procedure Use of Bee-Bots	Students wrote algorithms (instructions) to sequence actions to be more energy efficient in their homes. Students programmed the Bee-Bot robotics to correctly follow a set of instructions.
Use given components and equipment to safely make solutions (WATPPS08)	5 & 6	Use of robotics	When using robotics, students ensured they used the Bee-Bots safely and correctly when programming their sequence of steps.
Use personal preferences to evaluate the success of design processes (WATPPS09)	N/A		
Work independently, or with others when required, to create and safely share sequenced steps for solutions (WATPPS10)	5 & 6	Working in small groups to program Bee-bots	Students worked in small groups to program the Bee-Bots to complete a sequence of steps.

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Assessment - Western Australian Digital Technologies Curriculum			
Year 2 Syllabus	Session Number	Assessment Piece	Assessment Statement
Digital systems (hardware and software) are used for an identified purpose (ACTDIK001)	N/A		
Data can have patterns and can be represented and used to make simple conclusions (ACTDIK002)	2	Venn diagram	Students created a Venn that was used to explore and represent data.
Present data using a variety of digital tools (ACTDIP003)	3	Use of visualisation software used to present their data.	Students used a digital software program to represent the data they had collected about ways to be more energy efficient.
Use data to solve similar tasks/problems (ACTDIP003)	N/A		
Share and publish information in a safe online environment, with known people (ACTDIP006)	N/A		
Explore design to meet needs or opportunities (WATPPS11)	N/A		
Develop, communicate and discuss design ideas through describing, drawing, modelling and/or a sequence of steps (WATPPS12)	5 & 6	Written procedure Use of Bee-Bots	Students wrote algorithms (instructions) to sequence actions to be more energy efficient in their homes. Students programmed the Bee-Bot robotics to correctly follow a set of instructions.
Use components and given equipment to safely make solutions (WATPPS13)	5 & 6	Use of robotics	When using robotics, students ensured they used the Bee-Bots safely and correctly when programming their sequence of steps.
Use simple criteria to evaluate the success of design processes and solutions (WATPPS14)	N/A		
Work independently, or collaboratively when required, to organise information and ideas to create and safely share sequenced steps for solutions (WATPPS15)	5 & 6	Working in small groups to program Bee-Bots	Students worked in small groups to program the Bee-Bots to complete a sequence of steps.

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ELECTRICAL APPLIANCES

Data Recording Sheet

Electrical Device	Buddy Classroom	Our Classroom
Ceiling Lights		
Interactive Whiteboard		
Speakers		
Projectors		



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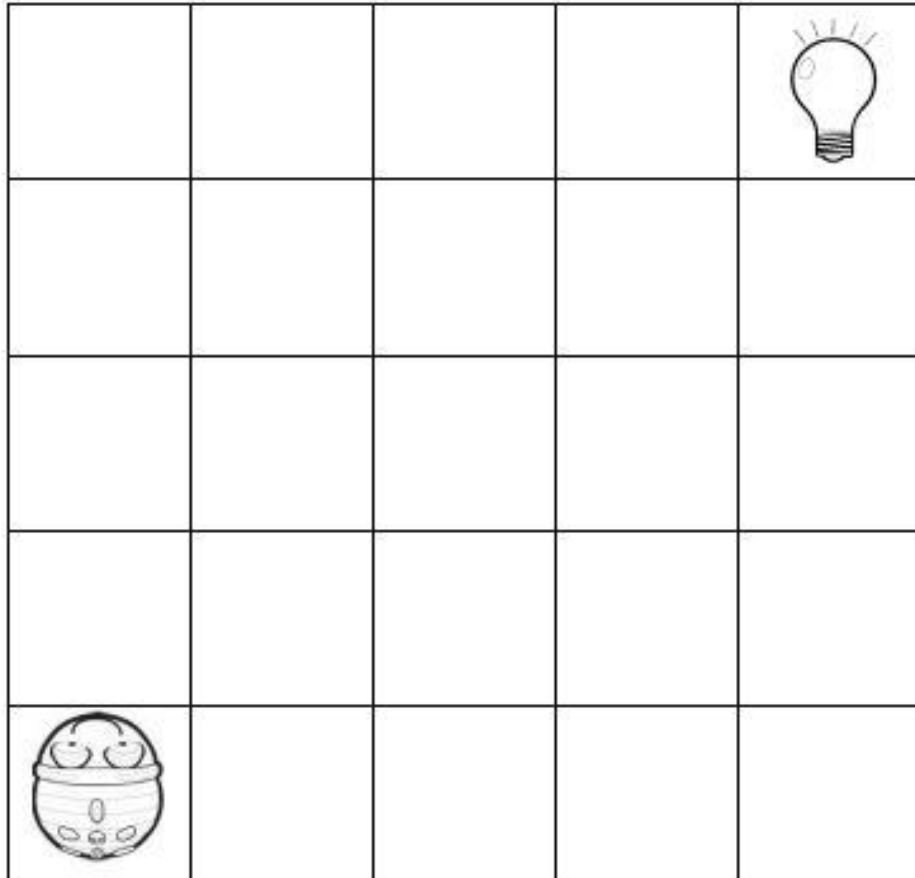
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Name: _____

Beebot Challenge



Cut and Paste the code into the boxes below to make your beebot turn out the light!

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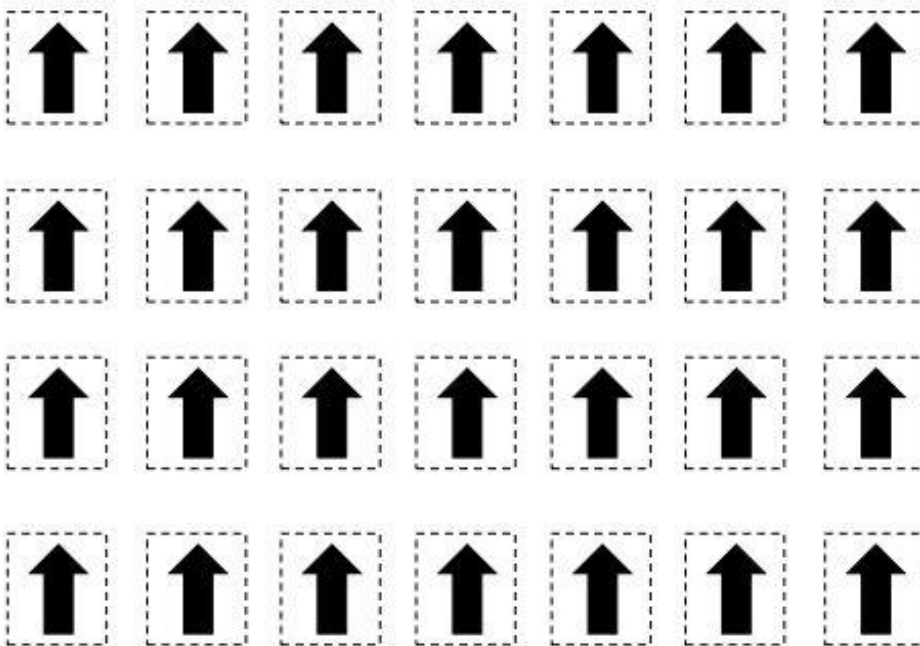
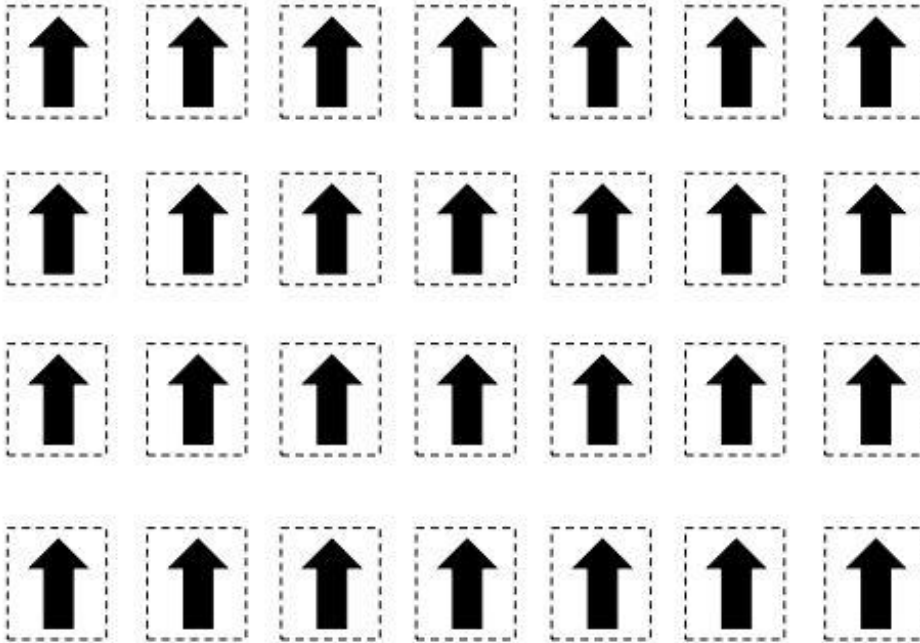
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