REINVENTING WILLY WONKA'S CHOCOLATE FACTORY

Levels 3-4

Unit Overview

These lessons have been designed to be incorporated into a whole class English lesson when reading the novel Charlie and the Chocolate Factory. The purpose of these lessons is to use English and a classic novel to introduce digital systems and design thinking. In these lessons, students will use their own imagination to create a machine that invents a chocolate of their own design. They will look at how each step in the machine constructs their chocolate. These steps will be written in plain English and then presented as a flow chart.

Other Curriculum Targeted Areas

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

- English

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

Unplugged Lessons

These lessons do not require digital technology devices. The core objective of these lessons is to encourage children to think about how a digital solution will work, the components that are required and how user input will influence the end results. Students can design their machines free hand using large paper (this will allow the students to add necessary detail). The most important preparation for these lessons is to ensure the lessons coincides with the timing of the chapter in the book. This chapter is one suggestion of when these activities can coincide with the adventures throughout Willy Wonka's factory.

Chapter 19: The Inventing Room - Notes in the chapter
http://www.sparknotes.com/lit/charlie/section10/
Clip from Charlie and the chocolate factory (newer movie)
http://www.dailymotion.com/video/x2v75qy
Clip from Willy Wonka and the Chocolate Factory
https://www.youtube.com/watch?v=7PJPJy00514

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.

ACS ICT Educators Community

ACS has resources to support the teaching of the Digital Technologies Curriculum from Foundation to Year 10. Access the community and resources by joining for free via:
https://www.acs.org.au/ict-educators.html

Key Understandings

Students will:

- Design a digital system that will be used in Willy Wonka's chocolate factory
- Design the system with user input options
- Write out specific instructions on the mechanics of the machine in the form of algorithms and flow charts

Key Questions

- What chocolate would you invent for Willy Wonka?
- What time of machine would you need?
- How can you use today's technology to help with your invention?
- How would your machine work? What parts will it need? How are those parts connected together?

Key Vocabulary

Systems thinking, design solution, digital system, peripheral devices, hardware, software, algorithms, branching, user input, flowchart

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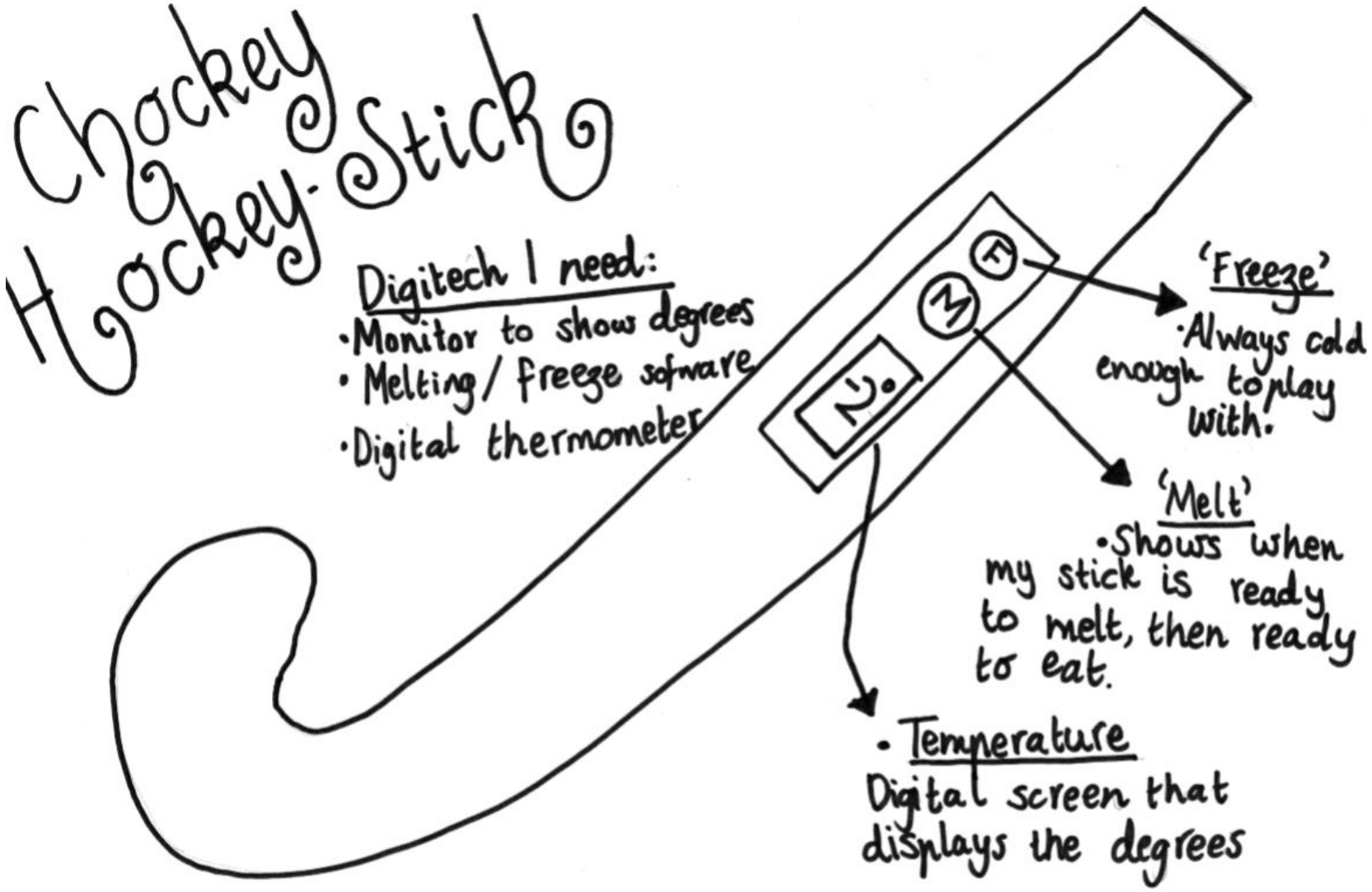
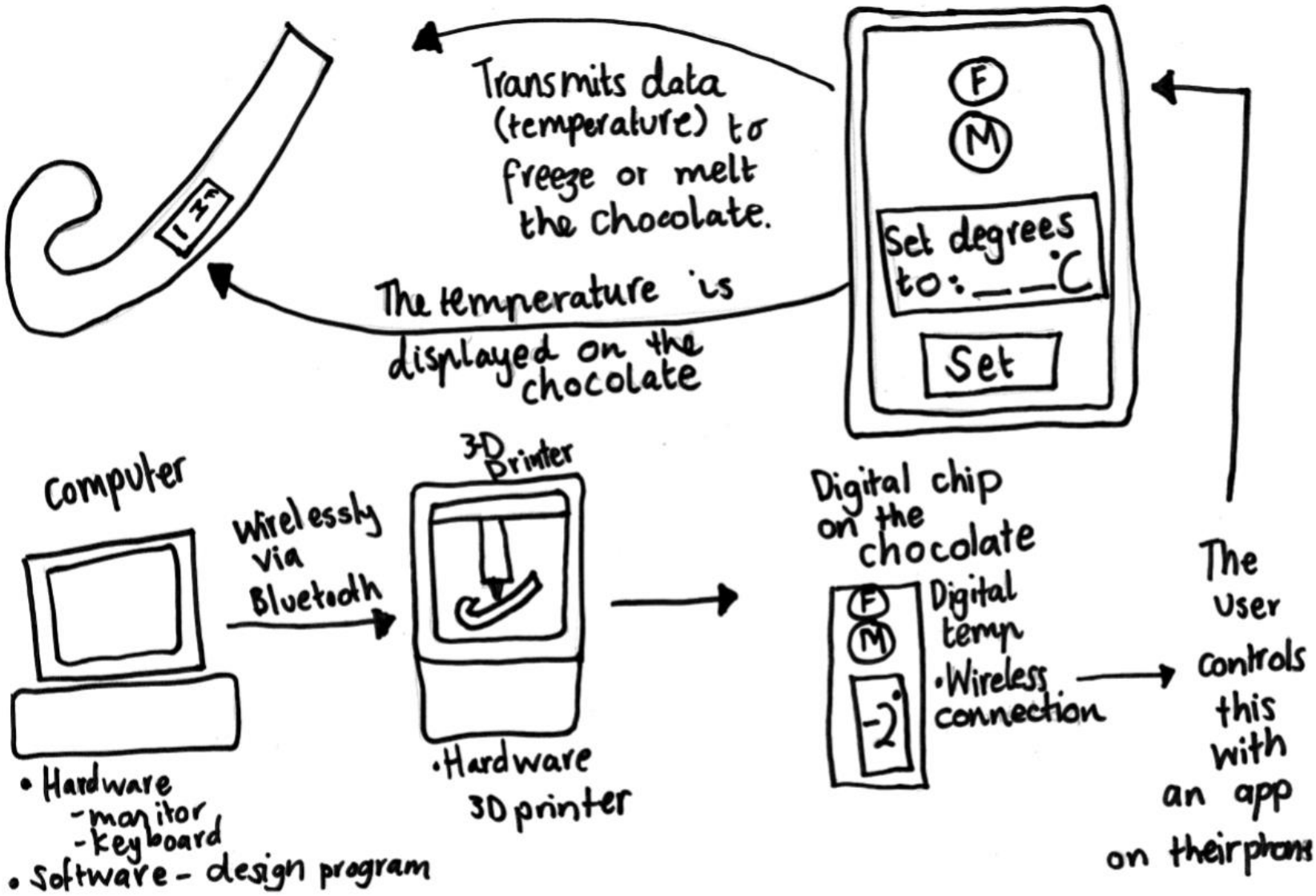
Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher instruction	Whole class activity
1.	Introduction	**Learning Intention** Design a chocolate/sweet that will be used in Willy Wonka's Factory. **Success Criteria** I can draw and design a new scrumptious chocolate for Willy Wonka's factory.	Read chapter 19 to the class. Students share ideas on how they think the machine works and the parts that are needed. Watch YouTube click that looks at Hershey's using 3D printers to make their chocolate.	Students create a new chocolate/sweet for the factory. To help them invent something new, encourage students to use things they like in their lives. See example of 'Chockey Hockey Stick'.
Session Resource	**Student Resources** • A3 white paper • 'How Hershey's is Using 3-D Printers to Make Chocolate Kisses' Video source: Bloomberg		**Teacher Resources** • ACS Teacher Resource: Systems to Meet Needs	
2.	Digital Systems	**Learning Intention** Students will design a digital system that will be used in Willy Wonka's chocolate factory. **Success Criteria** I can design a machine that will be used to create my invention that incorporates current technology (hardware and software).	Students share their new chocolate/sweets. Start a conversation on the type of technologies they might need in a machine to make their new sweet. Examples of questions to ask can include: How can you use today's technology to help with your invention? What type of hardware and software is needed?	Students design their machine and identify the different devices to use to make their sweet. Encourage students to add detail to their design especially name the part they need in their invention. See example of 'Chockey Hockey Invention Machine'.
Session Resource	**Student Resources** • ACS Student Resource: Peripheral Devices • A3 white paper		**Teacher Resources** • ACS Teacher Resource: Peripheral Devices	

3.	Algorithms	**Learning Intention** Students will write algorithms (specific instructions) on the mechanics of their machine. **Success Criteria** I can show how my machine works through writing algorithms as a sequence of steps (specific instructions).	Use the gobstopper invention machine from the film clip as an example to write algorithms. Together, write out how the parts of the system work and move. Some parts of the machine are covered, encourage students to make up names for the part of the machine.	Following the modelled writing session, students commence writing out the instructions. Students share the first 2 or 3 steps of the inventions with their peers. Focus on the explanation of the machine in detail. Students return to their groups and write out the instructions in detail. They can test their steps by drawing a small version of their chocolate/lolly and take it through the steps.
Session Resource	**Students Resources** • ACS Student Resource: Algorithms • ACS Student Resource: Flowcharts and Diagrams • Excerpt from Willy Wonka and the Chocolate Factory		**Teacher Resources** • ACS Teacher Resource: Algorithms • ACS Teacher Resource: Flowcharts and Diagrams	
4.	Evaluation	**Learning Intention** Students will explain how their design and digital solution will help the community. **Success Criteria** I can explain how my system can help the wider community	Students share their inventions and work with each other.	Students create an evaluation of their design (in the form of a persuasive style). They explain and persuade a chocolate maker the importance of their design for the local community.
Session Resource	**Students Resources**		**Teacher Resources** ACS Teacher Resource: Meeting Needs	

'Chockey Hockey Stick' – a chocolate hockey stick that can be frozen to play hockey then melted to eat after a game!



'Chockey Hockey Stick – Invention Machine'



Assessment – Australian Digital Technologies Curriculum			
Content Description	**Session Number**	**Assessment Piece**	**Assessment Statement**
Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)	2	Student design that identifies a selection of devices	Students created a machine for Wily Wonka's Chocolate Factory that incorporated current system systems and peripheral devices.
Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)	N/A		
Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009)	N/A		
Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)	3	Explicit instructions for their machine	Students wrote algorithms (explicit instructions) to explain how their invention for Willy Wonka's Chocolate Factory would operate.
Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)	N/A		
Explain how student solutions and existing information systems meet common personal, school or community needs (ACTDIP012)	4	Evaluation	Students explained how their new digital solution would benefit the wider community.
Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)	N/A		

Assessment – Victorian Digital Technologies Curriculum			
Content Description	**Session Number**	**Assessment Piece**	**Achievement Statement**
Explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (VCDTDS019)	2	Student design that identifies a selection of devices	Students created a machine for Wily Wonka's Chocolate Factory that incorporated current system systems and peripheral devices.
Recognise different types of data and explore how the same data can be represented in different ways (VCDTDI020)	N/A		
Collect, access and present different types of data using simple software to create information and solve problems (VCDTDI021)	N/A		
Individually and with others, plan, create and communicate ideas and information safely, applying agreed ethical and social protocols (VCDTDI022)	N/A		
Define simple problems, and describe and follow a sequence of steps and decisions involving branching and user input (algorithms) needed to solve them (VCDTCD023)	3	Explicit instructions for their machine	Students wrote algorithms (explicit instructions) to explain how their invention for Willy Wonka's Chocolate Factory would operate.
Develop simple solutions as visual programs (VCDTCD024)	N/A		
Explain how student-developed solutions and existing information systems meet common personal, school or community needs (VCDTCD025)	4	Evaluation	Students explained how their new digital solution would benefit the wider community.

Assessment – New South Wales Science and Technology Syllabus			
Outcomes and Objectives	**Session Number**	**Assessment Piece**	**Stage Statement**
Describes how digital systems represent and transmit data (ST2-11DI-T)	2	Student design that identifies a selection of devices	Students created a machine for Wily Wonka's Chocolate Factory that incorporated current system systems and peripheral devices.
Use a range of methods to represent data, including tables and column graphs	N/A		
Collect, access and present data, using software to present and communicate information and solve problems (ACTDIP009)	N/A		
Defines problems, describes and follows algorithms to develop solutions (ST2-3DP-T)	3	Explicit instructions for their machine	Students wrote algorithms (explicit instructions) to explain how their invention for Willy Wonka's Chocolate Factory would operate.
Develop a sequence of steps and decisions (algorithms) to solve a problem (ACTDIP010)			
Generate visual programs using algorithms to create simple digital solutions	N/A		
Explain how existing information systems meet personal, school or community needs (ACTDIP012)	4	Evaluation	Students explained how their new digital solution would benefit the wider community.
Participate individually and collaboratively with clear roles and goals	N/A		
Organise and perform strategic roles within a group to solve a problem	N/A		

Assessment – Western Australian Digital Technologies Syllabus			
Year 3			
Content Description	**Session Number**	**Assessment Piece**	**Assessment Statement**
Digital systems and peripheral devices are used for different purposes (ACTDIK007)	2	Student design that identifies a selection of devices	Students created a machine for Wily Wonka's Chocolate Factory that incorporated current system systems and peripheral devices.
Different types of data can be represented in different ways (ACTDIK008)	N/A		
Collect and present different types of data using simple software to create useful information (ACTDIP009)	N/A		
Use visually represented sequenced steps (algorithms), including steps with decisions made by the user (branching) (ACTDIP011)	3	Explicit instructions for their machine	Students wrote algorithms (explicit instructions) to explain how their invention for Willy Wonka's Chocolate Factory would operate.
Create and communicate ideas and information safely (ACTDIP013)	N/A		
Create a sequence of steps to solve a given task (WATPPS16)	3	Explicit instructions for their machine	Students wrote algorithms (explicit instructions) to explain how their invention for Willy Wonka's Chocolate Factory would operate.
Develop and communicate ideas using labelled drawings and appropriate technical terms (WATPPS17)	3	Explicit instructions for their machine	Students developed and created an idea to design a new chocolate/sweets digital solution for a chocolate factory.
Select, and safely use, appropriate components with given equipment to make a solution (WATPPS18)	N/A		
Use criteria to evaluate design processes and solutions developed (WATPPS19)	4	Evaluation	Students explained how their new digital solution would benefit the wider community.
Work independently, or collaboratively when required, to plan, create and communicate sequenced steps (WATPPS20)	N/A		

Assessment – Western Australian Digital Technologies Syllabus			
Year 4			
Content Description	**Session Number**	**Assessment Piece**	**Assessment Statement**
Digital systems and peripheral devices are used for different purposes and can store and transmit different types of data (ACTDIK007)	2	Student design that identifies a selection of devices	Students created a machine for Wily Wonka's Chocolate Factory that incorporated current system systems and peripheral devices.
Data can be represented in different ways (ACTDIK008)	N/A		
Collect and present different types of data for a specific purpose using software (ACTDIP009)	N/A		
Use simple visual programming environments that include a sequence of steps (algorithm) involving decisions made by the user (branching) (ACTDIP011)	N/A		
Create and communicate ideas and information safely, using agreed protocols (netiquette) (ACTDIP013)	N/A		
Define a sequence of steps to design a solution for a given task (WATPPS21)	3	Explicit instructions for their machine	Students wrote algorithms (explicit instructions) to explain how their invention for Willy Wonka's Chocolate Factory would operate.
Identify and choose the appropriate resources from a given set (WATPPS22)	N/A		
Develop and communicate design ideas and decisions using annotated drawings and appropriate technical terms (WATPPS23)	3	Explicit instructions for their machine	Students developed and created an idea to design a new chocolate/sweets digital solution for a chocolate factory.
Select, and safely use, Appropriate components and equipment to make solutions (WATPPS24)	N/A		
Use criteria to evaluate and justify simple design processes and solutions (WATPPS25)	4	Evaluation	Students explained how their new digital solution would benefit the wider community.
Work independently, or collaboratively when required, to plan, create and communicate ideas and information for solutions (WATPPS26)	N/A		