Year 8 Sciences

Title of Unit: Designing a Fair Test (CREST Bronze Project Awards)	
Developed by Chinasom Elekwachi (2018)	
Context / Setting	The class comprises of 25 girls. 3 girls have learning difficulties. 2 girls with wellbeing.
Duration	3 Weeks
Lessons per Week	4x 55-minute lessons. 2 singles and 1 double.

Stage 1 - Identify Desired Results

Learning Outcomes: What Australian Curriculum content descriptors will this unit address?

Achievement Standard:

- Students identify and construct questions and problems that they can investigate scientifically. They consider safety and ethics when planning investigations, including designing field or experimental methods.

- They identify variables to be changed, measured and controlled.

- Students construct representations of their data to reveal and analyse patterns and trends, and use these when justifying their conclusions.

- They explain how modifications to methods could improve the quality of their data and apply their own scientific knowledge and investigation findings to evaluate claims made by others.

- They use appropriate language and representations to communicate science ideas, methods and findings in a range of text types.

Science as a Human Endeavour:

- **Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world (ACSHE134)**
  - Discovering how people's understanding of the nature of matter has changed over time as evidence for particle theory has become available through developments in technology

Science Inquiry Skills:

- **Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS139 - Scootle)**
  - Considering whether investigation using available resources is possible when identifying questions or problems to investigate.
  - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation.
  - Using information and knowledge from their own investigations and secondary sources to predict the expected results from an investigation.

- **Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (ACSIS140 - Scootle)**
  - Taking into consideration all aspects of fair testing, available equipment and safe investigation when planning investigations

- **Measure and control variables, select equipment appropriate to the task and collect data with accuracy (ACSIS141 - Scootle)**
  - Identifying and explaining the differences between controlled, dependent and independent variables

- **Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate (ACSIS144 - Scootle)**
  - Describing measures of central tendency and identifying outliers for quantitative data

- **Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACSIS145 - Scootle)**
  - constructing tables, graphs, keys and models to represent relationships and trends in collected data

- **Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (ACSIS146 - Scootle)**
  - Suggesting improvements to investigation methods that would improve the accuracy of the data recorded

- **Use scientific knowledge and findings from investigations to evaluate claims based on evidence (ACSIS234 - Scootle)**
  - Identifying the scientific evidence available to evaluate claims
  - Deciding whether or not to accept claims based on scientific evidence
  - Identifying where science has been used to make claims relating to products and practices

- **Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate (ACSIS148 - Scootle)**
  - Using digital technologies to construct a range of text types to present science ideas
  - Selecting and using appropriate language and representations to communicate science ideas within a specified text type and for a specified audience

Prior knowledge: (year level, content descriptor)

N/A

General Capabilities: **How will this unit promote … ?**	
Literacy	Practical Report
Personal and Social Capability	Collaboration – Group activities and practical work
ICT Capability	PowerPoint Presentation
Critical and creative thinking	Experimental Design and Poster Presentation
Numeracy	Data collection and analysis
Ethical behaviour	Experimental design – safety and ethics component

Key Ideas:	Student outcomes:
Students will know that... *QUESTIONS FOR INQUIRY:* What is a fair test?	*Students will be able to…* • The students will be able to understand the concept of a fair test • The students will be able to design and perform a fair test • The students will be able to communicate the results of a fair test by laboratory report and poster presentation

Stage 2 – Suggested Assessment Plan	
Formative Tasks	Description
Assignment	Design a Fair Test
Practical	Conducting a Fair Test
Test	Kahoots: Fair Test Quiz, Games
Laboratory Report	Fair Test Laboratory Report

Stage 3 – Learning Plan
What teaching and learning experiences will you use to achieve the desired outcomes (Stage 1) and equip students to complete the assessment tasks (Stage 2)?
How will students <u>experience and explore</u> the key ideas in the unit?

Week #	Lesson Title	Lesson Activities	Resources
1 **W6,** **T4**	What is a Fair Test?	**Lesson 1** **What is a fair test?** Demonstrate the students understanding of a fair test. (Kahoots Quiz) https://play.kahoot.it/#/k/9e5e8b62-6eda-42d0-b18f-24c963650315 **Conducting a fair test:** 'Which ping pong ball is "best"?' experiment (Practical)	**Kahoots Online Quiz (DayMap)** **Practical Resources** -Meter ruler -Variety of Ping Pong balls -Experiment Worksheet (DayMap) **PowerPoint (Prompts)**
		Lesson 2-3 **Conducting a fair test:** 'What effects how fast the water rose opens?' experiment (Practical) **Practical report write up:** 'What effects how fast the water rose opens?' (Students finish experiment worksheet) **Class Discussion:** Discussion of 'What effects how fast the water rose opens?' practical (hypothesis, variables, results) **Game: Practical report Write up** • Student volunteers will be selected and a paper with an aspect of a practical report will be given to them. • The class will be asked to arrange the practical report aspects in the correct order. (Questions i.e. what is and why?)	**Practical Resources** -Paper flower standards -Different types of paper -Containers -Water -Experiment Worksheet (DayMap) **Paper with aspects of practical report written on them** **ICT: PowerPoint (Prompts)**

		Lesson 4
		
		CREST project proposal: Introduce Proposal Template (fill in document)
		• Students will organise their groups for the CREST project
		   o Brainstorm project ideas (http://www.csiro.au/education/crestquiz/start.html)
		   o Begin CREST proposal
			CREST Quiz Access Link (DayMap)
			
			CREST Proposal Template (DayMap)

2 W7, T4	Designing a Fair Test	**Lesson 5** **CREST project design:** Students will continue to work on their CREST project proposal (to be approved by PST and teacher)	**Game Resources** -Chocolate Chip Cookies -A3 paper for students to write down their answers -Coloured markers **ICT (PowerPoint Presentation)** Data collection teaching notes **Whiteboard** -Whiteboard markers
		Lesson 6-7 **CREST project design:** Students will complete their CREST project proposal **Scientific Presentation Creation:** The students will create a 1 slide PowerPoint about their CREST project **Scientific Presentation:** Present CREST project to the class	**Online laboratory (DayMap)** **ICT (PowerPoint Presentation)** -Students will be given criteria for the slide
		Lesson 8 **Data Analysis:** Definitions plus examples **Data Analysis guessing game: Random or Systematic error (Why?)** • In table groups students will guess whether the example is random or systematic error (bonus points awarded for explaining why) **Data Analysis guessing game: Precision and/or accuracy (Why?)** • In table groups students will guess whether the example is precise or accurate (bonus points awarded for explaining why)	**ICT (PowerPoint Presentation)** -Data analysis teaching notes -Data analysis examples for games -Correct answers **Game Resources** -A3 paper for students to write down their answers -Coloured markers

3 W8, T4	Fair Test	**Lesson 9** **Prepare for CREST project:** Students will organise the materials needed for their CREST project **If complete students can use online interactive resource [Designing and conducting a fair test]:** Growing tomatoes (http://www.scootle.edu.au/ec/viewing/L8487/index.html)	**Interactive resource access (DayMap)** **Student laptops**
		Lesson 10-11 **Conduct CREST Project:** Students will conduct their CREST project **Write up CREST Project:** Students will write up their CREST project laboratory report	
		Lesson 12 **Create CREST Project Poster:** Students will complete CREST project poster in class (If not finished in class then student will complete it for homework)	

Unit design template from: Wiggins, Grant and J. McTighe. (1998). _Understanding by Design_, Association for Supervision and Curriculum Development, ISBN # 0-87120-313-8 (pbk)