

**Assessment Task #2 – Technology lesson**

**Bachelor of Education (Primary)**

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**21/09/18**

Table of Contents

[1.0 Introduction 2](#_Toc525306924)

[2.0 Rationale 2](#_Toc525306925)

[2.1 Design Process Elements 2](#_Toc525306926)

[3.0 Australian Curriculum Alignment 4](#_Toc525306929)

[3.1 Design Technologies Knowledge and Understanding 5](#_Toc525306930)

[3.2 Design Technologies Processes and Production Skills 5](#_Toc525306931)

[4.0 Conclusion 5](#_Toc525306932)

[5.0 References 6](#_Toc525306933)

# Introduction

Throughout this report it will discuss the lesson plan, focusing specifically on the integration of design processes throughout the lesson as well as examining the curricular intention, enduring understanding, learning goals, selection of resources and the engage, explore and review and conclude learning phases. It will also consider how the lesson incorporates project-based learning. This report will also discuss how the lesson plan aligns with the Australian Curriculum, specifically design technologies knowledge and understanding and design technologies processes and production skills.

# 2.0 Rationale

A lesson plan was created with a specific focus on teaching design technologies to year 3 students. This was done by getting students to plan and create a particular design. The lesson plan was structured around developing design thinking skills within students in order for them to be capable of solving complex problems with a great focus on human centred design and radical collaboration. After engaging in the lesson, students will gain an enduring understanding about design technologies and how they are used to provide solutions to problems. By developing students skills of design thinking, this will aid in the construction of their design. Also, this lesson will encourage students to build empathy due to an awareness that design technologies can be used to assist people’s needs. The learning goals for this lesson revolve around the curricular intention of “investigating the suitability of materials, systems, components, tools and equipment for a range of purposes” (Australian Curriculum, 2018). Therefore, students will understand that specific materials, tools and equipment have the potential to affect the behaviour and outcome of a design. Students will design and construct a container, using specific materials, that are able to protect an egg when released from a certain height and student will also appreciate the importance of constructing containers securely and effectively in order to ensure that its contents remain undamaged.

## 2.1 Design Process Elements

According to Dam and Siang, “design thinking is a method that describes a human-centred, iterative design process [and it]… provides a solution-based approach to solving problems” (Dam & Siang, 2018). This design process involves five stages. These are: empathise, define, ideate, prototype and test (Figure 1). “Understanding these five stages of design thinking will empower anyone to apply the Design Thinking methods in order to solve complex problems that occur around us” (Dam & Siang, 2018).

1. The empathise stage is addressed within the engage section of the lesson plan where students gain a deeper understanding about the types of materials used for different purposes.
2. In the define stage, students will identify that materials have different properties and therefore particular materials will have a greater impact on the outcome of student’s designs. Students will also “analyse and synthesise” (Dam & Siang, 2018) the observations they made about different types of materials in the empathise stage in order to use the appropriate materials for their design.
3. For the ideate stage, students will form groups and collaboratively list the materials for their design, the key design features, ways in which they could assemble the design and a visual representation. By engaging in this stage students will generate ideas based on their knowledge gathered in the first two stages and “identify solutions to the problem” (Dam & Siang).
4. In the prototype stage, students will create a physical model of their design and display the key features in order to investigate the solutions generated in the ideate stage.
5. During the test stage, each group will explain their design to the class, pinpointing the key design features and also providing a demonstration of their container to the class. Those who are not presenting will be given the opportunity to constructively critique each group’s project and state whether or not the container would support the egg based on the structure of the design and the materials utilised. “The results generated during the testing phase are what students will use to redefine their design” (Dam & Siang, 2018) and also reflect upon in the review and conclude section.

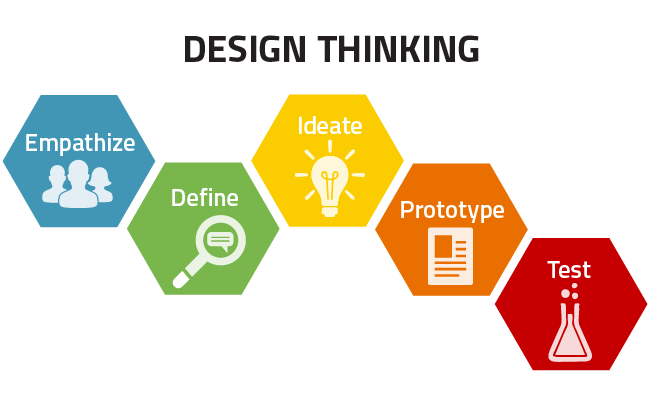


Figure 1: Design Thinking Stages

# 3.0 Australian Curriculum Alignment

The lesson plan created relates specifically to the Australian Curriculum. The design technologies curriculum for years 3 and 4 is constructed over two content descriptions: Design Technologies Knowledge and Understanding, and Design Technologies Processes and Production Skills. It addresses three technology contexts: “Engineering principles and systems; Food and fibre production and Food specialisations; and Materials and technologies specialisations” (Australian Curriculum, 2018). The activity presented in the lesson plan primarily demonstrates materials and technologies specialisations. Throughout the lesson students will “explore and learn to harness their creative, innovative and imaginative ideas and approaches to achieve designed products” (Australian Curriculum, 2018) by being aware of the properties of materials, and planning by collaboratively sharing their ideas when completing the worksheet and constructing their container design. Also, by implementing this students will “show an understanding of the importance of planning when designing solutions, in particular when collaborating” (Australian Curriculum, 2018). The Australian Curriculum (2018) also states that students “learn to reflect on their actions to refine their working and develop their decision-making skills”. The lesson plan refers to this in the review and conclude section because students are asked to consider a variety of questions in relation to the effectiveness of their design.

## 3.1 Design Technologies Knowledge and Understanding

The lesson plan aligns with the content descriptions for design technologies knowledge and understanding of the Australian Curriculum because it is based on the content descriptor of students “investigating the suitability of materials, systems, components, tools and equipment for a range of purposes” (Australian Curriculum, 2018). The lesson focuses on teaching students that specific materials, tools and equipment have the potential to affect the behaviour and outcome of a design. This learning goal is addressed in the engage section by commencing an open discussion about the importance of materials. It is also acknowledged in the explore section by giving students the opportunity to experiment with different materials for their designs. The importance of materials is additionally discussed in the review and conclude section because students will be asked to discuss what materials were the most effective and why? In this activity students will learn about and explore the “characteristics and properties of materials and components that are used to produce designed solutions” (Australian Curriculum, 2018). The Australian Curriculum also states in the knowledge and understanding strand that students will “recognise the role of people in design and technologies occupations and explore factors, including sustainability that impact on the design of products, services and environments to meet community needs”. Students are taught this aspect in the review and conclude section of the lesson plan by explaining that engineers design containers so that supplies can be airdropped to particular communities. Overall, this lesson aligns accurately with the year 3 and 4 Australian Curriculum for Design Technologies because it covers relevant content specifically addressed in the Curriculum.

## 3.2 Design Technologies Processes and Production Skills

The lesson plan also aligns with design technologies process and production skills. This is because during the lesson students will firstly “generate, develop, and communicate design ideas and decisions using appropriate technical terms and graphical representation techniques” (Australian Curriculum, 2018) by completing a design plan worksheet in groups. When engaging in this activity, students will share ideas as to what materials they should use, what key features the design should have, how they will join, connect, and assemble the materials, and how the design is going to look. This activity is used effectively within the lesson plan in order to stimulate design thinking and project-based learning. Furthermore, students will “explore and test a variety of materials, components, tools and equipment and the techniques needed to produce designed solutions” (Australian Curriculum, 2018) by physically creating a container to protect the egg. Therefore, the lesson plan integrates activities that specifically relate to the Australian Curriculum for design technologies process and production skills because the activities included explicitly align with the content descriptions acknowledged.

# 4.0 Conclusion

In summary, the lesson plan focuses specifically on educating students how to develop design thinking skills through students empathising, defining, ideating, prototyping and testing their designs. The lesson plan also accurately correlates to the Australian curriculum for year 3 Design Technologies. Therefore, it can be concluded that the lesson plan formulated, devises experiences which intentionally develop design concepts within students.

# 5.0 References

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| **School of Education & Humanities** | **MINI-LESSON PLAN** | | **UNIT CODE:** | | **CR192** |
|  |  | |  | |  |
| **Student Teacher** | Ebonnie Wright | | **Date** | 21st September 2018 | |
| **Learning Area** | Design Technology | | **Year Level** | Year 3 | |
| **Curricular Intention (Content descriptor)** | Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes (ACTDEK013). | | **Duration (minutes)** | 120 | |
| **Enduring Understandings** | | | | | |
| Students will understand that design technologies are used to provide solutions to problems and they will begin to develop skills of design thinking to aid in the construction of their design. Students will also understand that design technologies can be used to assist people’s needs when facing significant issues and therefore, this will encourage students to build empathy. | | | | | |
| **Learning Goals** | | **Essential Questions** | **Evidence of Understanding** | | |
| Students will:   1. Understand that specific materials, tools and equipment have the potential to affect the behaviour and outcome of a design 2. Design and construct a container, using specific materials, that are able to protect an egg when released from a certain height 3. Appreciate the importance of constructing containers securely and effectively in order to ensure that its contents remain undamaged. | | 1. Why would specific materials impact the desired outcome of the container design? 2. How would you adapt your container design to protect the egg if it was released from a greater height? 3. How could this container design be used in a real-life context? |  | | |

| **Learning Phases & Timing** | **LG (code)** | **Learning Experiences including Teaching Strategies and Essential Questions** | **Differentiation/Assessment Strategies** | **Resources & Organisation for Learning** |
| --- | --- | --- | --- | --- |
| ENGAGE  10mins |  | To begin the lesson, show a video of the nursery rhyme ‘Humpty Dumpty’ in order to provide the context for the students and to trigger an interest as to what the topic of the lesson is.  <https://www.youtube.com/watch?v=nrv495corBc>  After the video has been shown explain to students specifically what the activity is for today’s lesson. Explain to students that during this lesson they will be spilt into groups of three and be given a single egg. Tell students that they have to collaboratively design and construct a container to protect this egg when it is dropped to the ground from a certain height.  To define the activity further have a model previously created and give a demonstration to engage students and help them to understand what the activity is.  Ask students why they think the egg did not break in the demonstration?  This will lead into a discussion about the importance of the materials used and the design technique of the container.  This will then tie in with the first EQ: why would specific materials impact the desired outcome of the container design? |  | Video  Model container, egg  Whole class discussion |

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| --- | --- | --- | --- | --- |
| EXPLORE  90mins |  | **EMPATHISE & DEFINE**  To begin the explore section, firstly display the materials that students can select from in order to create their container. Explain to students that the materials used are important factors and need to be considered when designing their container.  **IDEATE: Brainstorm**  In order to help in generating the students’ ideas for their design, brainstorm ideas on the board to assist lower ability students who may be having difficulties.  Tell students to form groups of three  Before handing out a worksheet to each group explain to students that before they can start creating their container it is important for them to first create a design plan. -  **PROTOTYPE: Design**  **Activity #1:** Give each group a worksheet that provides space for students to list all the materials they wish to use, draw a diagram of their design, how they plan to assemble their design and explain the key features that are being used to support the egg in the container (See last page).  **PROTOTYPE: Create**  **Activity #2:** Once each group has shown their completed design plan they may then begin collecting all the materials they need to start constructing their container. Explain to the students that they have 50 minutes to create their design.  **TEST:**  After every group has completed their design, each group will place the egg inside their container then explain their design and give a demonstration to the class. The students who are not presenting will be asked the following question:   * Do you think the egg will break? Why/ why not?   After all the demonstrations have been conducted give students time to clean up their areas and then gather them on the floor to reflect upon and discuss the learning activity. |  | Cotton balls, duct tape, newspaper, cardboard, string, plastic bags , plastic cups, straws, PVA glue  Whole class discussion – brainstorming ideas  Group work  Worksheet, pencils, ruler |

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| REVIEW & CONCLUDE  20mins |  | To review and reflect upon the students’ understanding of the activity, get them to answer the following questions:   * What specific design features worked in your design and what did not? * What materials were the most effective and why? * EQ - How would you adapt your design to protect the egg if it was released from a greater height? * EQ - How could this container design be used in a real-life context?   Conclude by explaining to students that in some conditions, the only way for people to receive supplies such as food and medicine is by having them airdropped. Engineers have to design containers to support and protect important supplies to ensure that they are not damaged when dropped to the ground from these extreme heights.  Expand on this point by giving a specific example by referring to the 2010 Haiti earthquake. Explain to students that sometimes natural disasters can cause an area to be too dangerous and therefore, supplies need to be airdropped (as in the 2010 Haiti earthquake).  Explain to students that by creating this container they participated in design technology. Then finish by stating that design technology and design thinking are important skills to assist people and the environment. |  | Whole class discussion |

**Y E A R 3 D E S I G N T E C H N O L O G Y**

Design Plan

Student’s Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



You are to construct a container using specific materials

that will support an egg if it was dropped from a certain height. Use this worksheet to firstly plan your design.

List all the Materials:

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Draw a labelled diagram of your design:

How will you put your design together?

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List the key design features:

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