Design Your Dream Home

Learning Area(s)	Mathematics & Design & Technology	Year(s)	5 & 6

Description
AC Mathematics : Year 5 At this year level: Understanding includes making connections between representations of numbers, using fractions to represent probabilities, comparing and ordering fractions and decimals and representing them in various ways Fluency includes choosing appropriate units of measurement for calculation of perimeter and area, using estimation to check the reasonableness of answers to calculations and using instruments to measure angles Problem Solving includes formulating and solving authentic problems using numbers and measurements, creating transformations and identifying line and rotational symmetries Reasoning includes investigating strategies to perform calculations efficiently, creating financial plans, interpreting results of chance experiments and interpreting data sets **AC Mathematics : Year 6** At this year level: Understanding includes describing properties of different sets of numbers, using fractions and decimals to describe probabilities, representing fractions and decimals in various ways and describing connections between them, and making reasonable estimations Fluency includes representing negative numbers on a number line, calculating simple percentages, using brackets appropriately, converting between fractions and decimals, using operations with fractions, decimals and percentages, measuring using metric units, and interpreting timetables Problem Solving includes formulating and solving authentic problems using numbers and measurements, creating similar shapes through enlargements, representing secondary data, and calculating angles Reasoning includes explaining mental strategies for performing calculations, describing results for continuing number sequences, investigating new situations using known properties of angles, explaining the transformation of one shape into another, and inferring from the results of experiments **Technologies - Design and Technologies : Year 5** In Year 5 and 6 students critically examine technologies - materials, systems, components, tools and equipment - that are used regularly in the home and in local, national, regional or global communities, with consideration of society, ethics and social and environmental sustainability factors. Students consider why and for whom technologies were developed. **Technologies - Design and Technologies : Year 6** In Year 5 and 6 students critically examine technologies - materials, systems, components, tools and equipment - that are used regularly in the home and in local, national, regional or global communities, with consideration of society, ethics and social and environmental sustainability factors. Students consider why and for whom technologies were developed.

Unit Focus
The focus of this unit is to apply measurement concepts within a real life scenario. Students design their own dream house while using many mathematical and design processes with the final outcome being a complete house design with all costing included. The unit draws on both mathematical and design concepts such as measuring, predicting, estimating, calculating, designing, communicating, problem solving, generating ideas and communicating with others. Students will learn the processes and skills involved in house design.

Stage 1: Desired Results

Transfer of knowledge
• To use Measurements concepts (Area, Perimeter) in real life contexts • To use and explore design skills • To work effectively as part of a team and communicate with others

Understanding	Essential Questions
• Various Measurements such as area and perimeter	• How exact does measurement need to be when

are important when designing houses • It is important that measurements be exact in order to interpret costing, results or data • Area and perimeter can be measured in a variety of units (mm, cm, m, inch) • Problem solving includes formulating and solving authentic problems using measurements	designing a house? • How is perimeter and area used in real life situations? • What mathematical processes are involved within building houses? • What changes can I make to my house in order to get best prices?

Knowledge	Skills
• The different mathematical formulas to build a house (area & perimeter) • How to choose and use appropriate measurement units • How to perform different calculations efficiently • How to use whole numbers and measurements in building and designing	• Explaining plans for simple budgets • Using appropriate units of measurement for length and area • Calculating perimeter and area of rectangles • Listing and communicating probabilities using decimals and percentages

Curriculum
Curriculum AC Mathematics : Year 5 : ACMMG108 Using units of measurement: Choose appropriate units of measurement for length, area, volume, capacity and mass AC Mathematics : Year 5 : ACMMG109 Using units of measurement: Calculate the perimeter and area of rectangles using familiar metric units AC Mathematics : Year 5 : ACMNA099 Number and place value: Use estimation and rounding to check the reasonableness of answers to calculations AC Mathematics : Year 6 : ACMNA123 Number and place value: Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers AC Mathematics : Year 6 : ACMNG136 Using units of measurement: Convert between common metric units of length, mass and capacity AC Mathematics : Year 6 : ACMNG137 Using units of measurement: Solve problems involving the comparison of lengths and areas using appropriate units Technologies - Design and Technologies : Year 5 : ACTDEP025 Generate, develop, communicate and document design ideas and processes for audiences using appropriate technical terms and graphical representation techniques Technologies - Design and Technologies : Year 6 : ACTDEP025 Generate, develop, communicate and document design ideas and processes for audiences using appropriate technical terms and graphical representation techniques AC Mathematics : Year 5 : communicate and justify thinking and reasoning, using everyday and mathematical language, concrete materials, visual representations and technologies **Other Goals** **ACARA AC Achievement Standards** ACSA-MA6-8 Students connect decimal representations to the metric system and choose appropriate units of measurement to perform a calculation. ACSA-MA5-4 Students explain plans for simple budgets. ACSA-MA6-10 Students solve problems involving length and area. ACSA-MA5-12 Students use appropriate units of measurement for length, area, volume, capacity and mass, and calculate perimeter and area of rectangles.

ACARA AC Achievement Standards

ACSA-DAT5-6 Students combine design ideas and communicate these to audiences using graphical representation techniques and technical terms.
ACSA-DAT6-6 Students combine design ideas and communicate these to audiences using graphical representation techniques and technical terms.
ACSA-DAT6-4 Students create designed solutions for each of the prescribed technologies contexts suitable for identified needs or opportunities.
ACSA-DAT5-8 Students select and use appropriate technologies and techniques correctly and safely to produce designed solutions.

ACARA General Capabilities

GC43 assess the feasibility, possible risks and benefits in the implementation of their ideas
GC40 generate and develop ideas and possibilities
GC44 transfer their knowledge to new situations

Stage 2: Assessment Evidence

Criteria	Description
1. Explains budget for house proposal 2. Accurately measures rooms and calculates area & perimeter 3. Determines total costing of house	**Part 1: House Costing Proposal** Students create their proposal for the house of their dreams. For their house to be approved it must include all the relevant costing from the task sheet and be measured accurately demonstrating knowledge of both area and perimeter.
1. Creates 3D home plan from original drawn draft 2. Uses creativity skills in designing and reasoning skills if any changes need to be made 3. Ability to communicate design ideas	**Part 2: House Design** Students must use their house-costing proposal to accurately create their house plan using home design software. Students must make sure they recreate the accurate measurements from their plan and follow through from their proposal. Any changes from their original proposal must be explained with appropriate reasoning.

Stage 3: Lesson Sequence

Lesson	Description
Prior Knowledge	**What do we know:** 1. Class Discussions: What do we know about building a house 2. What processes are involved? 3. What mathematics and design skills are involved? **Homework:** To talk to family members about what mathematical and design skills would be involved in building a house.
Lesson 1	**House Designs** • Class to share and discuss homework task.

	Explain Tasks • Explain that students are going to be home designers. Go through task sheets. **House Plans Exploration** • **Brainstorm:** Students use A4 paper to brainstorm some of the rooms and things that they would like in their dream house. Share to the class • **Explore:** Students use laptops/computers to explore different house plans to get some ideas for the next lesson. Things to consider: a) What are realistic measurements of rooms? b) How many bedrooms do you want? c) How many bathrooms? d) Walk in robes? e) Garage? Students can print of any plans for ideas *Note- students need to use creativity skills and design own house. Although they can use pictures for inspiration they must design their own house.
Lesson 2	**Drawn House Plans** 1. **Discuss:** What skills are important when designing? (Accuracy, Neat, Using pencil & ruler, creativity, purpose) 2. **Table discussion:** Students come up with a list of essential rooms in a house. What's the difference between essential and luxurious? What could you include in your plan. 3. **House Designing:** Students have the lesson to design their house. Students must design their house on grid paper, create an accurate scale (i.e. 1 m = 2 grid squares) and have realistic room sizes. For example students wouldn't have a bedroom that was 10m by 17m. *Design must include doors & windows
Lesson 3	**Find the Perimeter & Cost** 1. **Discuss:** What is the purpose of finding the perimeter of each room? (Perimeter is used to find the cost of skirting boards) 2. **Perimeter:** Discuss how to find perimeter. Go through on the board. **3. Find Perimeter of rooms:** Students to complete the perimeter table for each room. **Table Headings:** **a)** Room **b)** Measurements **c)** Perimeter **d)** Cost ***Note**- give cost of skirting boards e.g. $3.50/metre
Lesson 4	**Find the Area & Cost** **1. Discuss:** What is the purpose of finding the area of each room? (Area is used to find the cost of flooring) **2. Area:** Discuss how to find perimeter. Go through on the board. **3. Find Area of rooms:** Students to complete the area table for each room. **Table Headings:** **e)** Room **f)** Measurements **g)** Perimeter **h)** Area **i)** Cost ***Note**- students to use laptops to explore flooring options and find prices.
Lessons 5-6	**Creating furnishings budget** 1. **Discuss:** Why is it important to create a budget? What are some of the things that you will need in your house? 2. **Furnishings brainstorm:** Students work in groups to brainstorm the different things that they will need in their house (fridge, couch, toilets, beds etc.)

	3. **Budget & Costing:** Students will have lessons to create a budget for various items they are going to buy for their house. Once this is created students use websites to explore actual cost of items. **Table headings:** a) Items b) Budget price c) Actual price
Performance Task 1 Due	**Dream House Assessment Part 1** • Students have the lesson to complete any unfinished sections of their house-costing proposal. All sheets need to be collated and handed up in the design folio. • Once students have completed they can peer share and check work before they hand up to teacher to be marked and 'approved' for building.
Lesson 7	**House Plan Software Exploration** 1. **Computer/laptop work:** Students have 5 minutes to play around with the software and find one thing that they can do. Students then share the skill with those around them. • As a class create a room together. Give specific task for them to trial program **For Example** • Create a Master bedroom with a walk in robe, einsuite and at least 2 windows. Bedroom cannot be bigger than 5m x 5m.
Lessons 8-10	**3D House Plans** • Students have the following lessons to accurately recreate their house design in the software. Students also add flooring, paint, and furnishings.
Performance Task 2 Due	**My Dream House** • Students share dream houses with classmates and give a peer rating for their dream home. • Student's hand up dream house along with peer ratings to be marked.

Websites/ Resources

Resource Description	Website
**Home Styler Software	http://www.homestyler.com/designer
Google house plans	https://www.google.com.au/search?q=house+plan+ideas&biw=1280&bih=603&source=lnms&tbm=isch&sa=X&ei=-0x1VbmJHeLXmAXAuoPgDw&ved=0CAYQ_AUoAQ
GJ House plans	http://www.gjgardner.com.au/offices/house-designs.aspx
Blue Lake home plans	http://www.bluelakehomes.com.au/site-built-homes
Area & Perimeter	http://www.amathsdictionaryforkids.com/dictionary.html
Area & Perimeter interactive	http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html

Bunnings flooring prices	http://www.bunnings.com.au/our-range/paint-decorating/flooring http://www.bunnings.com.au/our-range/paint-decorating/flooring/timber-floors http://www.bunnings.com.au/our-range/paint-decorating/flooring/vinyl http://www.bunnings.com.au/our-range/paint-decorating/flooring/timber-floors/laminate http://www.bunnings.com.au/our-range/paint-decorating/flooring/carpet
Choices flooring	http://www.choicesflooring.com.au/carpet-flooring/carpets-price/
Paint	http://www.bunnings.com.au/our-range/paint-decorating/paint http://www.wattyl.com.au/en/