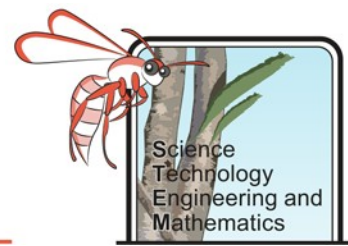


## How to use this document

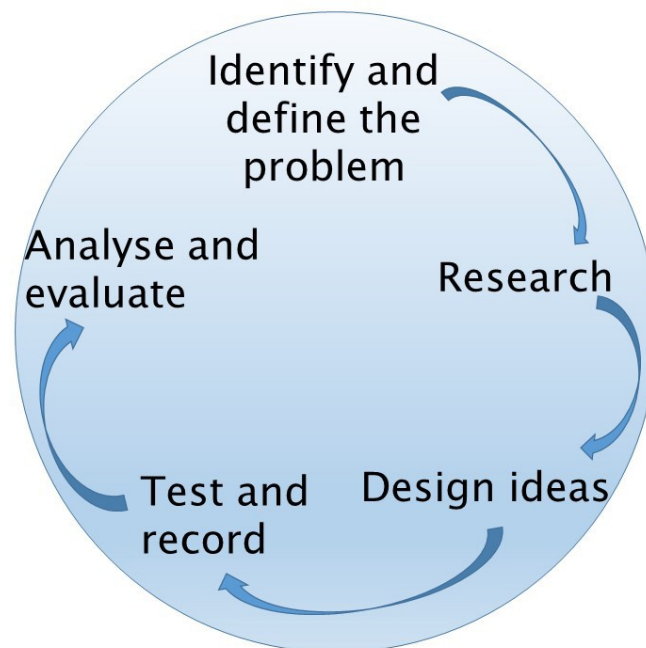
1. Open this file in Adobe Reader. If you do not have this program you can download it for free here: <https://acrobat.adobe.com/au/en/acrobat/pdf-reader.html>
2. Download the file and **save** it to your computer as Project Name \_Your Name e.g. Going for Gold\_Joe Bloggs. **It is really important you do this otherwise none of your input will be saved.**
3. Fill in your answers in the spaces provided in the document.
4. Where there are image boxes take photos or scans of your work and upload the picture file. If you cannot do this, for any reason, upload the pictures as separate files and save them as Project Name\_Your Name\_Image number e.g. Going for Gold\_Joe Bloggs\_Image 1.
5. Save your work as you go along.
6. When you have finished email or upload your completed document (and image files) as your teacher has instructed.

# Chopping on Rock – Student Booklet



## The Challenge

You are moving house and your parents have decided that they would like some new equipment for the kitchen. They would like to keep it modern and stylish, but also practical. In particular they would like a new chopping board, as they are sick of the flimsy plastic one they have been using. You have decided for their anniversary you would like to have one made for them, and have taken on the challenge of designing it yourself.



## Background Information

Some of the earliest tools ever used by humans were those intended for food preparation; chopping, grinding and tenderising have always been important techniques in the kitchen. The simple chopping board, is actually anything but – and can be designed for multi-purpose use, for example a heat mat and chopping board combined. New designs are still entering the market, with developments to make them more user friendly, or convenient for storage and cleaning.

One of the most important aspects of a chopping board is that it is food safe. Chopping boards need to be able to be cleaned easily and effectively, so that they do not harbour any bacteria. It is vital that their surface is not too absorbent. This will also prevent bad smells as well as staining.

Personalised chopping boards have become very popular in the past few years, especially as house warming, wedding and anniversary gifts. Often they are made with engravings including names or dates. For "foodies" they might include words suggesting what to place where on them, such as cheese names.

## Chopping on Rock – Student Booklet

There is a wide array of materials that are used for chopping boards, and it is important that they have been tested properly to ensure that they can withstand everyday use, as well as any accidental knocks or bumps that might occur. Chopping boards need to be durable, reliable, cost effective and convenient.



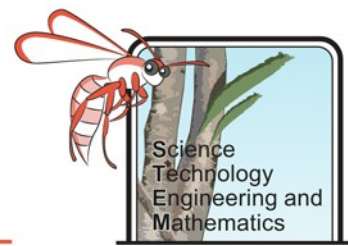
Figure 1. Slate cheese platter. (Acabashi, 2017)

### Background Research

1. What are possible materials for a chopping board?
2. How do sedimentary, igneous and metamorphic rocks form? Draw labelled diagrams for each rock type. Attach these as a separate file or insert below.

3. What dimensions would be practical for a chopping board?
4. Which materials are most sustainable?
5. What are the most important features and functions of a chopping board?

# Chopping on Rock – Student Booklet



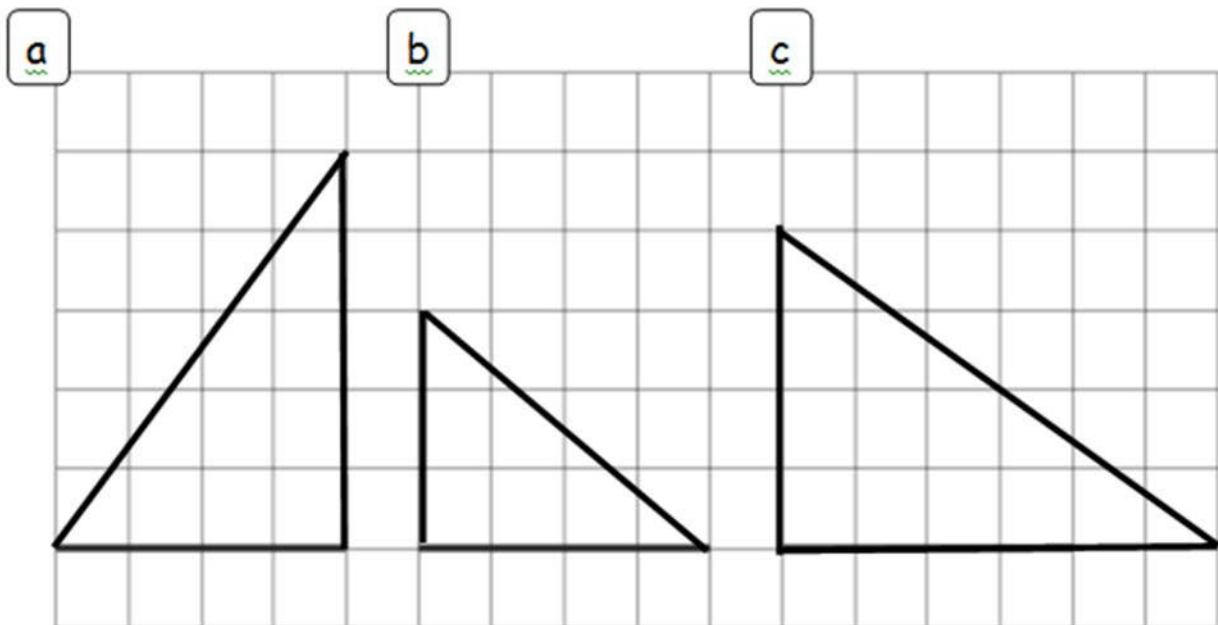
## Investigation: Shaking Up the Style

A rectangular chopping board might be a bit boring, how about making your chopping board a different shape?

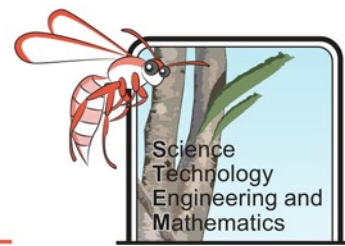
1. A triangular chopping board could look good, especially if used for cheese. What is the formula used to calculate the area of a triangle?

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2. Calculate the area of the following triangles, if each square represents 10 cm (show working):



A	
B	
C	



## Chopping on Rock – Student Booklet

3. If the chopping boards are 3 cm thick, calculate the volume of each:

A	
B	
C	

4. The density of granite is  $2.7 \text{ g/cm}^3$  calculate the mass of each chopping board by multiplying this figure by its volume.

A	
B	
C	

5. It has become very fashionable to have round chopping boards, as they look stylish in the center of a table.

a. What is the formula for the area of a circle?

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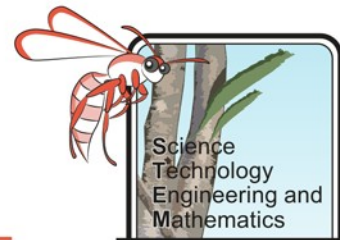
b. What is the formula for the circumference of a circle?

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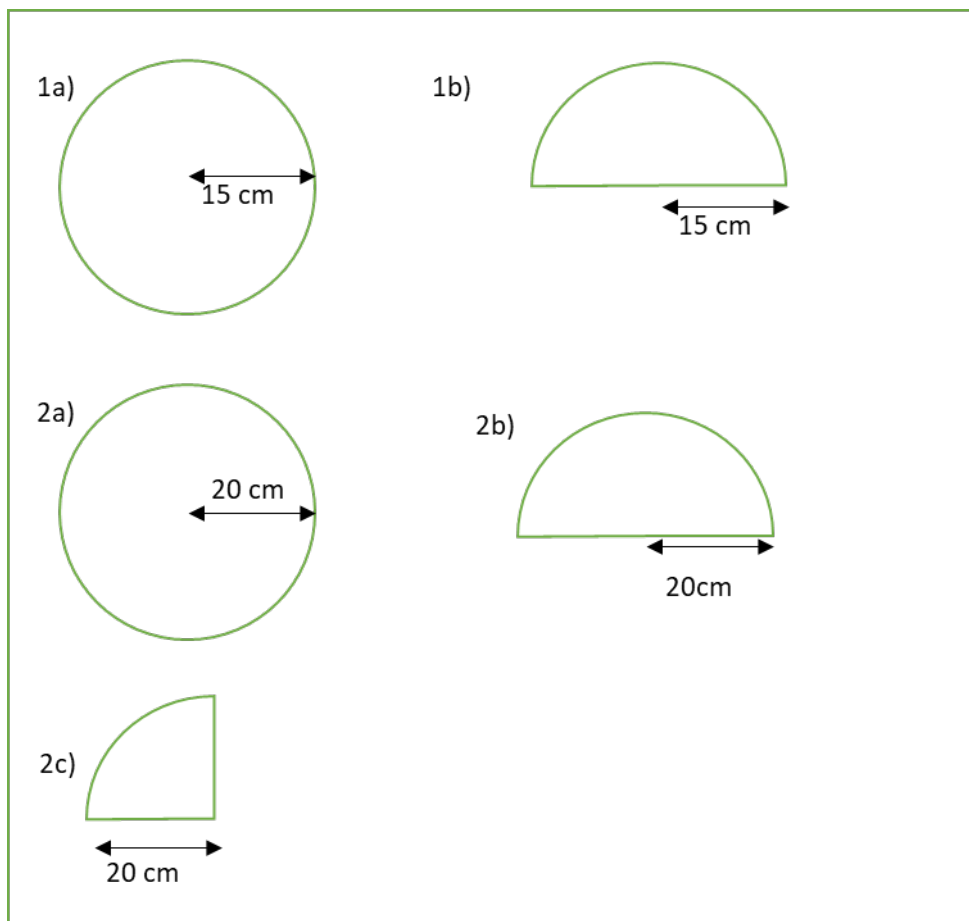
6. Calculate the circumference and area for the shapes on the next page (show working):

Shape	Circumference (cm)	Area (cm <sup>2</sup> )
1a		
1b		

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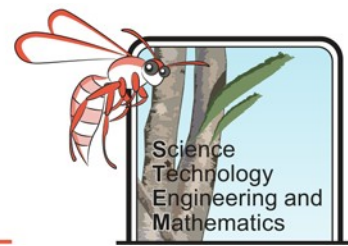


2a		
2b		
2c		



7. Which shape do you think would be best for your chopping board design? Explain why and give suggested dimensions.

# Chopping on Rock – Student Booklet



## Cost analysis

### Objective

The price of materials will always affect a designer's decision on what material to use for a design. Your job is to investigate the price of different materials to determine how much it will cost to make your chopping board

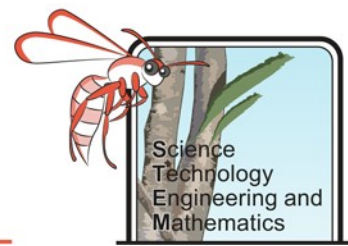
### Method

1. Create a table which will allow you to input calculations and data (Excel will do calculations for you – example below).
2. Decide on the ideal dimensions you will use for your product.
3. Research different merchants to find at least 3 quotes for the price of the materials, ensure you note where you got each quote from.
4. Consider the size that you can buy the material in – will it need to be cut down? If so will there be lots of waste, or would it even be possible to make a few?
5. Will you have to varnish the product, if so how many times? How much varnish will you use, and how much will that cost?
6. How much time will it take to make the product roughly? Consider that a tougher material may take more time to cut. Adding layers of varnish will also add time. How much is your time worth?
7. Will you have to buy new tools to make the product? If so what is the cost of the tools?

	sample type	dimensions for board	price	size available	amount wasted	website	how many boards can you make?
Merchant 1							
Merchant 2							
Merchant 3							



# Chopping on Rock – Student Booklet



## Designing and planning the product

### Objective

To create different design ideas to decide on the most suitable design for the intention. To make a clear and safe plan of how the product will be made.

### Method

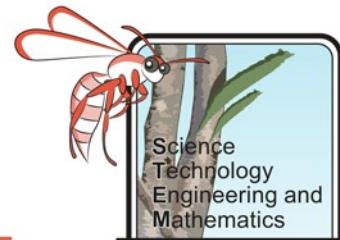
1. Carry out some background research into products that have already been made, filling them into this table, highlighting their pros and cons.

<u>Idea</u>	<u>Pros</u>	<u>Cons</u>

2. If possible, create 3D scale drawings of different design ideas, highlighting the features which make them appropriate for the design brief. You may wish to do this on the computer using SketchUp or CAD.
3. Write a plan of how you could make your chosen design, ensuring you have completed a risk assessment.

Equipment and tools needed:

# Chopping on Rock – Student Booklet



Method/ Steps:

Risk assessment

Hazard	Risk	Prevention
Spilling varnish	Could damage clothing, and surfaces, may stain skin	Use care, and cover surfaces.  Wear an apron and roll up sleeves.  Ensure lid is put straight back onto bottle after use  Clean spillages straight away and dispose of tissues safely.