Nguzu Nguzu Mathematics

Pupil's Resource Book 2

Standard 6

Pupil's Resource Book 2

Acknowledgements

Important Note

This Pupil's Resource Book belongs to the school. You must not take it home unless your teacher tells you to and it must always be returned to school.

Contents

1a Expressing Two Quantities as a Ratio

Activity A

Look at each box and write ratios for each group of objects in two different ways.

Remember!

The ratio is the relationship between two amounts or measurements.

Activity B

Write the ratio for each of these statements. The first one has been done for you.

1. Our team won 6 games and lost 9 games. **won:lost   6:9**

2. Our school has 4 teachers and 120 pupils.

3. In our class, 12 pupils are girls and 18 are boys.

4. At our farm, we have 25 hens and 15 roosters.

5. Our school netball team won 8 games and lost 3.

6. My father caught 6 mamula and 9 snapper.

Unit 9

Activity C

Look at these graphs. They show tonnes of copra shipped out of Santa Anna and Arosi villages each month.

Monthly Copra Sales in Tonnes

Key
Santa Anna
Arosi
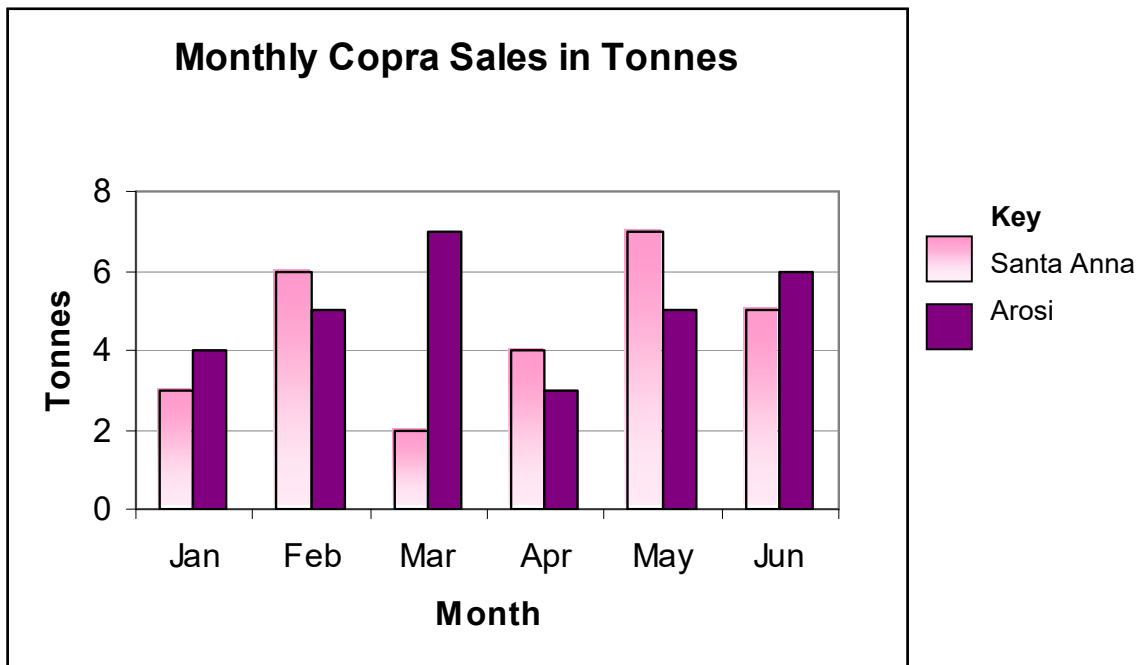
Look at the amount of copra shipped from Arosi as compared to Santa Anna. Write a ratio for the following:

1. January.

2. March.

3. June.

4. The first three months of the year.

5. April to June.

6. The total amount of copra in tonnes from January to June.

1b Simplifying Ratios

Activity A

Write the following ratios in their simplest form.

Hint!

If you know your multiplication tables you will be able to find common factors quickly!

1. 3:6	**2.** 4:2	**3.** 3:9	**4.** 4:8	**5.** 2:2
6. 12:3	**7.** 5:15	**8.** 16:2	**9.** 25:50	**10.** 50:200

Activity B

Calculate the following ratios.

1. Kolosulu School has 252 pupils and 9 teachers. What is the ratio of pupils to teachers?

2. There are 100 boys and 150 girls at Kolosulu School. What is the ratio of girls to boys?

3. My father has 24 bags of cocoa beans and 72 bags of copra. What is ratio of cocoa bean bags to copra bags?

4. My uncle's plantation has 192 coconut trees and 64 cocoa trees. What is the ratio of coconut trees to cocoa trees?

5. In my extended family, there are 30 females and 60 males. What is the ratio of females to males?

6. On my island, there are 24 community high schools and 52 primary schools. What is the ratio of primary schools to community high schools?

Activity C

Students at Koloale School were asked which game they liked to play best.

Study the results of the survey below and write the given ratios in their lowest terms. The first one has been done for you.

Game	Number of Pupils
soccer	110
softball	30
basketball	80
volleyball	40
rugby	90

1. soccer to rugby   **110:90 = 11:9**
2. volleyball to basketball
3. softball to volleyball
4. softball to soccer
5. soccer to total
6. total to rugby

Remember!

To find the lowest terms look for common factors.

1c **Calculating Ratios**

Activity A

The ratios in each column are equivalent ratios. Find the missing numbers to complete them.

1. **2:1**
   a. 4:?
   b. 6:?
   c. 8:?
   d. ?:5

2. **3:2**
   a. ?:4
   b. 9:?
   c. 12:?
   d. ?:10

3. **4:5**
   a. 8:?
   b. 12:?
   c. ?:20
   d. 20:?
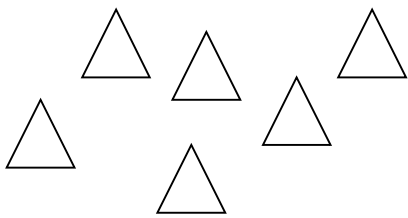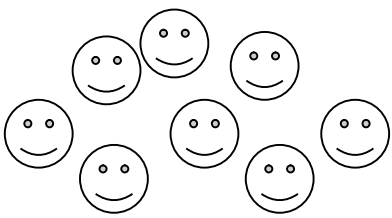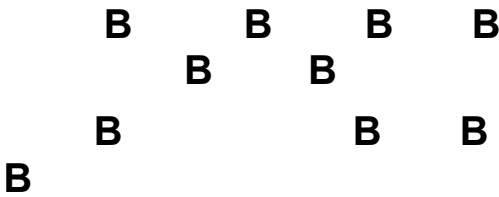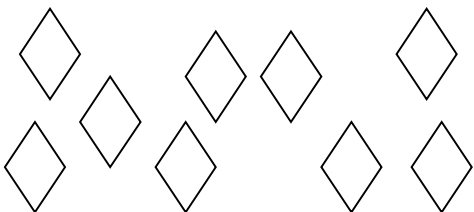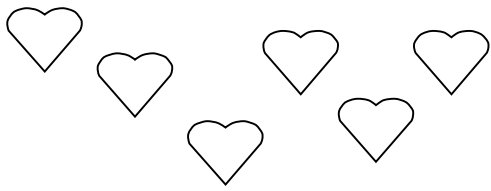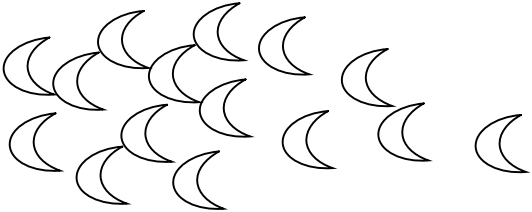
4. **3:4**
   a. 6:?
   b. ?:12
   c. 12:?
   d. 15:?

Unit 9

Activity B

Look at the ratio given for each set. Draw and complete the set so that the number of objects is correct.

1. triangles:squares   3:1

2. circles:faces   3:2

3. A:B   1:5

       B   B   B   B
          B   B

       B   B   B

B

4. diamonds:circles   3:5

5. hearts:crosses   2:5

6. moons:stars   5:6

Activity C

Read the following problems carefully and calculate the ratios.

Show your working out and write your answers in your exercise book.

What Does it Do?

A ratio lets us compare one quantity with another.

1. The ratio of boys to girls in our class is 3:2. If there are 16 girls how many pupils are there in our class?

2. We bought a crate of drinks for our picnic. If there were 12 cokes and 15 fantas in the crate, what was the ratio of fanta to coke?

3. The government decided that each class in a school should have no more than 30 pupils in it.

   a. There are 252 pupils in our school. If we have 5 teachers already how many more do we need so that we can follow the government's rules?

   b. What will be the ratio of pupils to teachers in our school then?

4. We did a survey of the ages of people who lived in Tali village. Here is the table of our results.

Age in Years	Number
0 – 1	22
2 - 6	96
7 - 15	88
16 - 21	40
22 - 40	38
41 - 60	42
over 61	2

a. What is the ratio of people over 21 to young people 21 and under?

b. What is the ratio of children 2-6 to children 7 – 15?

c. What is the ratio of people over 61 to people between 22 and 60?

d. How many people are there in the village altogether?

e. In 3 months time four babies will become 2 years old. There are also 2 more babies expected. What will the ratio of babies to children 2-6 years old be in 3 months time?

2a Expressing Quantities as a Ratio

Activity A

Work out these quantities. Studying the ratios will help you.

Interesting!

Quantities can be expressed as ratios!

1. You need 1 measure of milk powder and 3 measures of water to make 1 cup of milk. How much do you need to make 6 cups of milk?

2. My mother uses the juice of 2 lemons and 250 mL water to make one glass of lemon juice. How much will she need to make four glasses of lemon juice?

3. I use 250 g of sugar and 300 mL of coconut water to make 10 coconut lollies. What do I need to make 40 coconut lollies?

4. To make 10 pancakes you need 750 grams of flour and 1 litre of milk. What do you need to make 20 pancakes?

5. If I can make 15 drinks with 1 bottle of orange cordial how many bottles do I need to make 60 drinks for the whole of Standard 6?

Activity B

Read each problem carefully, identify the ratio then answer the question.

1. If you add 50 mL of dye to 200 mL water you get 250 mL of dye mix. How much dye and water is needed to make 1 litre of dye mix.

2. To mix chainsaw fuel, you add 200 mL of oil to 10 litres of petrol. How much oil do you need to add to 25 litres of petrol?

3. Builders use a ratio of 1:6 to mix cement and sand to make concrete. If a builder mixes 500 grams of cement, how much sand should he or she add?

4. I use 1 egg and 250 g of flour to make one flat bread. If I have 5 eggs and 1 kg of flour how many flat breads can I make?

5. To mix chainsaw fuel, I add 200 mL of oil to 10 litres of petrol. If I buy a 5 L can of oil how many litres of petrol will this be enough for?

Activity C

Last year, Bosa Primary School spent $250 on new soccer uniforms, $25 on socks, $125 on brushing the soccer field and $300 on transport for the school team.

Compare the amount spent on each item in the form of a ratio. Write the ratios in their lowest terms.

1. brushing soccer field to socks
2. soccer uniforms to transport
3. socks to uniforms
4. transport to socks
5. socks and uniforms to brushing the soccer field

Tip

Using ratios is a good way of analysing data.

1a Identifying the Probability of Events

Activity A

Read each event. Write 0 **if it is impossible,** 1 **if it is certain and** between 0 and 1 **if it is neither impossible nor certain.**

1. December 25th will be a clear and sunny day.

2. A bag of cement will float in water.

3. If you teach a cat it will be able to fly.

4. A new treatment will be found for malaria this year.

5. There will be 30 days in February next year.

6. A 20 cents coin when flipped will land on heads.

7. If a coconut is dropped from the tree, it will fall towards the ground.

Remember!

Probability is the chance of something happening, or not happening.

Activity B

Think about the probability of each of the following events. Copy the table below into your exercise book and list each event in the correct column.

1. Our class will start flying lessons next week.

2. If I flip a coin, it will land to show either heads or tails.

3. We will have a school picnic at the end of the year.

4. We will get an earthquake in the next three months.

5. Sunday will be after Saturday this week.

6. Kossa will win their match against Naha this Saturday.

7. My dog is expecting kittens.

8. My sister will learn to cook.

a. an even chance	b. highly likely	c. certain	d. highly unlikely	e. impossible

Activity C

Explain the meaning of the following statements in your own words. The first one has been done for you.

1. Both teams have an even chance of winning the match.

   Both teams are just as likely to win or to lose.

2. There is a 20% chance of rain this evening.

3. There is a 50% chance of rain sometime tomorrow.

4. Your chances of finding a mermaid in the sea are none.

5. If we get up late we could be late for school.

6. If you flip a coin, there is a 50-50 chance it will land on heads.

7. One of the 4 semi-finalist teams will win the cup.

1b Predicting and Finding Probability

Did you Know?

Estimating and predicting mean the same.

Activity A

Work with a partner. Carry out this experiment. Estimate first and write this number down. Take turns to toss the coin when you do the experiment.

Outcomes	Estimate		Results	
	Heads	Tails	Heads	Tails
20 tosses				
10 more tosses				
10 more tosses				
Totals from 40 tosses				

1. Compare your estimate to the actual results. Talk about this with your partner.

2. Add up your totals and write the number of heads over the total number of tosses. Then write the number of tails over the total number of tosses.

   With your partner, discuss your results using words which you have used in your probability lessons. Write a short paragraph in your exercise book explaining what you found out.

Activity B

Work with your partner. Use a four-colour spinner like the one on the right. Copy the table on the following page into your exercise book. Estimate your result first and record your estimate in the table.

Now carry out the experiment. Take turns to spin the spinner and see which colour it lands on.

Record your results as a tally on a piece of scrap paper to make it easier to work out the totals. When you have finished, write your totals in the table.
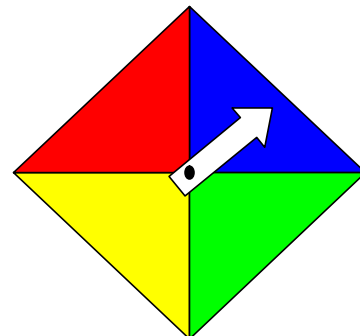
Outcomes	Estimate				Actual Results			
	Yellow	Blue	Red	Green	Yellow	Blue	Red	Green
40 spins								
Totals								

Work out the probability of getting a particular colour with each spin. Write this as a fraction. Compare this with your results. Write a few sentences about what you found out.

Activity C

Think about the results of the experiment you did earlier with the class, when each group tossed a coin 40 times and recorded the results.

Read the statements below. Decide which statements are true and which are false. Record your answers in your exercise book.

1. If a coin is tossed there are two possible outcomes.

2. If a coin is tossed 1,000 times the probability of getting heads or tails is equal.

3. If a coin is tossed twice neither tails nor heads will appear twice.

4. If a coin is tossed 3 times and each time it lands on heads the chances of it landing on tails in the 4th throw are increased.

5. When tossing a coin the probability of it landing on tails is 🗁.

6. When tossing a coin there is an even chance of getting heads or tails.

1d   Predicting and Calculating the Probability of Events

Activity A

Look at the diagram of the spinner and answer the questions. Write each answer as a fraction in its simplest form. The first question has been done for you as an example.

Write the probability of getting:

1. an 8   **1 out of 8, $\frac{1}{8}$**

2. a 2 or a 6

3. a 2, a 4 or a 6

4. a 7 or an 8

5. an odd number

6. a number greater than 6
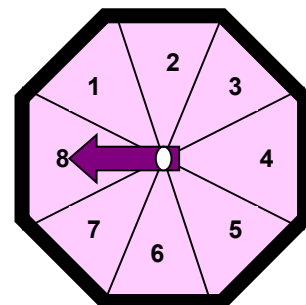
Reminder

Look at the total number of outcomes and number of favourable outcomes when predicting probability as a fraction.

Unit 9

Activity B

Using the spinner shown on the left, write down the probability of each of the following scores. Write your answers as fractions.
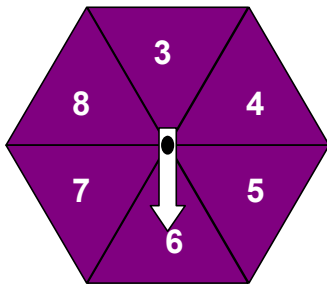
1. an 8

2. an even number

3. a multiple of 3

4. a multiple of 2

5. an odd or an even number

6. 6, 7 or 8

7. a 9

Remember

If you know your times tables then you know the multiples of many numbers!

Activity C

Here are some jobs that need to be done at home. Each job is written on a piece of paper. The pieces of paper are put in a box and you have to pick one out without looking.

Sweep the house	Cut the grass	Tidy the bedroom	Weed the garden	Cut some firewood

1. **What is the probability that:**

   a. you have to tidy the bedroom?

   b. you **don't** have to cut the grass?

   c. you have to do a job inside the house?

   d. you have to do a job outside the house?

2. If you pick first and you pick "weed the garden". When your brother picks, what is the probability that he will have to wash the clothes?

3. Your brother picks first and picks a job inside the house. Then you pick. What is the probability that you get a job outside the house?

Check Up Page

1. **Look at the sets of shapes below. Write the ratio of purple shapes to white shapes in each set.**

   a.

   b.

   c.
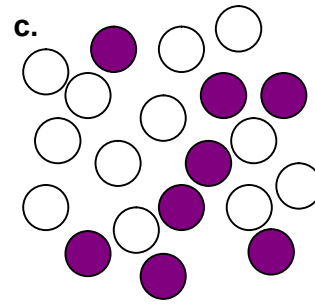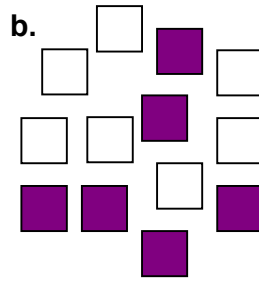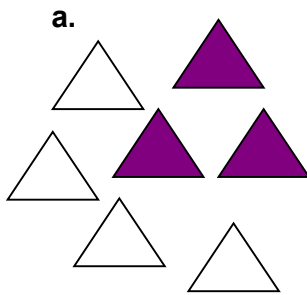
Read the problems carefully and write down the ratios.

2. If there are 6 teachers in our school and there are 180 pupils what is the teacher to pupil ratio?

3. The ratio of boys to girls in our class is 3:2. If there are 15 boys how many girls are there?

4. The ratio of girls to boys in our netball club is 5:4. If there are 16 boys how many members are there in our club?

5. To mix chainsaw fuel, you add 200 mL of oil to 10 litres of petrol.

   a. How much oil do you need to add to 50 L?
   b. What is the ratio of oil to petrol?

6. Builders use a ratio of 1:6 to mix of cement and sand to make concrete. If a builder has 24 kg of cement how much sand must he add?

7. **Match each fraction to a statement about probability from the box.**

   a. $\frac{9}{10}$

   b. $\frac{0}{5}$

   c. $\frac{1}{2}$

   d. $\frac{6}{6}$

   e. $\frac{1}{8}$

   certain event

   unlikely event

   impossible event

   even chance of the event happening or not

   likely event

8. **If you throw a six sided dice, what is the probability of:**

    a. scoring a 6?

    b. scoring a 1?

    c. scoring an odd number?

    d. scoring an even number?

9. **Look at the box of shapes below. If you pick one shape out at random, without looking, what is the probability that you will pick each of the following:**

    a. a cylinder?

    b. a cube?

    c. either a cylinder or a cube?
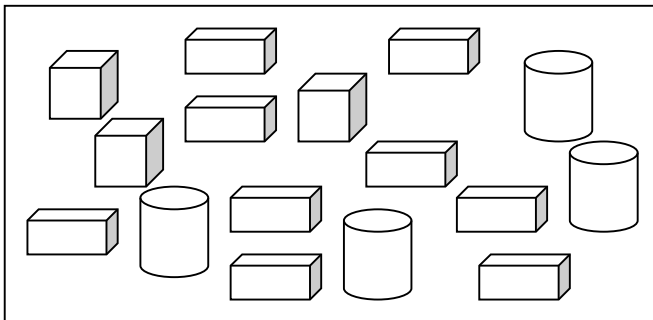
10. **Write a formula which you could use for predicting the chances of a particular event happening.**

1a   Using a Calendar

Activity A

Here is a page from a 2007 calendar. Look at it carefully and then answer the questions below in your exercise book.

January 2007						
Sun.	**Mon.**	**Tue.**	**Wed.**	**Thur.**	**Fri.**	**Sat.**
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Remember!

30 days has September,
April, June and November.
All the rest have 31, except
February clear
which has 28
and 29 each leap year!

1.   How many days are there in the month shown?

2.   How many Mondays are in this month?

3.   How many Fridays are in this month?

4.   Which days of the week are most common in this month?

5.   How many full 7-day weeks beginning on Sunday are there in this month?

6.   How many school days could be in this month?

7.   What day will February 1st be?

8.   On what day of the week is New Year's Day in 2007?

Activity B

Read the questions and write the answers in your exercise book. Use the January 2007 calendar in Activity A to work out your answers.

1.   If you have a test exactly 2 weeks after January 5th, what is the date of your test?

2.   If you have an appointment to see the doctor at the clinic 2 weeks after January 11th, what is the date and day of your appointment?

3.   What will be the day, date and month 2 weeks after the 31st January?

4.   Today is January 9th and you want to have a party in 6 days time. What is the day and date of your party?

5.   What is the date of the first Wednesday of February 2007?

6.   What will be the day and date one week after January 29th?

Activity C

Use the January 2007 calendar from Activity A. Study the month of January before answering these questions. Write your answers in your exercise book.

1. Draw a calendar page for February 2007.

2. Write four facts you can take from your calendar. Use the ideas in Activity A as a guide. **For example: The first day of February is a Thursday.**

3. Is 2007 a leap year?

4. If John is 11 years old in 2006, how many leap years has he lived through?

5. Which of the following years will be leap years? 2100 2210 2330 2400

2a Understanding Longer Units of Time

Activity A

Study each problem carefully before writing your answer in your exercise book.

1. The old man lived for 9 decades. How many years is that?

2. The family lived in the same house for 2 and a half decades. How many years is that?

3. What was the date of the eve of the last millennium?

4. Solomon Islands was first visited by Europeans four centuries ago. Which century was that?

> **Useful Reminder!**
>
> **dec-** means 10,
> **cent-** means 100,
> **milli-** means thousand.

5. John's father has lived for 4 decades and 3 years. How old is he?

Activity B

Read each question carefully before writing your answer in your exercise book.

1. Rock and Roll music was very popular throughout the 1960s and the 1970s. For how many years was Rock and Roll music popular?

2. Motor cars were invented early last century. Which century was that?

3. If a millennium lasts for 1,000 years, when will the next millennium begin?

4. Solomon Islands has been an independent country since 1978. How many decades is it since we got independence?

5. If this century started in 2000, when will the next century start?

Activity C

Rearrange the events below in order, on a time line. Start with the earliest and end with the most recent.

1893 – Solomon Islands became a British Protectorate.

1978 – Solomon Islands became an independent country.

1986 – Cyclone Namu struck Guadalcanal.

1657 – Solomon Islands discovered by Alvaro de Mendana.

1944 – Second World War reached Solomon Islands.

1977 – Big earthquake in Solomon Islands.

1910 – First missionaries sent to Rennell Island.

1981 – The South Pacific Mini Games held in Honiara.

2b Understanding AD and BC

Activity A

Copy the timeline and enter the dates from the box in their correct place. The first two dates have been entered for you.

10 BC	**2000 AD**	**76 BC**	**46 BC**	**68 BC**
300 AD	**23 AD**	**1134 AD**	**100 BC**	**1943 AD**

BC – before the birth of Christ   **AD – Anno Domini: The year of our Lord**

10 BC   **1**   2000 AD

Activity B

In Unit 7 English (World Heritage) you read about Canterbury Cathedral in England. This activity is about some important dates in the history of Canterbury Cathedral.

Calculate how many years ago each event took place.

1. The Romans invaded Canterbury in 54 BC.

2. The Romans invaded Canterbury again in 43 AD.

3. King Ethelbert's son started the church monastery in 602 AD.

4. The Vikings raided the city of Canterbury in 991 AD.

Activity C

This timeline contains some important historical dates to do with maths. Study the timeline and use it to answer the questions below in your exercise book.

1800 BC	The first multiplication table was invented by the Babylonians.
1350 BC	The Chinese used the first decimals.
100 BC	Chinese mathematicians used negative numbers.
876 AD	The symbol zero was first used in India.
100 AD	The decimal point was first used.
1514 AD	Plus and minus signs were invented.
1631 AD	The multiplication sign (x) was first used.
1813 AD	The tangram was printed for the first time.

1. How long ago did the Babylonians invent the first multiplication table?

2. How many years were there between the invention of the multiplication table and the first use of the multiplication sign (x)?

3. How many years ago was the zero symbol first used?

4. How long ago did Chinese mathematicians start to use negative numbers?

5. How many years passed between the use of decimals and the use of a decimal point?

3a What is the Time?

Activity A

Read these questions and write your answers in your exercise book.

1. If a day is 24 hours long, how many hours are in 3 days?
2. Give 2 afternoon times that are important to you and explain why.
3. Which of these 2 times is in the morning, 6:30 a.m. or 6:30 p.m.?
4. The Monday 8:30 a.m. flight is delayed for 24 hours. When will the flight take off?
5. A new day starts at midnight. When does it end?

Activity B

Read these questions and write your answers in your exercise book.

1. Our cat was missing for 20 hours and turned up at 9:30 a.m. on Wednesday morning. What time did it go missing?

2. Sam took a 3 hour flight from Honiara to Brisbane. Then he flew from Brisbane to Los Angeles. That flight took 13 hours and 25 minutes. For how long was Sam flying altogether?

3. It takes the earth 24 hours to make 1 rotation. How many rotations does the earth make in 96 hours?

4. A marathon runner completed the race in 155 minutes. If the runner started the race at 0630h what time did he finish?

5. During the cyclone, it rained without stopping for three and a half days. How many hours is that?

Activity C

Use a globe to help you answer these questions:

1. Which countries or places do you think would experience the same time as Solomon Islands?

2. Do you think Solomon Islands will have the same time as Canada? Explain your answer.

3. Name 3 countries which you think will be in darkness when it is daylight in Solomon Islands.

4. If it is daylight in Solomon Islands, is it day or night in Papua New Guinea?

5. How can we tell whether it is morning or afternoon in analogue time?

3b Time Zones

Activity A

Use the time zone map on page 23 to answer these questions:

1. If it is 12 noon in Solomon Islands what time is it in:
   a. Delhi   b. Cape Town   c. Perth?

2. If it is 6 p.m. in Solomon Islands what time is it in:
   a. Paris   b. Nairobi   c. Fiji?

3. If it is 10 p.m. in Solomon Islands what time is it in:
   a. Karachi   b. Shanghai   c. Brisbane?

Did You Know?

The International Date Line is at 180° longitude.
The Prime Meridian or the Greenwich Meridian is at 0° longitude.

The places you have looked up are all cities except Fiji, which is a country.

Using the same numbers as the last activity, write the name of each city and the country it is in. You may need to use a World map to look these up.

Activity B

Study the time zone map on page 23 and use it to help you calculate the following.

1. If it is 12 noon on Wednesday in Solomon Islands what time is it in:
   a. Honolulu   b. Santiago   c. Ottawa?

2. If it is 5 a.m. on Sunday in Solomon Islands what time is it in:
   a. San Francisco   b. Rome   c. Peking?

4. If it is 9 p.m. on Thursday in Solomon Islands what time is it in:
   a. New York   b. Wellington   c. Jakarta?

Using the same numbers, write the name of each city and the country it is in. You may need to use a World map to look these up.

Activity C

Use the time zones map on the next page to work out the answers to these questions.
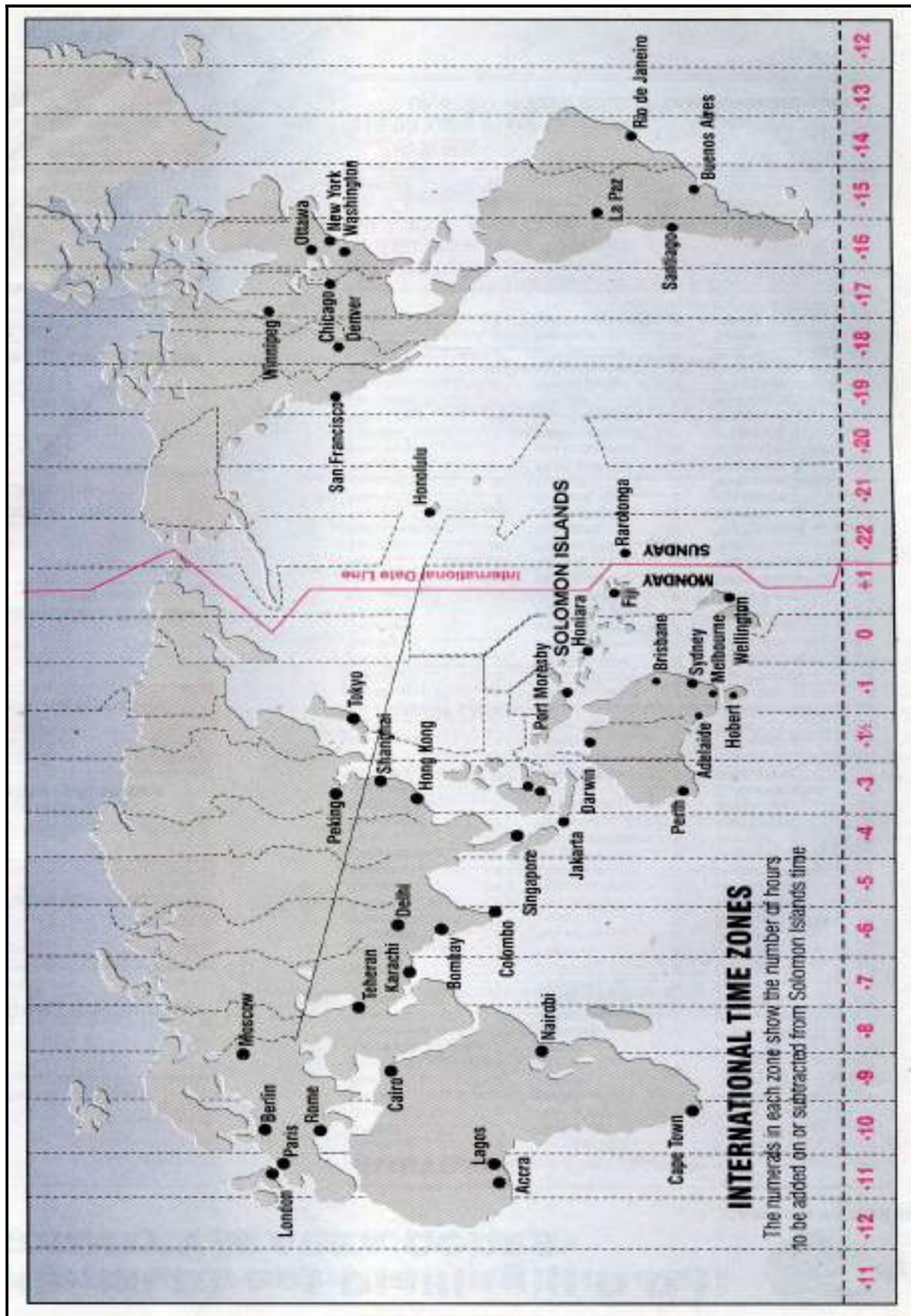
1. If you flew from Honiara on Friday night and arrived in Washington the next morning, what day would it be in Washington?

2. If it is 10 a.m. in Honiara, what is the time in Cape Town, South Africa?

3. How many time zones is Australia divided into?

4. The flight from Honiara to Brisbane, Australia takes 3 hours. If you left Honiara at 4:30 p.m. what time would you arrive in Brisbane? Don't forget the time difference when you calculate your answer.

5. If it is midday in Solomon Islands on Sunday what day and time is it in London?

Strange, but True!

I travelled for 13 hours from Honiara to America and arrived six hours before I left!!
How is this possible?

INTERNATIONAL TIME ZONES

The numerals in each zone show the number of hours to be added on or subtracted from Solomon Islands time.

Unit 10

3c

Activity A

Use the time zones map to help you calculate each of the following:

1. What time is it in Solomon Islands if it is:

   a. 3 p.m. in Fiji?

   b. 12 noon in Bombay, India?

   c. 5 a.m. in Cairo, Egypt?

   d. 4 p.m. in Singapore?

2. What time is it in Solomon Islands if it is:

   a. 8 a.m. in London, U.K.?

   b. 9 p.m. in Hong Kong, China?

   c. 12 noon in Berlin, Germany?

   d. 2 p.m. in Colombo, Sri Lanka?

Interesting Facts!

There are four time zones in U.S.A.
There are three time zones across Australia.

Activity B

Calculate the following. Be careful! The day as well as the time may be different.

1. What time is it in Solomon Islands if it is:

   a. Monday 3 p.m. in Washington?

   b. Saturday 2 a.m. in Buenos Aires, Argentina?

   c. Tuesday 11 p.m. in Honolulu, Hawaii?

   d. Sunday 10 a.m. in Chicago, U.S.A.?

Activity C

1. What time is it in Fiji when you start school in the morning?

2. What time was it in New York when you got up this morning?

3. What time will it be in Rarotonga when you leave school today?

4. What do you think children in London might be doing as you are getting ready for school in the morning?

5. Note other times at which you do different things today and work out the time in different parts of the world using your map.

   Write a few sentences including these calculations.

Check-Up Page

	May					
Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1. **Study these calendar pages on the right and then answer the questions below.**

    a. What day of the week is the 13th June?

    b. If I get paid on the 3rd Friday of every month, list down my pay days for May, June and July.

    c. My birthday is on 21st July. If it is 13th May today, how long is it until my birthday?

	June					
Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Now answer the following questions.

2. How often do we have leap years?

3. How many days are there in a leap year?

4. Apart from February, how many days do the months of a year usually have?

5. How long ago was:

    a. 48 BC?

    b. 113 AD?

	July					
Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

6. How many years are between 10 BC and 120 AD?

7. How many years are there in 3 centuries?

8. How many years are there in 5 decades?

**Use the map in your Pupil's Resource Book on page 23 to help you answer the questions below.**

9. Give the name of a Pacific country that is on the other side of the Date Line from Solomon Islands.

10. What is the time difference between Honiara and Port Moresby?

11. If it is 3 p.m. on Friday in Solomon Islands, what day and time is it in Perth, Australia?

12. If it is 9 a.m. on Monday in Solomon Islands, what day and time is it in Rarotonga, Cook Islands?

13. If it is noon on Wednesday in London, what time is it in Solomon Islands?

14. James, who lives in San Francisco, phoned his mother in Honiara at 3 p.m. on Monday, San Francisco time. What would the day and the time of his call be for his mother?

Unit 11

1b Division of Money

Remember!

Always put the decimal point in the right place in the answer line!
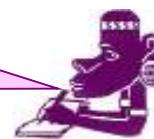
Activity A

Set out these division sums carefully and work out the answers in your exercise book.

1. $16.50 ÷ 6

2. $24.15 ÷ 7

3. $32.40 ÷ 8

4. $48.15 ÷ 9

5. $19.95 ÷ 7

6. $20.40 ÷ 12

7. $25.00 ÷ 10

8. $24.90 ÷ 6

9. $108.45 ÷ 9

10. $44.75 ÷ 5

Activity B

Here are some calculations for you to work out. Make sure you show all your working out in your exercise book.

1. $19.20 ÷ 16

2. $55.20 ÷ 16

3. $596.25 ÷ 25

4. $118,404.00 ÷ 13

5. $1,519.50 ÷ 15

6. $439.45 ÷ 11

Activity C

Work out the answers to these problems. Show your working in your exercise book, as well as your answer.

1. 24 cartons of Taiyo cost $3,552. How much did one carton cost?

2. The school bought a carton of exercise books for $1,886.40.

  a. There were 24 packs of books in the carton, how much did each pack cost?

  b. If each pack contained 12 books how much did each exercise book cost?

  c. How many exercise books were there altogether?

3. I bought presents for all my nieces and nephews for Christmas. There are 13 of them. Altogether I spent $333.45. What was the average amount I spent on each child?

4. In a year I earn $26,901.00. How much do I earn in a month?

5. On December 31st I have $3,703.50 in my bank account. If I have been saving for a year and a half how much have I saved on average every month?

1c Multiplication and Money

Activity A

Copy and complete the following calculations in your exercise book.

1. $34.60	**2.** $29.85	**3.** $ 243.40	**4.** $ 644.25	**5.** $ 57.00	**6.** $93.50
x 5	x 9	x 3	x 6	x 7	x 4

7. $23.85 x 8 =   **8.** $102.05 x 2 =   **9.** $10.80 x 3 =   **10.** $205.55 x 9 =

Activity B

Work out the following multiplications. Show all your working out in your exercise book.

1. $ 89.30	**2.** $ 12.90	**3.** $ 53.45	**4.** $ 908.05	**5.** $302.50
x 25	x 36	x 52	x 24	x 17

6. $445.00 x 13 =   **7.** $5.55 x 77 =   **8.** $405.20 x 67 =

Activity C

Read the problems carefully and think about how to solve them before you calculate the answers.

1. If one complete football kit cost $165.80 how much would it cost to buy the kit for a team of eleven players and two reserves?

2. If one pencil cost 35 cents, how much would it cost to buy enough pencils for a school of 450 pupils, so that each pupil could have a new pencil every term? Remember there are four terms in a year.

3. A ticket to go on the boat is $52.00 for an adult and half price for a school child. How much would it cost for my class of 28 pupils to go on the boat with our teacher?

4. 1 metre of material costs $15.65. How much would it cost to make curtains for our dormitory if we need 78 metres of material altogether?

5. If one text book costs $63.55, how much would 26 text books cost?

Unit 11

2a Problem Solving

Activity A

Answer these questions in your exercise book. Remember to round your answers to the nearest 5 cents.

1. If 10 fish cost $83.70, how much for one?

2. If a book costs $24.00 how much will 100 books cost?

3. What does two hundred and forty-five dollars divided by sixteen equal?

4. Divide $48.00 by 13.

5. What is the cost of 15 lollies at 70 cents each?

6. What do 42 cakes cost if one costs $3.70?

7. How much would I pay for 125 books at $5.85 each?

8. My mother won $100.00 in a raffle. If she decided to divide $50.00 between myself and my two sisters, how much would we each get?

9. If I sell fifteen kilograms of fish for $330. What is the price per kilogram?

10. Lynette spends $7.85 on her lunch everyday when she goes to a workshop in Honiara. How much would she spend altogether if the workshop lasts for 5 days?

Activity B

1. **Tickets for the final of a soccer competition are on sale as shown on the poster. Study the poster and answer the questions below.**

   a. What would be the cost of 12 adult tickets?

   b. A schoolboy has $128.00 in his pocket. He is thinking of buying some student tickets. How many student tickets will he get and how much money will he have left over?

> **Tickets for Sale**
>
> Adults
> **$16.00**
>
> Students
> **$9.50**
>
> Children under 10 **$5.50**

2. **My family went to Sol Café to celebrate my grandmother's birthday.**

   There were eighteen of us altogether.

   Half of us had chicken and the other half had fish curry. We ordered six servings of cabbage and six servings of tomato and cucumber to share. We also had $20 worth of rice and $13.25 worth of taro between us.

   We finished off the meal with a cake each as well as a glass of bush lime.

   Study the menu on the following page and then answer the questions on the right.

SOL CAFÉ
Menu

Chicken	$8.50
Fish Curry	$7.75
Cabbage	$1.00
Tomato and Cucumber	$1.50
Rice	$2.50
Taro	$2.65
Cake	$3.00
Bush Lime	$1.25

a. What was the total bill?

b. How many servings of rice did we order?

c. How many servings of taro did we order?

d. What was the average cost per person to the nearest five cents?

Remember!

To round your answers to the nearest 5 cents.

3. Divide $9,240.00 equally among:

    a. 5 children   **b.** 8 students   **c.** 7 adults

Activity C

1. **Sam earns $1,850.00 a month in his new job. After one year he receives a 5% pay rise.**

    a. What will his new monthly salary be after the rise?

    b. How much will he earn in the next year at his new rate?

    c. How much more cash is this compared to his salary for the first year?

2. **$360 is shared between three brothers. The oldest brother, Solomon, gets twice as much as the middle brother, Wilson, who gets three times as much as the youngest brother, Patrick. How much does each brother get?**

3. **If I have $480 in the bank I will get 5% interest every 6 months.**

    a. How much will I have in the bank after 6 months?

    b. How much interest will I earn after 12 months?

    c. What will be my balance after 18 months? (Round this to the nearest five cents.)

Remember!

Work out the interest, add it to the balance. Work the next interest payment on the **new** balance.

4. **A new bank in town pays 10% interest every year. This year I got $135 interest. What was the balance in my bank account before and after the interest was paid?**

29

Unit 11

2b Solving More Money Problems

Activity A

Read these problems carefully before solving them in your exercise book. Write down all your working out to show how you calculated the answer.

1. A Chinese store offered $2,400.00 in bonuses to its 48 workers. The management decided to share it equally among them. How much will each worker receive?

2. The Solomons' television station (STV) broadcast 50 football games this season. The STV paid a total of $75,000.00 in fees to the Solomon Islands Broadcasting Corporation for the rights to do this. What was the fee for each game?

3. Six children each paid $3.45 to see a movie. How much they pay altogether?

4. At a school fundraising, one stall sold egg burgers for $5.00 each. If they sold 128 egg burgers, how much money did they make?

5. Class six of Vuturua Primary School raised $339.30. If there are 26 pupils in the class. What is the average that each of them raised?

6. If 28 parcels cost $358.40 to post what does it cost to post one? All the parcels are exactly the same size and weight.

7. If a new outboard motor costs $7,200.00 how much would twenty-five cost?

8. I save $105.00 every month for a year. At the end of the year I share all my savings between my four children. How much will each one get?

Activity B

Read each problem carefully and work it out showing all your working in your exercise book.

1. At a fundraising our class made cakes to sell. The flour cost us $12.50, the butter cost $15.00 and the sugar cost $6.30. We made 45 cakes and sold all of them for $3.50 each. How much profit did we make?

2. Everyone who leaves Solomon Islands by air has to pay an airport tax of $40.00. If $3,080 was collected from the passengers flying to Fiji how many passengers were on the plane?

3. If a 20 kg bag of rice costs $87 and a 10 kg bag costs $48 work out the difference in cost of buying 240 kg in 20 kg bags and 10 kg bags.

4. Five friends bought tickets to a concert. If the total price was one hundred and twelve dollars fifty cents, how much was each ticket worth?

5. Bread comes from the Hot Bread Kitchen in large flat trays. There are half a dozen loaves of bread on each tray. If the supermarket pays $64.80 for 6 trays of bread, how much are they paying per loaf?

6. A case contains 96 marbles. If Jack bought 8 marbles for $1.45, how much will the whole case of marbles be worth?

> **Problem Solving Strategy**
>
> Try **Ask, Think, Do!**

Activity C

Read these problems carefully, there is a lot of information in each one. Think about how to solve them. Set out all your calculations in your exercise book.

1. I went on the village truck to sell some produce at the market.

We sold 25 watermelons at $30 each, 75 mangoes at $1.50, 15 pawpaws at $3, 12 pawpaws at $5 and 32 heaps of limes at $1 a heap.

The fuel for the truck cost $42.50 and we spent $15 on drinks and snacks while we were at the market. How much money did we take back to the village?

2. Mr. Chan the store keeper imported 250 plastic bowls. The bowls cost him $6.50 each and he also had to pay $375.00 in shipping costs. When the plastic bowls arrived in the country, he had to pay 15% custom's duty on the cost price of the bowls and the shipping.

How much would he have to sell each plastic bowl for if he wants to make 100% profit on each one?

3. A boat captain takes 135 students to their home island from Honiara. If he collects $16,875.00 in fares what is the fare for each person?

4. If my salary is $22,200.00 a year how much will I be paid each month if my employer deducts 10% of my salary because he rents me a house?

5. Martha wants to buy 2 new saucepans for her kitchen. One costs $53.60 and another costs $54.00. If she saves $13.45 a month, for how many months will she need to save until she has enough money to buy the saucepans?
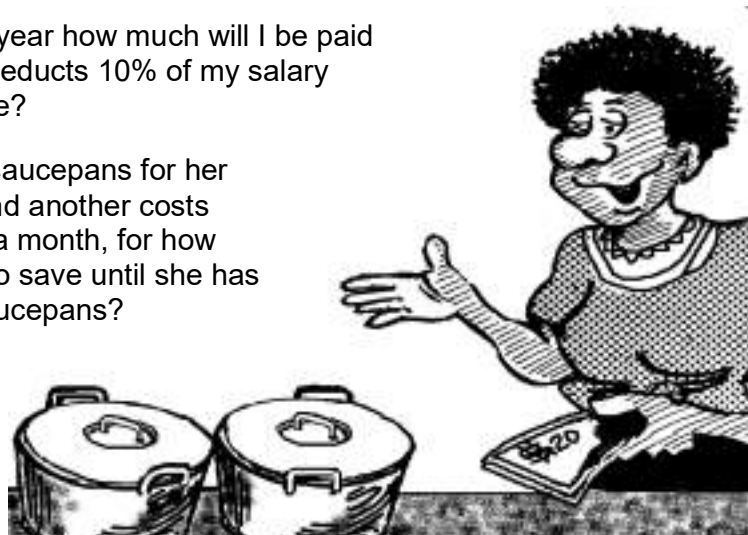
Check Up Page

1. Work out the answers to these calculations. Set out your work carefully.

    a. $76.05   **b.** $56.30   **c.** $24.20   **d.** $208.35

      x   2   x   9   x   13   x   46

2. Set these calculations out in your exercise book and work out the answers.

    a. $24.60 ÷ 4 =   **b**. $345.00 ÷ 15 =   **c**. $213.60 ÷ 16 =   **d**. $400.95 ÷ 9 =

3. Solve the following problems. Show all your working out.

  a. If one watermelon costs $30 how much would 12 watermelons cost?

  b. 8 people shared a prize of $2,603.60. How much did each person receive if they all had an equal amount?

  c. A bag contains 36 taro from Temotu. If Helen bought 4 taro for $2.00, how much would the whole bag of taro be worth if they were all sold for the same price?

  d. If a twenty kilogram bag of rice costs $83.00, how much does one kilogram of rice cost?

  e. If an exercise book costs $2.15 how much would 3 cartons of exercise books cost if there are 144 in each carton?

  f. My uncle went fishing and returned home with a big catch.

    He sold 26 kg of tuna for $15 a kilogram. He sold 12 kg of swordfish for $17 a kilogram and he sold 12 kg of assorted reef fish for $8 a kilogram.

    What was the average cost per kilogram of fish that he sold?

1a Tessellating Regular Polygons

Activity A

Look at each the following shapes. In your exercise book, write the name of each shape and write whether you think it will tessellate or not.
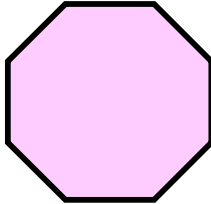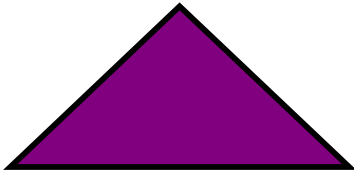
1.
2.
3.
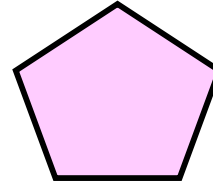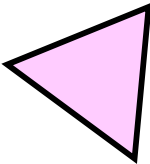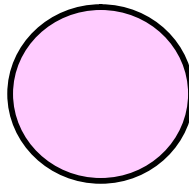
4.
5.
6.
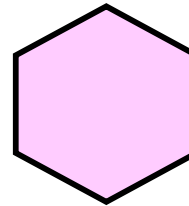
Activity B

Use each of the following shapes to draw a tessellating pattern in your exercise book. You can either use a ruler to construct the shapes carefully, or you can trace the shapes from the book.

1.
2.
3.

Activity C

A rectangle can tessellate in different ways. Draw two or more interesting tessellating patterns in your exercise book using only rectangles.

1c Tessellations Combining Two Regular Polygons

Activity A

The patterns on the following page use two different regular polygons to form a tessellation.

Copy each pattern into your exercise book and colour it following the directions given.
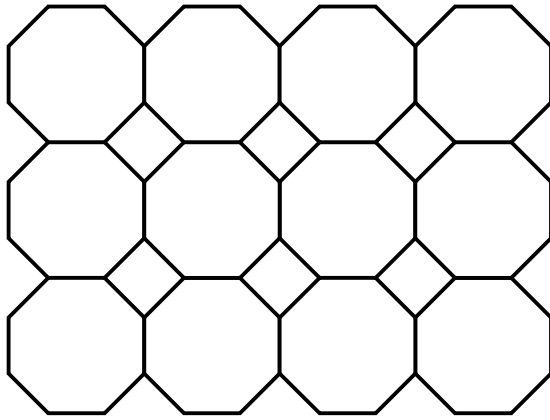
1. Colour the octagons red and the squares yellow.
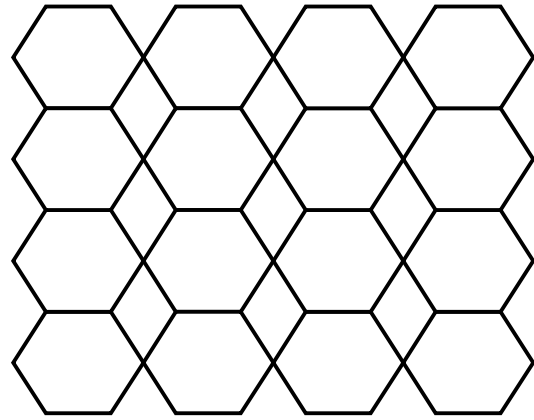
2. Colour alternate hexagons blue and purple and colour the rhombi green.

Activity B

In your exercise book, design, draw and colour the following two-polygon tessellations. You can use cut out shapes to help you.

1. Octagons and triangles.
2. Pentagons and rhombi.
3. Squares and triangles.

Remember!

A tessellation repeats the same pattern with no overlaps and no spaces between the shapes.

Activity C

Study the tessellation below. This is made by combining hexagons and triangles.
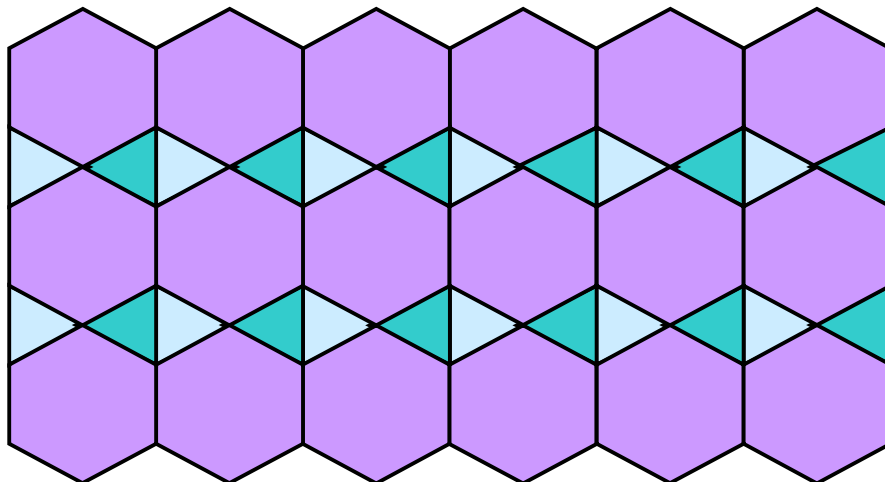
In your exercise book, design two more tessellations of your own using only these two shapes.

Colour your designs.

1d Tessellations with Three or More Regular Polygons

Activity A
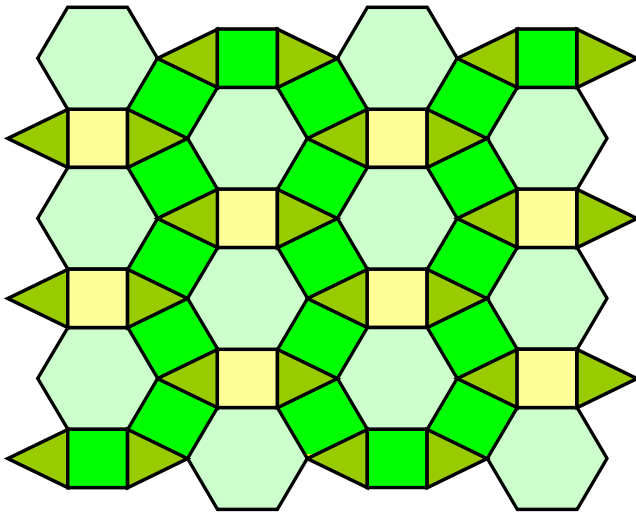
Study the three tessellating patterns on the left. Each one is made up of three different regular polygon shapes.

Can you identify the three shapes?

The patterns are the same, but they look different because they have been coloured differently.

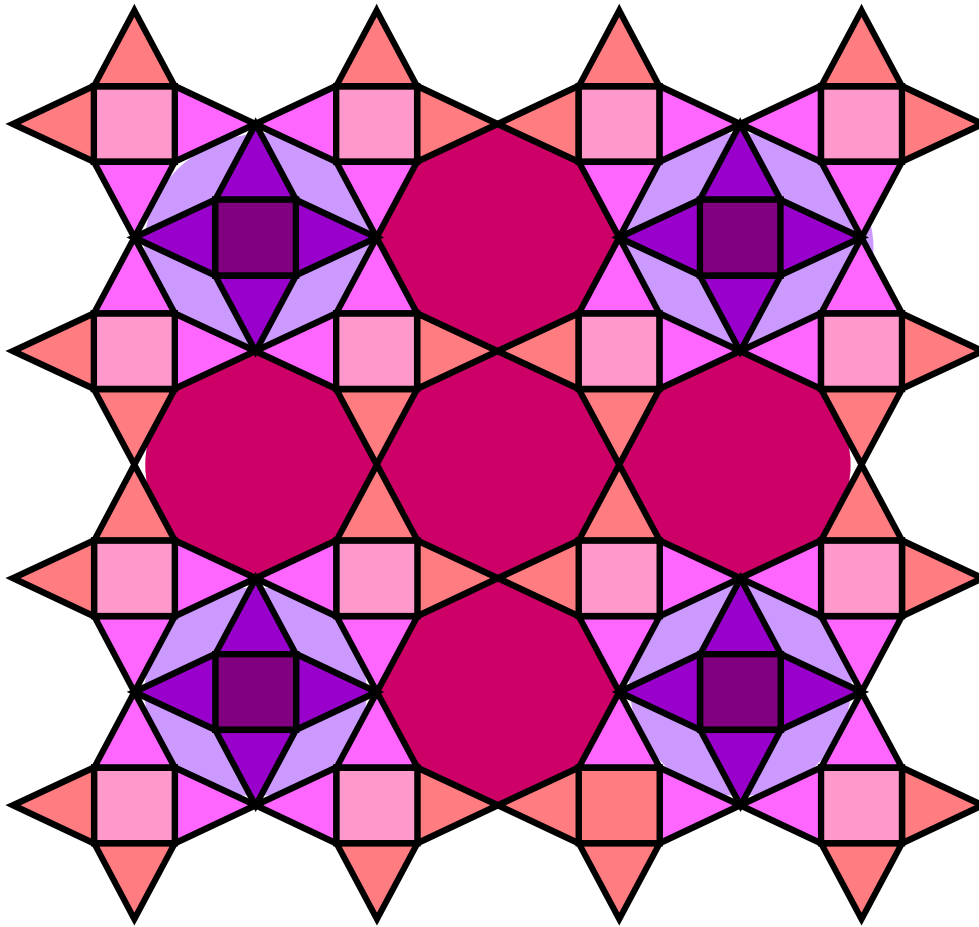Copy or trace the pattern into your exercise book or onto squared paper and colour your pattern in a different way.

If you have time you can do more than one.
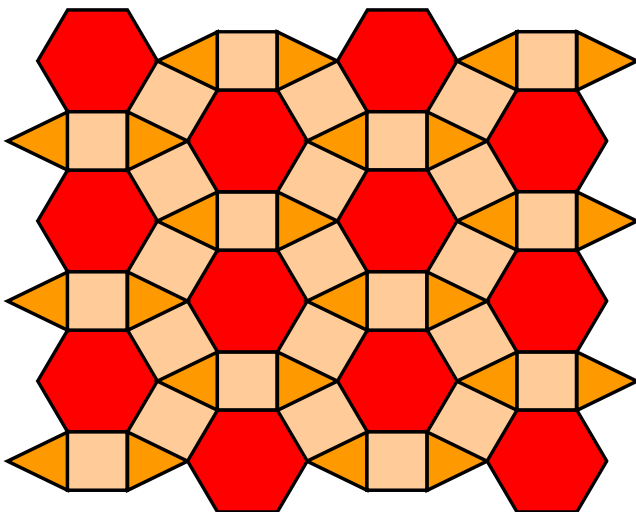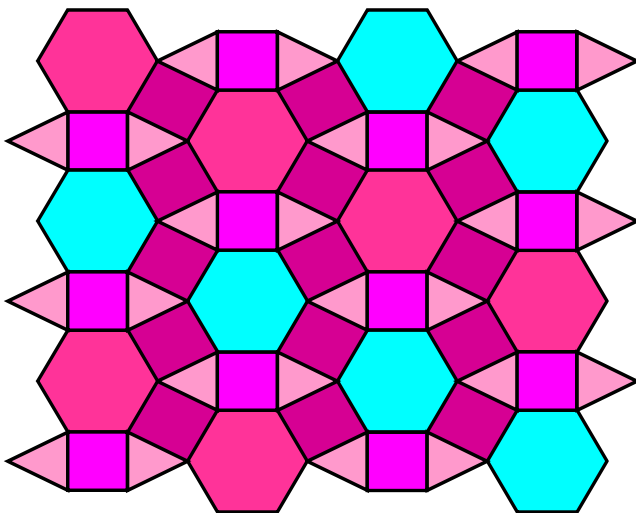
Activity B

The tessellation below is made up of octagons, squares, parallelograms and triangles.

1. Write a few sentences to describe the tessellation

2. Use the same four shapes to design your own tessellation. Plan it first and then draw it in your exercise book or on squared paper.

3. Colour your design.

Tip!
You can use the polygon shapes you have been working with to help you with your design.

Activity C

Design a tessellation of your own using at least four different polygons.

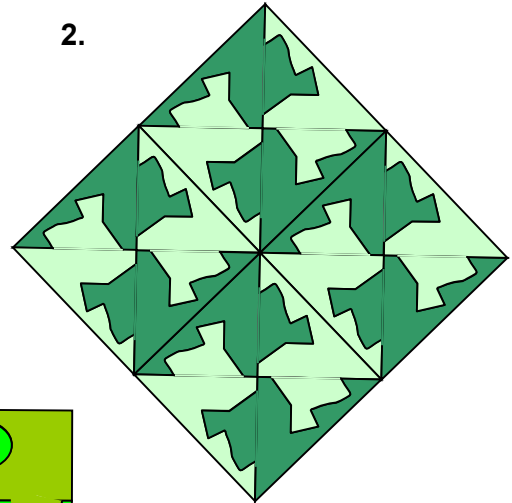**Draw your design in your exercise book or on squared paper.**

1e Irregular Tessellations

All the tessellations below have been made by cutting one or more irregular shapes out of squares, rectangles and triangles. Study them carefully before thinking of your own design.
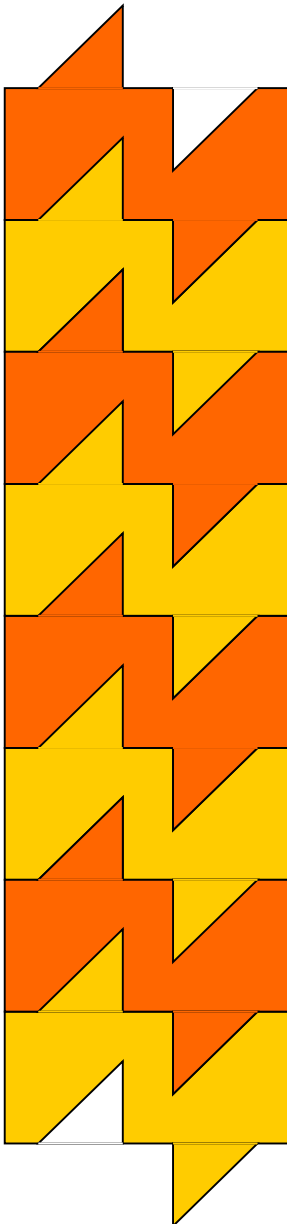
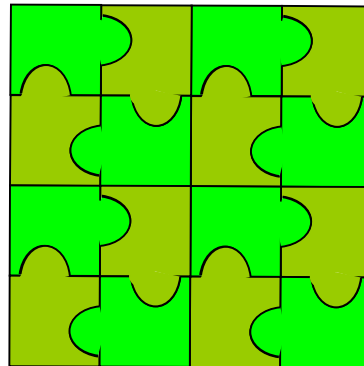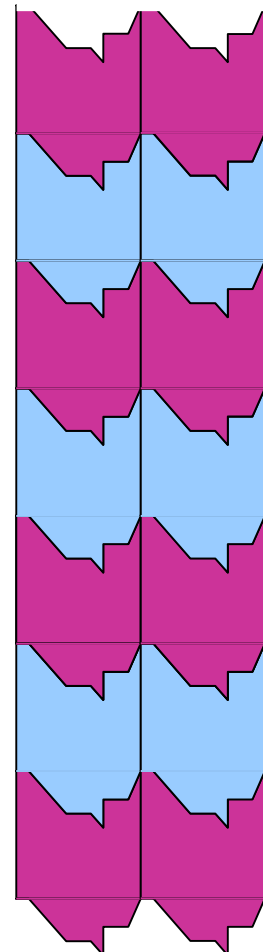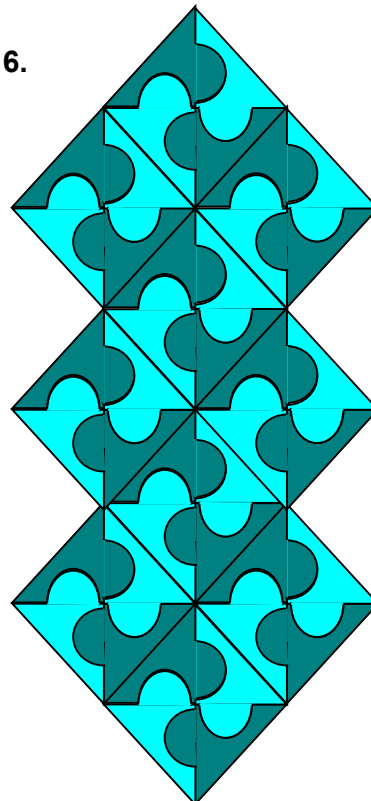**1.**
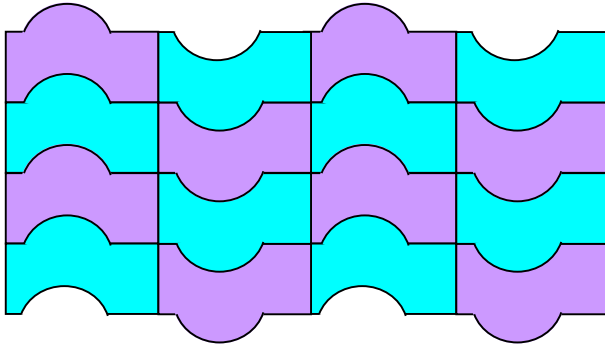
**2.**

3.

4.

5.

6.

Unit 12

Activity A

Look at the tessellations on the last page and answer the following questions:

1. Which tessellations are made from cut out squares?

2. Which tessellations are made from cut out triangles?

3. Which tessellations are made from cut out rectangles?

4. Each of the shapes below is found in one of the tessellation patterns on the last page. Which is which? Write the number for each pattern and the letter for each shape in your exercise book.

5.   a.   b.   c.

   d.   e.   f.
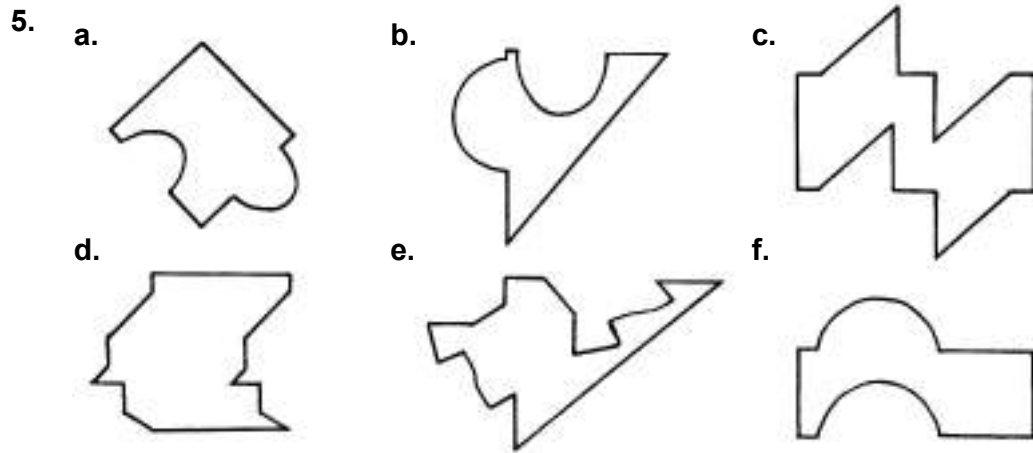
Activity B

Look at the tessellations on page 37 and answer the following questions:

1. Only one of the tessellating patterns has had two pieces cut from the original shape. Which one is it?

2. In tessellation **2.** the original triangle shape has been rotated to make the repeating pattern. There are two other tessellations that use rotation, which are they?

Activity C

Pattern 4, on page 37, is made by cutting a semi circle from a square and pasting it on the adjoining side, as in figure 1.

1. Draw a sketch to show how this pattern would be different if the semicircle was attached to the opposite side of the square instead, as in figure 2.

   Figure 1   Figure 2

2. How would the pattern look if two semi circles were cut out? Is there more than one possibility for how this could be done? Figures 3 and 4 will help you.
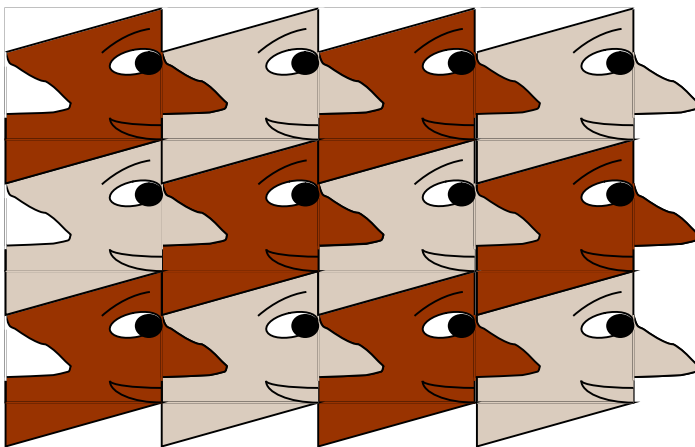
   Figure 3   Figure 4
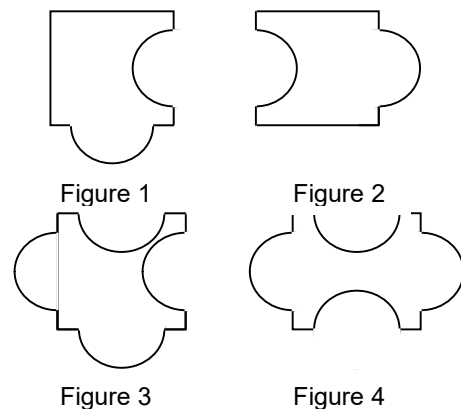
1e Tessellating Pictures

The tessellations below have been made into pictures. Study them carefully before thinking of your own design.
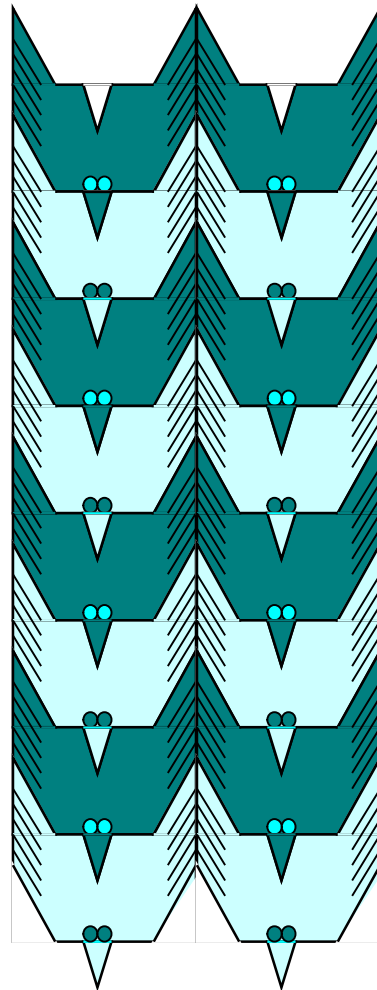
The fish tessellation is made by cutting two triangles out of a square shape.
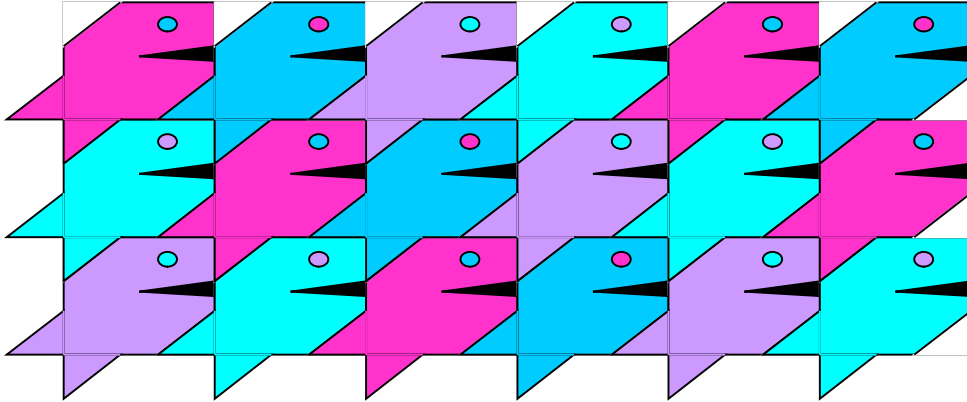
The face tessellation below is made by cutting the nose shape and a triangular shape from a square.

The bird tessellation on the right is made by cutting three triangles from a rectangle.
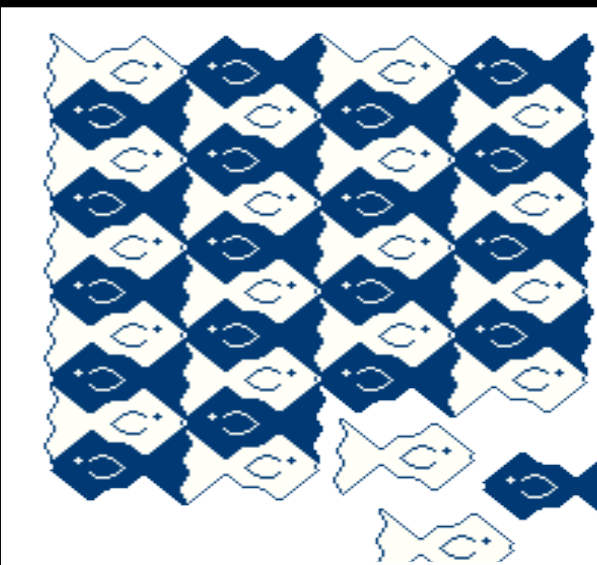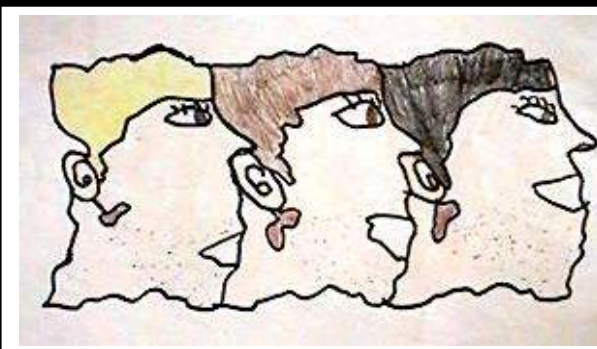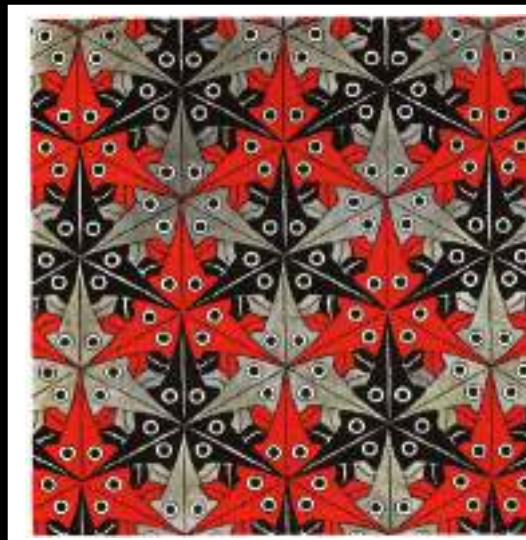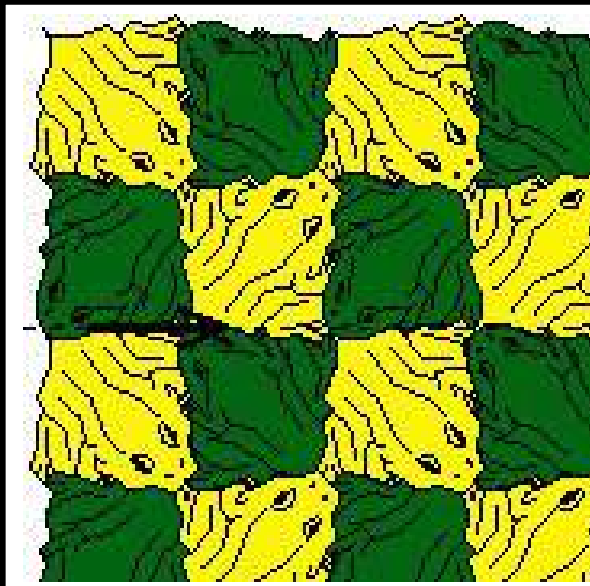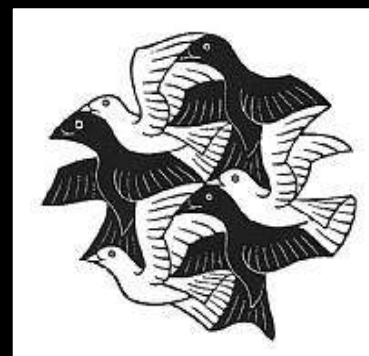
Unit 12

1f Clever Tessellations – From Maths to Art!

Look at these tessellations. They use the same idea that you have been working on to create clever pictures and designs.

Unit 12

1a | Revision: The Properties of Three-dimensional Shapes

Activity A

Name and describe each of these three-dimensional shapes.

1.
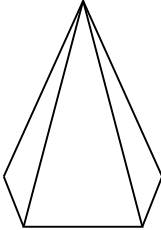
2.
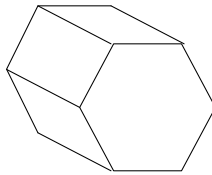
3.
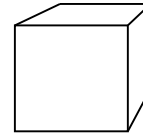
4.
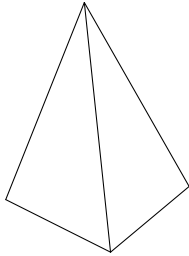
5.
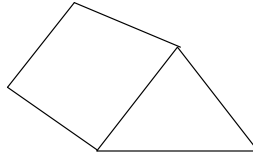
> **Reminder!**
> Your description should include the number of faces, edges, vertices and bases.

Activity B

Copy the following sentences into your exercise book and fill in the spaces using words from the box below.

cube	parallel	two	edges	octagonal	pyramids
apex	eight	vertices	faces	congruent	octagonal prism

1. A _____ has six faces that are all the same and _____ vertices.

2. On a pyramid, the point at which all the triangular _____ meet is called the _____.

3. A prism has _____ bases that are _____ .

4. All the edges that join the _____ of a prism are _____.

5. All _____ have one base and an apex.

6. A shape with sixteen _____ eight rectangular faces and two _____ bases is called an _____.

Activity C

Write down the name of the three-dimensional solid that could be made from each of the following sets of faces.

1. Six squares of the same size.

2. Four congruent triangles and a square.

3. Two congruent pentagons and five rectangles.

4. Four congruent triangles.

5. Eight squares and two congruent octagons.

> **Reminder!**
>
> Congruent means exactly the same.

1b How to Design a Net

Follow the instructions below to design your net:

1. Think about the solid shape that you are going to make. Note down:

  a. How many faces it has.
  b. What shape these faces are.
  c. Which faces are congruent.
  d. Which faces need to fit together with other faces.

2. Make a sketch of all the faces you will need to include. Arrange them so that they will fit together properly.

3. With your ruler, construct the net accurately following your sketch. Measure each shape carefully so that all the edges that meet are the same length.

4. If you will be using glue to construct your net, plan where you will need tabs.

5. To decide where the tabs go, plan out which edge will match with which other edge as shown in the sketch for a cube on the right. Add one tab for each pair of edges.
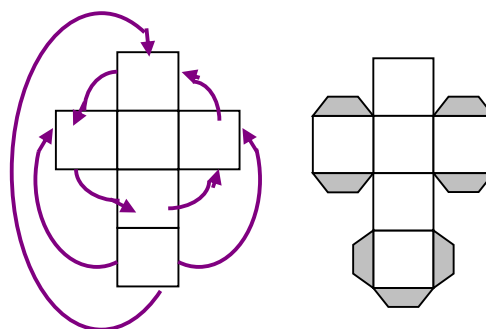
How to Fold and Make a Solid from your Net

Follow the instructions below to make your solid shape:

1. Use thin card to construct the solid if you have some. You might use old packaging or the card from the back of an old exercise book for example.

2. Draw out the design on your card. Measure each line carefully.

3. Cut out the whole shape carefully with sharp scissors or a cutting knife.

4. Use an old (empty) biro and a ruler to go over each line that you have to fold. This makes the folding easier.

5. If you have coloured pens or crayons, colour or decorate the faces of your shape before you fold it.

6. Fold up the shape.

7. Glue the tabs one at a time to join the edges of the shape. The first ones are easy, but the last one is quite tricky – you may want to use sellotape for this.

8. Let the solid dry before you handle it too much.

What if you have made a mistake?

You will know as soon as you try to fold your net whether or not it is going to work. If it doesn't fit together properly, don't worry!

Unfold it again and try to work out where you have gone wrong. Change your net design to see if you can put it right!

1c Properties of Three-dimensional Shapes

Work with your partner or group.

Copy the following table into your exercise book.

Study each polyhedron in turn. Discuss it with your group and complete the table together.

Use the observations column for anything interesting that you notice about each shape.

Name of the shape	Number of faces	Number of edges	Number of vertices	How many faces meet at each vertex?	Shape of the faces	Observations
cube						
double tetrahedron						
regular octahedron						
dodecahedron						
cube octahedron						

Check Up Page

1. **Not all of the following regular polygons will tessellate. Write down the names of only the ones that will tessellate.**
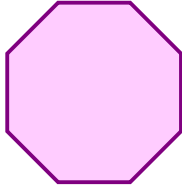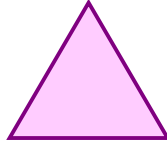
   a.   b.   c.
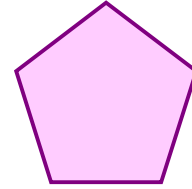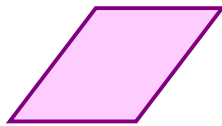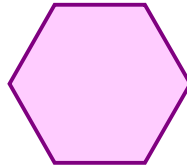
   d.   e.   f.

2. **Design and sketch a tessellating pattern following each set of instructions:**

   a. Use only two regular polygons.

   b. Use only one regular polygon.

   c. Use one irregular shape.

   d. Use three or more regular polygons.

3. **Calculate the size of each of the marked angles in the following diagrams.**

   a.   b.

   30°

   c.

   45
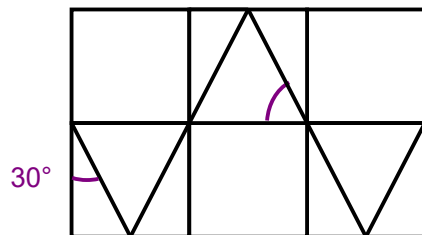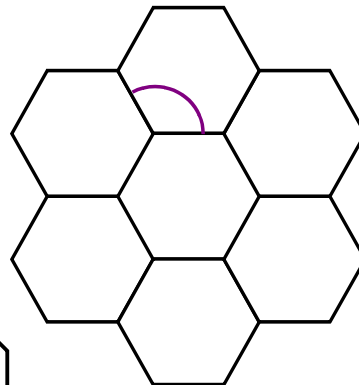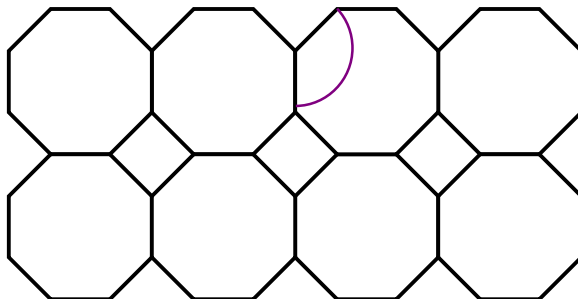
Unit 12 Check Up Page

4. **Look at the four sets of nets below. Only one of each set will fold up to make the given solid shape. The other two will not. Write down the letter for the correct net for each shape.**

a. Cube
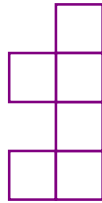
Net A   Net B   Net C
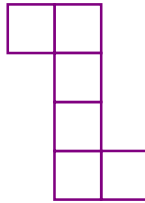
b. Triangular Prism
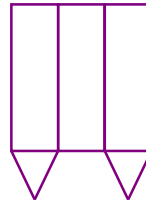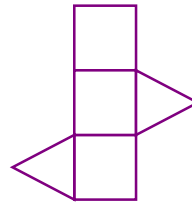
Net A   Net B   Net C
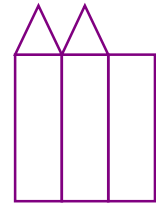
c. Square Based Pyramid
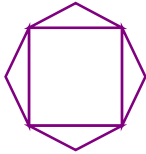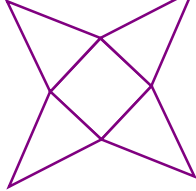
Net A   Net B   Net C
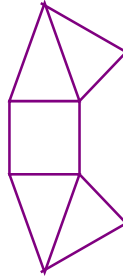
d. Hexagonal Prism
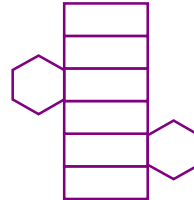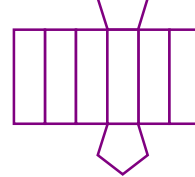
Net A   Net B   Net C
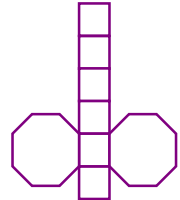
5. **Copy and complete the following sentences using words from the box.**

polyhedra	dodecahedron	polyhedron	base	vertices
tetrahedron	pentagonal	octahedron	twelve	triangular

    a. The mathematical name for a three-dimensional shape is a _____ the plural of this is _____.

    b. Another name for a _____ pyramid is a _____.

    c. A _____ is a polyhedron with twelve _____faces.

    d. Two square based pyramids can be joined at the _____ to make an _____.

    e. A dodecahedron has _____ faces and twenty _____.

6. Write down the name of the shape that could be made from each of the following nets.

a.
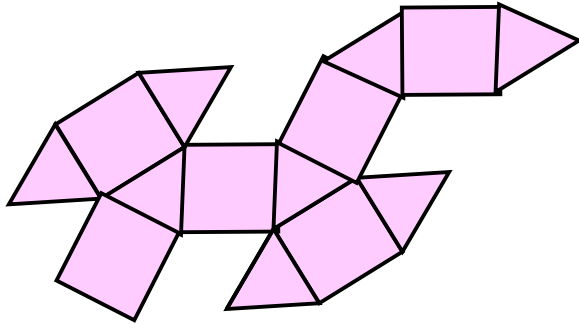
b.
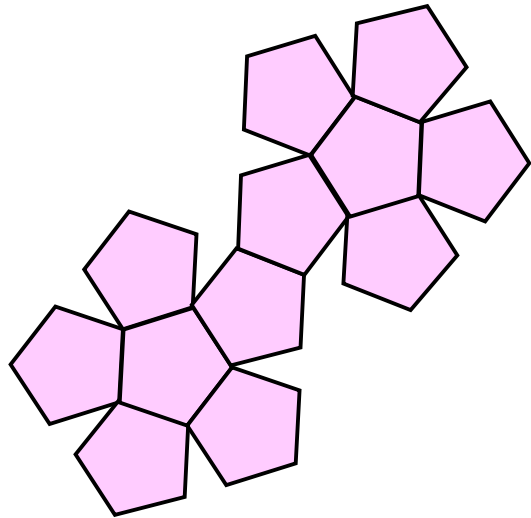
c.
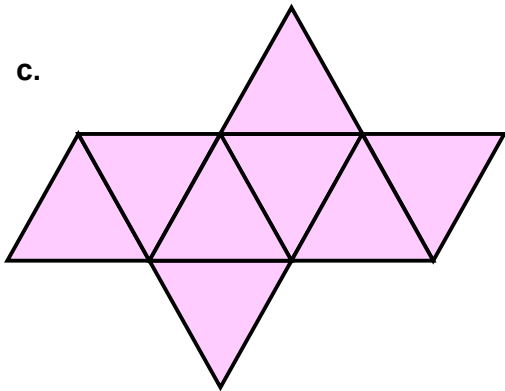
d.
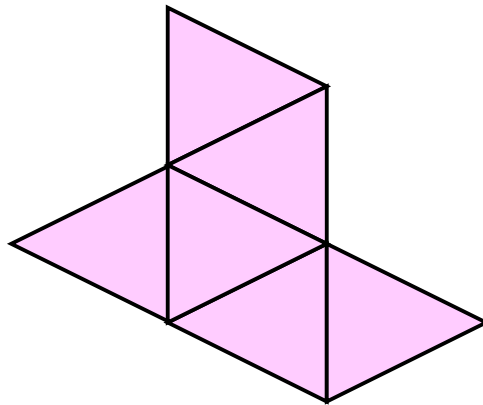
Term 4

Creative Maths Projects

Explore and Enjoy!

Chapter 1: Fun with Numbers

The History of Number Symbols

Have you ever thought about the numbers which you use every day when you do your maths' lessons? Who invented the numbers? Where did the idea of the shapes of the numbers come from? Have you seen anyone using different symbols or shapes for counting? Here is some information about the symbols that we use in mathematics. Read through the information carefully and then work through the activities with a partner.

The number system that is used almost everywhere in the world today was probably developed in India. It was the Arabs, however, who spread the system to other places and therefore the numerals the system uses have come to be called **Arabic numerals**.

These Arabic numerals which are also called **Hindu numerals** or **Hindu-Arabic numerals** are considered to be one of the most significant developments in the study of mathematics.

Our number system is a base 10 number system with 10 symbols representing the 10 digits, 0,1,2,3,4,5,6,7,8,9. One idea is that the first four numerals were based on trigonometry, (a branch of mathematics which uses lines and angles).

Each number symbol therefore was developed from a shape which contained that number of angles between 0° and 90° including 90°.

Look at the example below: each symbol is drawn in such a way as to form its value as a number of angles. Notice that the number four looks different. It is thought that the number four became closed later due to early cursive handwriting styles.

Numeral 1 has 1 angle · Numeral 2 has 2 angles · Numeral 3 has 3 angles · Numeral 4 has 4 angles · (we are more used to seeing the number 4 written like this)
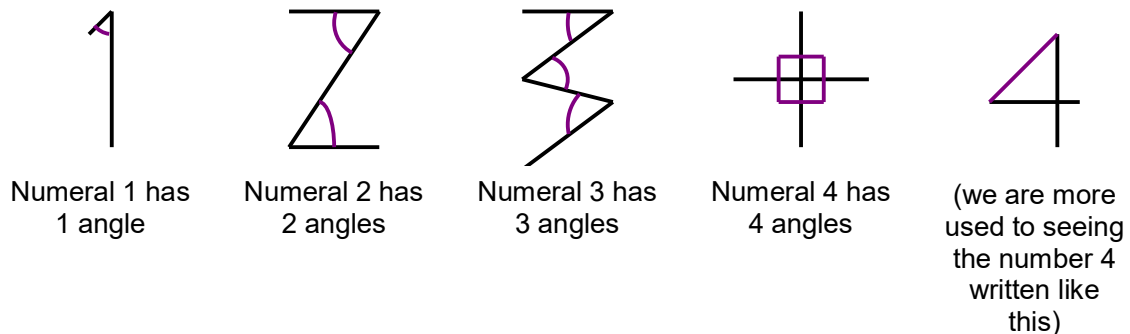
There are many different ideas about how the symbols for the other numerals were designed. The shape of some has changed over time like the numeral 4 above.

Study the numerals below and see if you can suggest your own theory about how they came to be!

123 456 78 90

The Arabic numerals are not the only system used for recording numbers. The table below shows some different systems of numbering used around the world.

Arabic	0	1	2	3	4	5	6	7	8	9
Arabic-Indic	٠	١	٢	٣	٤	٥	٦	٧	٨	٩
Eastern Arabic-Indic (Persian and Urdu)	٠	۱	۲	۳	۴	۵	۶	۷	۸	۹
Tamil		க	உ	ங	ச	௫	சா	எ	அ	கூ
Roman		I	II	III	IV	V	VI	VII	VIII	IX

Try these sums using the different symbols from the table. Write your answers in the same numeric system as the sum.

1. க + ச = **2.** VIII ÷ II = **3.** ௫ x ௭ = **4.** ௫ − ௫ = **5.** ٩ − ٤ =

These symbols help us to work with numbers. Without them mathematics would be impossible!

Without mathematics, many activities of daily life would be impossible too, such as building, engineering, astronomy, navigation, statistics and medicine.

The Islamic Research Centre in Baghdad, the present day capital of Iraq, was the centre of all mathematical development in the 9th century.

Activities

1. Read the information above. With your partner, discuss which information you found most interesting and why.

2. The text suggests some activities where the use of mathematics is important.

   Make a list with your partner of other uses of maths which you can think of. You could start like this:

   - weighing things **to sell**, e.g. sugar, tea, flour

   - measuring materials **to build a house**

   - **working out wages** by looking at how many hours someone has worked

3. Imagine if there was no numerical system; discuss with your partner how you would solve mathematical problems. How would you calculate cost and value of goods at the market for example?

4. Look at the table which shows different symbols that are used to represent our numerals. Can you write the numbers below using a number system from the table? Write them in your exercise book. By each number or set of numbers write the system you have used.

        a. 5   **b.** 9   **c.** your age   **d.** the date today

5. Can you develop your own number symbols? Explain what each symbol represents and why you have chosen it. Discuss your ideas with a partner. Draft your work first, improve on your ideas and then write and draw out a good copy.
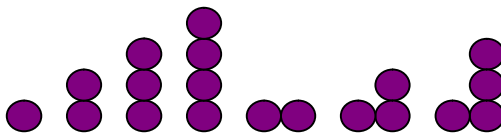
Here is a suggestion to start you thinking. If the symbols on the left represent numerals 1 to 7, how do you think you would write the numbers 8, 9 and 10 in this system?

How could you write the numeral 0?

What is wrong with this system of numerals? Try using it to write larger numbers, (say 3,650). Is this easy or difficult? Is it easy to read?

Palindrome Numbers

Investigations

1. Look at this pattern: $1^2 = 1$ $11^2 = 121$ $111^2 = 12,321$ $1,111^2 = 1,234,321$ Calculate the answers for $11,111^2$ through to $11,111,111^2$. Is the answer always a palindrome number?	2. Sometimes when you reverse a number and add it to itself, the answer is a palindrome. Look at these examples: **123 + 321 = 444** **92 + 29 = 121** **1,235 + 5,321 = 6,556** What other numbers plus their reverse result in palindrome numbers? Try to find numbers that do this in one, two, three or more steps. Are there numbers that do not result in a palindrome?
3. Study the following pattern: $0 \times 9 + 1 = 1$ $1 \times 9 + 2 = 11$ $12 \times 9 + 3 = 111$ $123 \times 9 + 4 = 1,111$ $1,234 \times 9 + 5 = 11,111$ $12,345 \times 9 + 6 =$ Continue the x 9 pattern as far as possible. Is the answer always a palindrome number?	4. In this century, which years will be palindrome numbers?

Chapter 1

Heading Back to 1

Investigations

1. Work through all the numbers from 1 – 20 and find out how many steps it takes to get back to one in each case.

2. Which of these numbers takes the most steps?

3. Which of these numbers takes the least steps?

> **Remember the Rules**
>
> If the number is **even** divide by 2. If the number is **odd** multiply by 3 and add 1.

Fibonacci Numbers

Activity

1. Make a diagram of your own family tree. Ask your parents, grandparents and older relatives as each will be able to tell you about different parts of your family tree.

   The diagram below will help you get started.

   It can be fun trying to see how far back you can go. If you can, add the year and place of birth and death of each person.
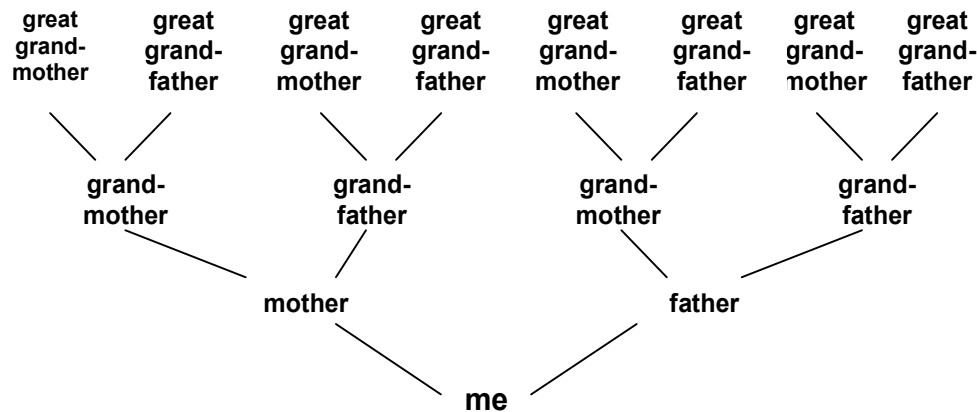
2. A brother or sister is the name for someone who has the same two parents as you. What is a **half-brother** or **half-sister**?

   Describe a **cousin** and use simpler words such as **brother, sister, parent, child?**

   Do the same for **nephew** and **niece**. What is a **second cousin**? What do we mean by a **brother-in-law, sister-in-law, mother-in-law**, etc? **Grand-** and **great-** refer to relatives of your **parents**. Therefore a **grand-father** is a father of one of your parents and **great-aunt** or **grand-aunt** is the name given to an aunt of one of your parents.

   Make a diagram of family tree names so that **me** is at the bottom and **mother** and **father** are above you. Mark in **brother**, **sister**, **uncle**, **aunt, nephew, niece** and as many other names of different relatives that you know. It doesn't matter if you have no brothers or sisters or nephews as the diagram is meant to show the relationships and their names.

   Do you know the names of these relatives in your language? You could make a list of these and write the name in English by the side.

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Analysing your Family Tree

Questions to Talk About

1. What name do you use for **the wife of your parent's brother**?

2. Do you use a different name for the sister of your parents? In law these two are sometimes distinguished because one is a **blood relative** of yours and the other is not, just a relative through marriage.

   Which do you think is the blood relative and which the relative because of marriage?

3. How many parents does everyone have? So how many grand-parents will you have to make spaces for in your **family tree**?

4. Each of them also had two parents so how many great-grand-parents of yours will there be in your family tree? How many great-great-grandparents?

   What is the pattern in this series of numbers?

   How many entries will there be on your family tree if you go back 5 generations?

   How many if you go back 10 generations?

   A human family tree involves a different sequence to the Fibonacci Numbers. Do you know what this sequence is called?

Food For Thought

Looking back at your work on your family tree, a friend comes up the idea that the population of the world must be getting smaller. This is his argument:

- You have 2 parents.
- They each have two parents, so that's 4 grand-parents.
- They also had two parents each making 8 great-grand-parents in total and 16 great-great-grand-parents, and so on.
- So the further back you go in your family tree the more people there are.
- It is the same for the family tree of **everyone** alive in the world today.
- This shows that the further back in time we go, the more people there must have been.
- So it is a logical deduction that the population of the world **must** be getting smaller and smaller as time goes on!

Think about it!

Do you agree with your friend?
Is there an error in your friend's argument? If so, what is it?

Fibonacci Number Patterns in Nature

Look at the examples below. They show how the Fibonacci number pattern can be found in nature.

A spiral can be created using Fibonacci Rectangles. Sometimes this can be seen in a spiral arrangement of leaves or branches. Sometimes the pattern can be seen by counting different parts of a flower, a seed or a fruit.

Example 1: Nautilus Shell

The picture shows the cross-section of a nautilus sea shell. (Cross section means that it has been cut to show the spirals inside.)

It shows the spiral curve and the internal chambers of the shell. These are added on to the shell as the animal grows. The chambers provide buoyancy in the water.
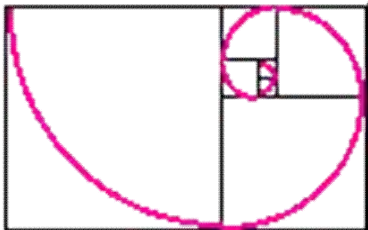
Does the shape of the shell remind you of the diagram of Fibonacci rectangles?

Example 2: Plant Branches
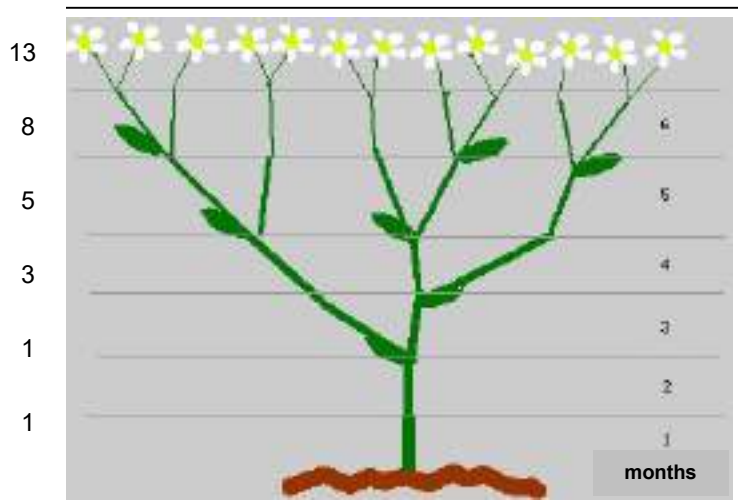
This plant shows the Fibonacci number pattern in the number of "growing points" that it has. Suppose that when a plant puts out a new shoot, **that shoot has to grow for two months** before it is strong enough to support branching. If it **branches every month after that** at the growing point, we get the picture shown here.

Look at the number of branches each month.

Can you see the pattern: **1, 1, 2, 3, 5, 8, 13**?

Example 3: Flower Parts

The pictures show a passion flower viewed from the back and front:

Back View

3 sepals that protected the bud are on the outside.

5 outer green petals followed by an inner layer of 5 more paler green petals.

Front View

Two sets of 5 green petals are on the outside.

An array of purple-and-white stamens comes next (how many?).

In the centre are 5 greenish stamens (T-shaped)

Uppermost in the centre are 3 dark brown carpels.

On many plants, the number of petals is a Fibonacci number: Flowers with 3, 5, 8, 13 and 21 petals can be found. Some flowers which have many petals also have larger Fibonacci numbers such as 34, 55 and even 89.

Example 4: Vegetables and Fruits

A **banana** can have 3 or 5 flat surfaces depending on the variety. When it's peeled and cut in cross section, the shape of the cross section will be a **Fibonacci number**.

Can you think of any other fruits with Fibonacci numbers in their shapes?

Example 5: Seeds

This flower seed head has 13 ridges on top of it.

Count them and check.
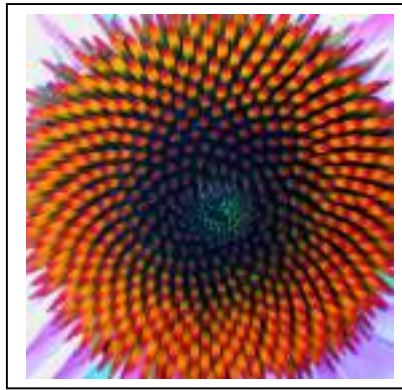
Fibonacci numbers can also be seen in the arrangement of seeds on flower heads.

In this flower there are 55 spirals if you count those at the edge. A little further inwards it is possible to count 34. These numbers come next to each other in Fibonacci's number sequence.

The spirals on this flower head look similar to the spiral drawn inside Fibonacci's rectangles.

Investigation

Plan an investigation to look for Fibonacci's number patterns in living things.

Read the examples above and think of what you could investigate. Here is a list of suggestions. You will be able to think of some more ideas.

- Which plants show Fibonacci spirals on their **flowers**? Can you find an example of flowers with 5, 8, 13 and 21 or more petals? Can you find flowers with other numbers of petals which are **not** Fibonacci numbers?

- Look for the Fibonacci numbers in **fruit**. Check the numbers seen in a banana as described in Example 4.

  Look at the pattern of spirals in the scales on a pineapple for example. Can you find a Fibonacci number connection?

Try other fruit too. Collect fruits you can find and cut them up to study their segments, seeds, shape, and so on. Are there any Fibonacci number patterns?
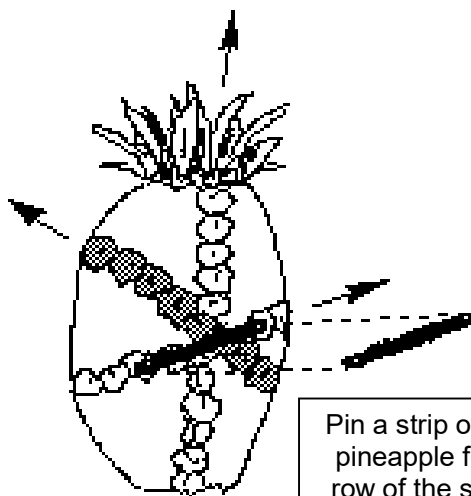
Pin a strip of paper to the pineapple following one row of the scales to help you keep track of which one's you have counted.

- Look at a variety of **vegetables**. Look at ones which grow around a stem like different types of cabbage. Can you find a spiral arrangement? Count leaves growing from a stem. Can you find any Fibonacci numbers?

- Investigate **seeds** and **seed heads**.

- Look at **whole plants** and the way they grow. Can you find any patterns? What can you count?

- Look at a variety of **shell fish** as well as **snails**. Can you find any Fibonacci spirals or number patterns?

When you have decided what you are going to investigate, plan your investigation. How are you going to record what you find out? Here are some ideas to help you get started:

- Make annotated drawings of what you are investigating. (Annotating means writing detailed notes around your drawings.)

- Prepare tables to fill in to compare characteristics of different samples you have studied. For example, if you studied flowers you might record: number of petals, number of sepals, number of carpels, number of stamens, style, stigma, anthers.

- Present your findings as an information poster.

- Summarise your findings and write a report of your investigation. This could include suggestions for further investigations.

Gauss' Method of Summation

Investigations

> **Remember the Formula**
>
> $t = \dfrac{n \times s}{2}$

1. What is the sum of the numbers from 1 to 20?

2. What is the sum of the numbers from 23 to 49?

3. What is the sum of the numbers from 103 - 120?

4. Design some sequences of your own to try out. Make sure you have worked them out correctly and challenge your partner to try them out.

5. With your partner talk about which method is quicker and easier to use: the adding method or the formula method. Why?

6. Can you remember the name of the mathematician who first thought of this method?

Chapter 1

Working with Numbers

Activity 1: Totals

Add any of these cards together to make the following totals.

| 2 | 4 | 8 | 3 |
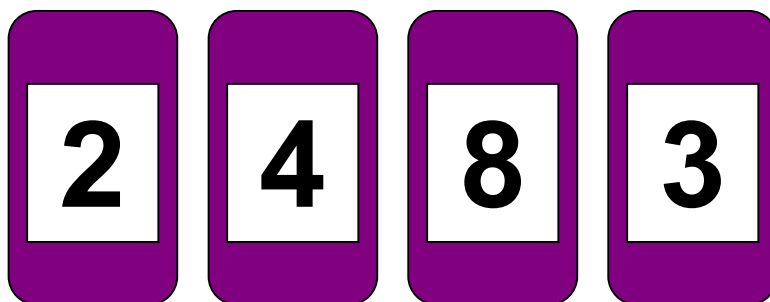
9, 10, 11, 12, 13, 14, 15

You can use each card only once in each sum.

What other totals can you make from the cards?

Activity 2: Number Lines

Copy this diagram. Make each line add up to 16.

2	5	3	
			2
		2	
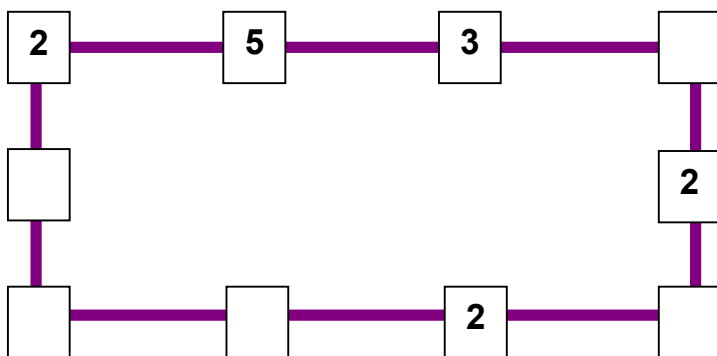
Activity 3: Investigating Magic Squares

Look at the magic square a below and decide if a pattern is used.

Reminder!

In a Magic Square all the horizontal, vertical and diagonal lines have the same total!

Change the numbers around. Is it still a magic square?

a.

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

b.

18	116	109	39
95	53	60	74
67	81	89	46
102	32	25	123

Square b is not a magic square. One of the numbers is wrong. Find the wrong number and change it so the square becomes a magic square.

c.

	24		8	15
	5			
		13		22
10	12	19		
		25	2	9

Copy this magic square into your exercise book.

Complete the square by placing the remainder of the numbers from 1 to 25 in the empty squares. Each column, each row and each large diagonal must add up to 65.

Copy the magic square on the right.

Complete the square by placing the remainder of the numbers from 13 to 37 in the squares so that each column, row and large diagonal adds up to 125.

d.

29	36		20	
			26	
16		25		
		31	33	15
23	30	37		

Activity 4: Benjamin's Magic Square

Benjamin Franklin (1706 - 1790) is best known as an American politician and scientist. He also had an interest in mathematics and drew up the following magic square which has some very interesting features to look at and investigate.

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

a. Add up the numbers in each row, and then add up the numbers in each column. What total do you get every time?

b. Pick any row of numbers, add up the first four numbers, and then add up the last four numbers. What do you notice?

c. Pick any column, add up the first four numbers, and then add up the last four numbers. What do you notice?

d. Add up the numbers in any 2 x 2 square. What do you notice?

e. Imagine the whole 8 x 8 square cut into quarters. Four separate smaller squares each consisting of 4 rows x 4 columns.

Add up the numbers in each row, then in each column for every quarter. What do you notice?

How Many?

Can you work out how many squares there are in Benjamin Franklin's square altogether without counting them all?

Activity 5: Number Placement

Copy the 3 x 3 square into your exercise book.

Place the numbers 11 to 19 in the grid so that the rows, columns and diagonals all have the totals shown in purple. Use each number only once. You must also obey the following rules:

- Row A contains only even numbers;
- Row B has all odd numbers;
- 12 and 16 are in the same column;
- 16 is not in the same row as 14;
- 11 and 19 are in the same row.

Remember!

Rows run horizontally and columns run vertically

	A	B	C	
A				44
B				45
C				46
	44	45	46	54

Activity 6: Star Addition
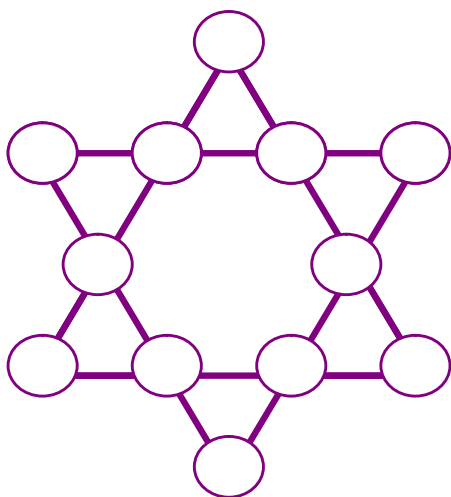
Copy this diagram into your exercise book.

Place the numbers 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 and 60 in the circles.

You must make every line of four circles add up to 130.

Activity 7: Make 100

7   2   4   1

Use these four digits. Put one digit in each box in the square.

This makes two 2-digit numbers reading across and two 2-digit numbers reading down. Add up all four of the numbers.

The total of the four numbers must be 100. Draw your square and put in the correct digits.

Activity 8: Making 200

1   2   3   4   5   6   7   8   9

Choose four of these digits. Each one must be different. Put one digit in each box.

This makes two 2-digit numbers reading across and 2-digit numbers reading down. Add up all four of the numbers.

The total of the four numbers must be 200.

Draw your square and put in the correct digits.

Remember

A square number is a number whose units can be arranged into a square.

Activity 9: Square Numbers

Study these diagrams. Count the number of squares in each one. Copy the diagram into your exercise book. In the purple squares, write down the difference **between the two square numbers on either side. Look for a pattern.**

Calculate the difference between another 5 square numbers to explore the pattern further.
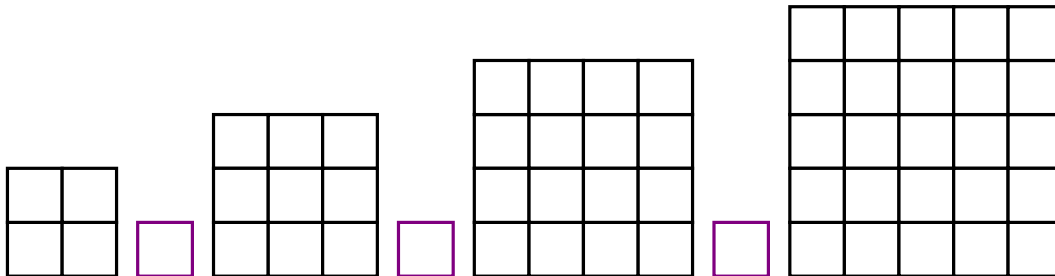
Activity 10: Triangular Numbers
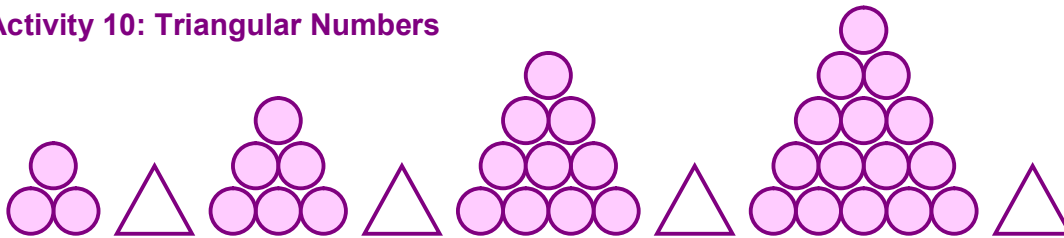
Sketch the above diagram into your exercise book. In the purple triangles, write down the difference **between the triangular numbers on either side. Look for a pattern. Explore the pattern further by calculating the difference between another 5 triangular numbers.**

Activity 11: Going in Circles

Copy the diagram on the right into your exercise book.

Place the numbers 1 to 19 into the circles so that any three numbers joined by a line add up to the same number.
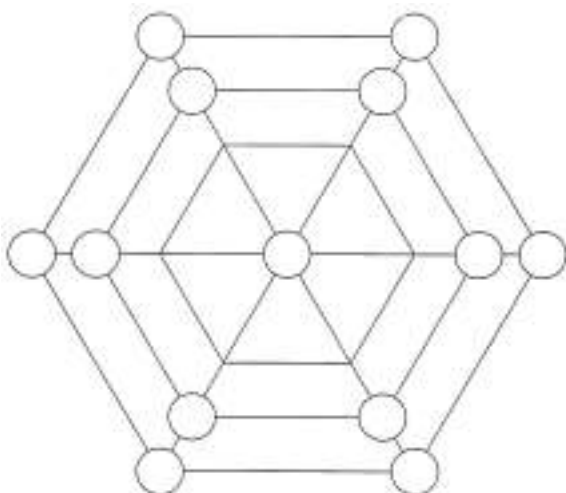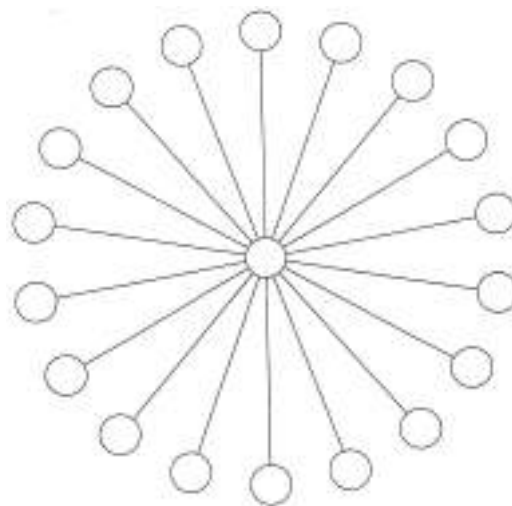
Activity 12: A Magic Hexagon

Copy this magic hexagon.

Place the numbers 14 to 26 into the circles so that the lines leading into the centre add up to 60.

Chapter 2: Fun with Words and Numbers

Activity 1: Rotten Rat's Lunch
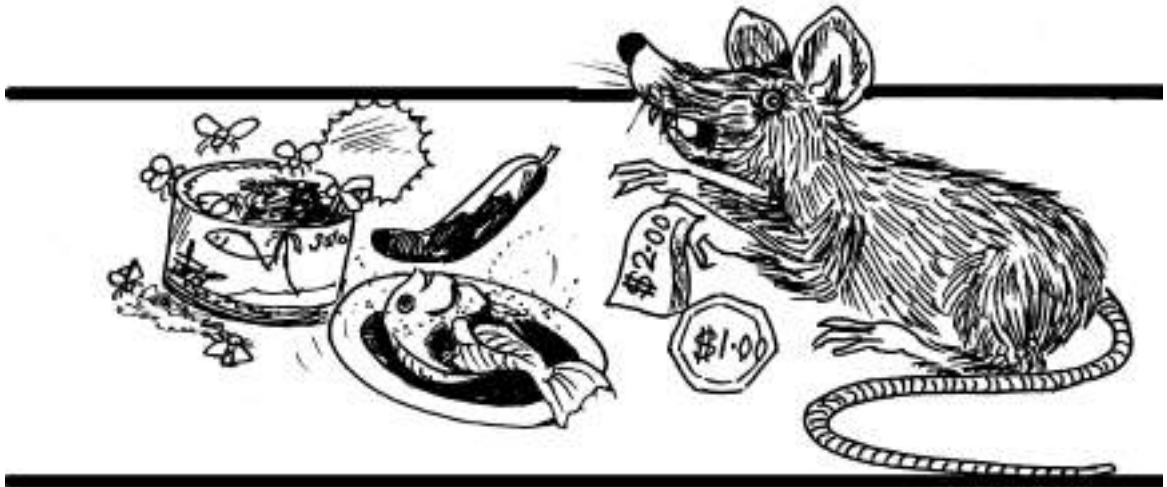
For lunch, Rotten Rat ate a rotten banana, a rotten, smelly fish and an open can of Taiyo with flies.

It cost him $3.00. He paid 60 cents more for the banana than he did for the open can of Taiyo with flies and 45 cents more for the rotten smelly fish than the rotten banana.

"I wonder how much that rotten smelly fish cost me?" thought Rotten Rat.

Questions

1. What did Rotten Rat have for lunch?
2. How much did it cost altogether?
3. How much did the banana cost?
4. How much did the open can of Taiyo with flies cost?
5. How much did the rotten smelly fish cost?
6. What percentage of the total cost was the rotten smelly fish?
7. What percentage of the total cost was the open can of Taiyo with flies?
8. What percentage of the total cost was the rotten banana?

Extension Activity

Draw your favourite lunch. If the whole lunch is 100% what percentage is each item? What percentage of the lunch do you think you could eat?

Activity 2: How Old are Selwyn's Parents?

There is something about parents that always makes them have trouble knowing their own age. They always seem to give you a silly answer if you ask them how old they are. They say something silly like, "sixteen!" or they say something confusing like Selwyn's dad did. This is what he told Selwyn.

"Well a few years ago you were two and I was 34 but now I'm five times older than you."

What type of answer is that to 'How old are you'?

Selwyn tried asking his mum, "Mum, How old are you?"

"When you divide my age by 2, 3, 4 or 6 there is always one left over," Selwyn's mum replied.

What an answer!

Questions

1. How old do your parents say they are?

2. How old is Selwyn's dad?

3. How old is Selwyn's mum?

4. If Selwyn is an only child and he is 8, how many candles will he need for all of the birthdays in his family?

5. How many would he need if they all had their birthday on the same day?

6. Make up a problem about your own age. Try it out on a friend.

7. If Margaret is in year 5 and her father says "I was five times your age when you started school, now I'm three times it," then how old is Margaret's dad?

Extension Activity

What do you think is a present your parents would choose if they could have anything they wanted?

Draw it. Check out your guess with them. Were you right?

Birthday Information

It is custom in some places to put small candles on a cake for your birthday. There is a candle for every year, so if it is your twelfth birthday there would be twelve candles on the cake.

Activity 3: Nula, the Human Fly

Nula the human fly was crawling up the side of the world's tallest fence outside the world's largest rubbish dump.

The fence was two hundred metres high. Nula climbed 40 metres every 30 minutes, He then had to rest for half an hour to get his breath back. While he was resting he was blown back 30 metres by the wind.

Finally after a struggle and quite some time he got to the top of the fence and launched himself at the great mound of rubbish before him, only to be knocked flat by Francis the human fly swat.

Questions

1. How tall was the fence that Nula was climbing?
2. How far did Nula climb in the first 30 minutes of each hour?
3. How far was he blown back by the wind?
4. How much gain did Nula make each hour?
5. How long did it take Nula to reach the top?
6. Draw a diagram of Nula's journey on squared paper to check your answer. Was your answer correct?

Extension Activity

Invent your own superheroes.

Draw them, name them and describe them if you dare!

Activity 4: Timothy Tiler's Incredible Tiles

Timothy Tiler has incredible tiles with great patterns and pictures on them. He likes to think of his tiled floors as works of art.

He charges high prices for his work.

For his last rectangular floor he charged $5,000.00.

Mary Million thought she would like her floor tiled too. It was twice as long and twice as wide as the last one Timothy did.

"Will that cost twice as much?" Mary Million asked.

"No way!" said Timothy.

Questions

1. **a.** How much did Timothy's last floor cost?

    b. What shape was it?

2. If Timothy's last room was 5 metres x 2 metres, what was the charge per square metre?

3. If there were 4 tiles to every square metre how many tiles did he use?

4. What would Timothy charge for a floor twice as large as the last one he did?

5. Using squared paper draw Timothy's last floor (5 x 2). In a different colour draw in Mary's room. (Use Timothy's as the corner.)

6. **a.** How much will Timothy charge Mary for the room?

    b. If there are 4 tiles to every square metre, how many tiles will Mary's floor need?

Extension Activity

Design your own tiled floor. You can use colours, patterns, drawings or whatever you like on your tiles. Can you make the tiles into an interesting pattern?

Activity 5: Mr. Slippery and his Worms

Mr. Slippery sells worms.

"Worms are good," Mr. Slippery tells his customers, "Especially with bread!"

One morning Mr. Slippery had four customers. He opened a fresh can of worms. The first customer bought half the can plus two extra worms to eat on the way home. The next customer bought half of what was left in the can plus an extra two for a snack.

The third customer bought half of what was left in the can plus another two and the last customer bought the one worm that was left.

"Do you want me to open another can of worms?" asked Mr. Slippery.

Questions

1. What does Mr. Slippery sell?

2. How many customers did Mr. Slippery have?

3. What did the last customer buy?

4. How many worms were in the can of worms he opened?

5. If each customer had bought the same amount of worms how many would they each have bought?

6. If Mr. Slippery charged 5 cents a worm how much did it cost the:

    a. First customer?   **b.** Second customer?

    c. Third customer?   **d.** Fourth customer?

7. If it cost Mr. Slippery 50 cents to produce all the worms in a can how much profit does he make on each can of worms?

Extension Activity

Make up a worm food recipe. Make the worms the main ingredient.

Chapter 2

Activity 6: Roy and Rob

Roy and Rob sell 'Pacific Star' newspapers in town every weekend.

Last week they were paid $65.00. From that money they had to pay the store keeper $39.00 for the newspapers. They split the profits equally.

They also won a prize for selling the most papers. Their prize was to go and see the 'Pacific Star Rats' play in a concert.

At the concert they sat in the second row. There were 35 seats in the front row. Roy counted 35 rows in the hall.

"I wonder how many people are here?" he said to Rob.

"I don't know," Rob answered. "A lot!"

Questions

1. How much did Roy and Rob get paid last week?
2. How much did they pay the store keeper?
3. How much profit did they make altogether?
4. How much did they each make?
5. How much did they earn per day?
6. How many people were at the concert if all the chairs were filled?
7. If Roy and Rob took $65.00 for 'Pacific Star' at $1.25 each, how many newspapers did they sell?

Extension Activity

Imagine you are going to see your favourite band, group, singer or sports star.

- Who are they?
- What will they be doing?
- Where will this be?
- How will you get their autograph?

Write it all down.

Activity 7: Henry Heavy Duty Heron

Henry Heavy Duty Heron has a job in the Twisties factory putting the pattern on Twisties packets. He does this by stamping on them. Henry likes his job.

Henry earns $18 an hour for his normal 40 hours a week and gets one and a half times that for any overtime he works.

Last week Henry worked 44 hours and 30 minutes. The boss said he should get faster at his work.

"Step on it Henry!" he yelled.

Questions

1. What does Henry do in the Twisties Factory?

2. **a.** How much does Henry earn an hour?

   b. How much does he earn in a 40 hour week?

3. What would Henry earn for four hours overtime?

4. How much did Henry earn last week?

5. If Henry steps on 40 bags of Twisties every hour, how many does he step on in an eight hour day?

6. How much would Henry be paid per bag to earn exactly $18 an hour, if he presses 40 bags an hour?

Extension Activity

Think of your favourite snack – sweet or savoury.

Draw an advertisement for your snack.

Activity 8: Spider and the Letter Flies
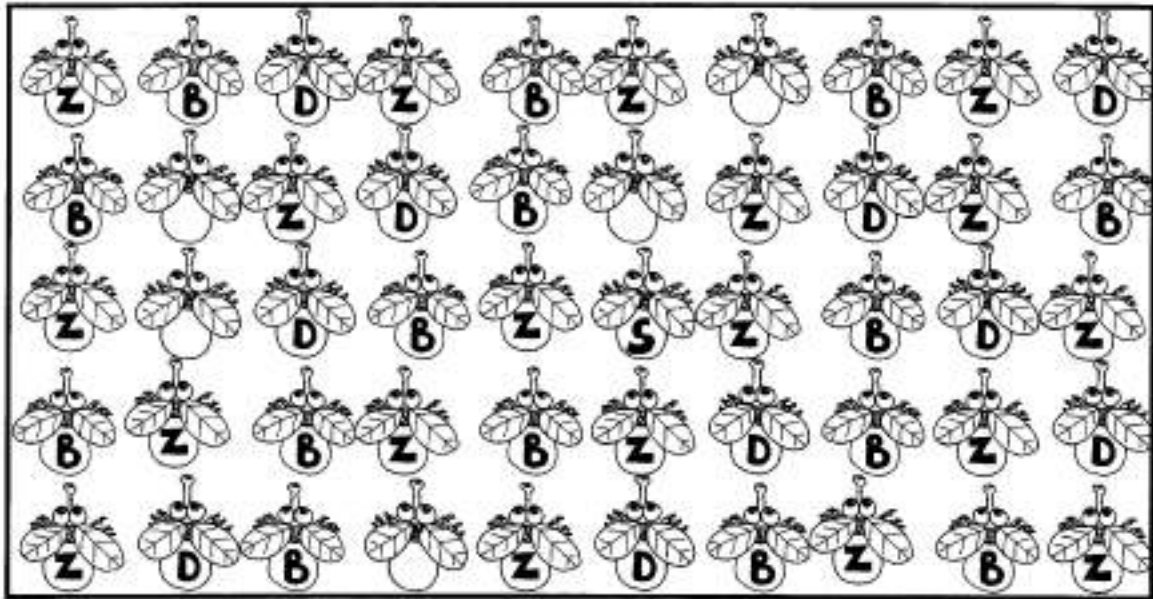
Spider caught 50 flies on his wire fly screen. Some flies had a letter on their abdomens. There were **Z** flies, **B** flies, **D** flies and **S** flies, as well as other flies.

Spider scratched his head and thought. "I wonder what a fly without wings is called?"

He then smiled. "I know, it's a walk!"

Questions

1. What percentage of flies were **Z** flies?

2. What percentage of flies were **B** flies?

3. What percentage of flies were **D** flies?

4. What percentage of flies were **S** flies?

5. What percentage of flies were other flies?

6. **a.** What flies were in the greatest percentage?

   b. What flies were in the least percentage?

7. **a.** If Spider swatted the **B, D,** and **S** flies what percentage of flies would be killed?

   b. What percentage of flies would be left?

8. If there were 25 flies on the wire and 13 of them were **A** flies, then what percentage of the total flies would they be?

Extension Activity

Identify insects around your school. Draw the ones you find. Draw them to scale.

Invent your own insect. Draw an annotated drawing of your insect. Draw your insect to scale.

Activity 9: The Alien Space Craft

As the alien space craft zoomed closer to Earth, the radar scope picked up several new and interesting objects. "What is that reading?" Commander Zx22 asked his second in command, 21C.
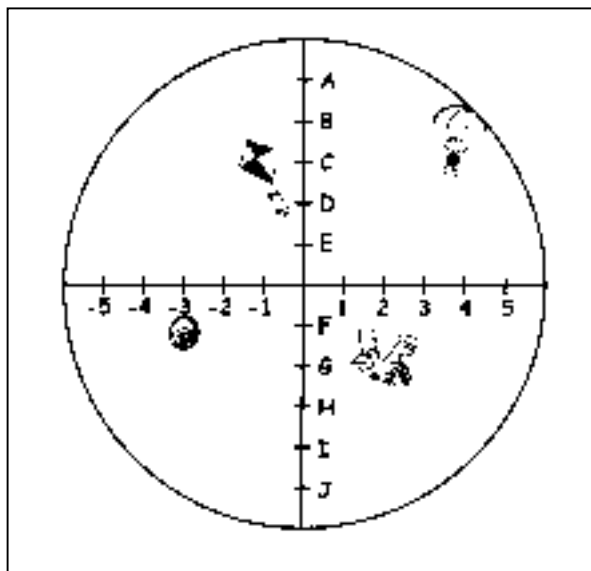
"It's a kite, Sir" 21C replied. "Shall we blow it out of the sky?"

"No," said Zx22. "But what is that other reading?"

"A football," said 21C. "Shall I shoot it sir?"

"No. What is the third reading?" asked Zx22.

"A bird. Shall I shoot?" asked 21C.

"No, wait, what is the fourth reading?" enquired Zx22.

An alien in a parachute," explained 21C."In a para what?" asked Zx22.

"chute," said 21C.

"OK," said Zx22. "chute."

"If you say so!" shouted 21C.

Bang!

Questions

1. What is the reading for the bird?
2. What is the reading for the kite?
3. What is the reading for the football?
4. What is the reading for the parachute?
5. Sketch the radarscope into your exercise book.

    a. Draw a missing alien bomb at D,-4 on the radar scope.

    b. Draw a flying footballer about to take a catch at I,2 on the radar scope.

6. **a.** If alien spaceship commanders are more important, the higher their last two numbers, then how high could Zx22 go?

    b. How many promotions does he need to become supreme commander?

    c. What percentage of a supreme commander is Zx22? (Think about it!)

Remember

In a grid reference when using co-ordinates the horizontal reading is given first.

Extension Activity

Be angry! Which ten things would you like 21C to blow up for you? Give a reason for each choice.

Activity 10: The Six Exciting Smiley Brothers

The Six Exciting Smiley Brothers like to make acrobatic pyramids in this six shape. Sometimes they arrange themselves so that the sides of the pyramid add up to the same total.

Sometimes they fall and the total of their efforts come to zero, which brother 6 finds a real pain in the neck!
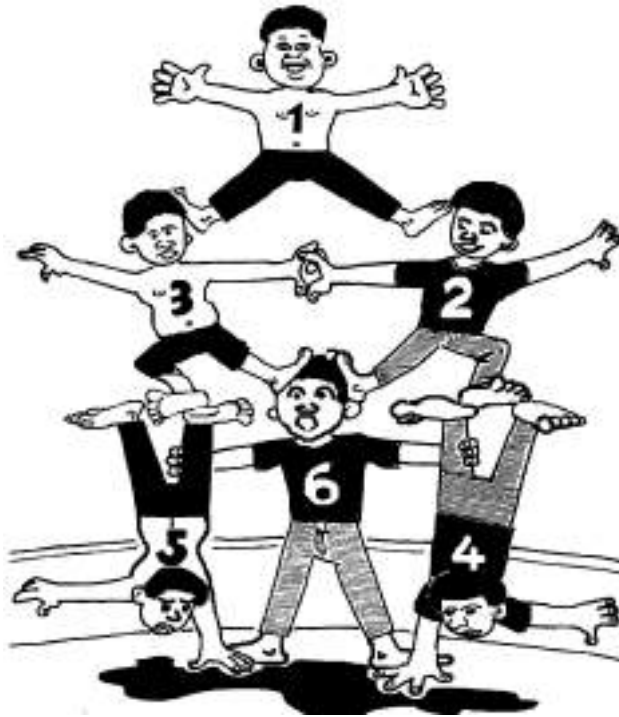
Questions

1. What is the total of all the brothers added together?

2. The Six Exciting Smiley Brothers can make three different pyramids in which the sides add up to 9, 11, and 12. Copy the diagrams below and put in the numbers to show each different pyramid.
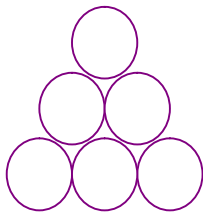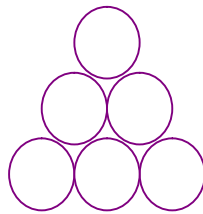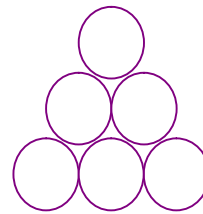
9   11   12

3. If the pyramid stayed in order how many changes would it take to get brother 6 to where brother 1 is in the picture?

Extension Activity

Try and make a six pyramid with your classmates.

Try it kneeling down first and then try standing up.

Activity 11: The Great Sam Yannis Slippery Snail

The Great Sam Yannis Slippery Snail is the fastest long distance sliding snail in history, smashing all sliding records recently when he slid a fabulous 261 cm in six days.

In a charity 'Slide for Orphaned Snails' Sam slid 5 cm more each day than he had the day before.

"Long distance sliding is great for you. It gives you a really strong foot. The only trouble is that when you get a blister it nearly kills you," said an exhausted Sam.

Questions

1. How far did Sam travel in six days?

2. **a.** If he raised $76 per centimetre, how much did he raise for orphaned snails?

   b. How much short of $20,000 was the amount raised?

3. What was Sam's average speed each day?

4. Copy and fill in the chart of Sam's daily progress.

Day	1	2	3	4	5	6
Centimetres covered each day						
Total covered altogether						261

5. Draw another chart to show Sam's daily progress when he slid 5 cm more each day. Start with 48.5 cm and finish at 291 cm.

6. Show your data in the second chart as a graph.

Extension Activity

Think up some crazy long distance races or ones which would take a long time to complete. Maybe you could design a sponsored fund raiser in this way. Remember your race must be interesting if you are going to get people to sponsor you. What other things would you need to prepare if you were organising this event. Write down everything you would need to do.

Activity 12: Final Results of the Crash Ball Season

Team	P	W	L	D	Goals F	Goals A	Pts	%	GD
Reds	10	9	1	-	178	98	36		
Roosters	10	9	1	-	196	123	36		
Smashers	10	8	2	-	109	48	32		
Warriors	10	7	3	-	108	76	28		
Bulls	10	5	5	-	104	82	20		
Coconuts	10	2	8	-	98	103	8		
Banyans	10	2	8	-	127	136	8		
Hunters	10	1	9	-	48	179	4		

After the end of the Crash Ball Season there were two teams on top of the ladder with the same points.

No one could decide who should be the leader. Simon Nelson thought that you could work out the winner on percentage of goals scored for and against.

"I don't know how to do it," Simon admitted, "But I think we could try to work out the real winner from the results!"

Questions

1. What do you think the abbreviations at the top of each column stand for?

   Copy each abbreviation and write the meaning next to it.

2. Who should be the leader on the ladder? Give a reason for your answer.

3. **a.** What other teams scored the same number of points?

   b. Are they in the right position?

4. In soccer they use 'goal difference' to separate teams, i.e. the difference between the goals scored for and the goals scored against. This could be a positive or a negative number.

   Could this settle the situation here?

5. Calculate the percentages for all the teams and their goal differences (GD). Order the teams for each method. Is the result the same? Does the same team come out on top?

Extension Activity

Which is your favourite team sport? What is the best team that you know of? Draw them. Write a few sentences giving reasons for your choice.

Chapter 3: Challenges in Shape and Space

Activity 1: Optical Illusions

Is what you see around you always true or do your eyes sometimes tell lies? Try out these activities and see whether you can fool yourself or your partner.

1. **On a clean piece of paper, or a clean page in your exercise book, draw two straight lines that are parallel to each other and exactly the same length.**

2. **Now mark a point at the mid point of the two lines about 1 to 2 cm above the top line.**
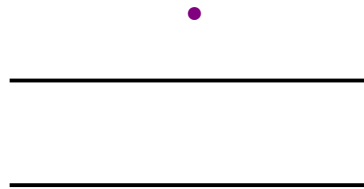
3. **Next draw two lines from the point passing through the ends of the top line and extending about 2 cm. Lastly draw two lines from the point passing through the ends of the bottom line and extending about 2 cm.**
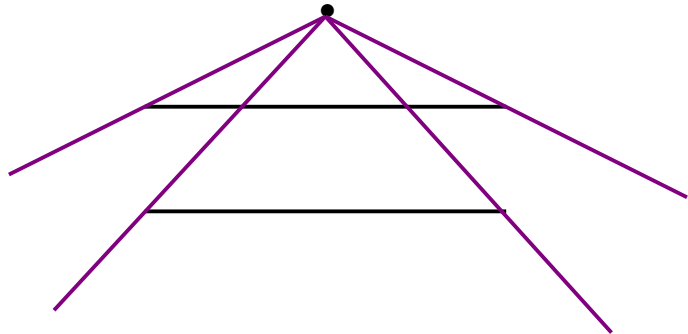
4. **Look again at the parallel lines in your diagram. What do you see? Do they still look the same length?**

    Why do you think this is?

> **Reminder**
> Parallel lines are two or more lines exactly the same distance apart. Parallel lines do not need to be the same length.

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Look at the two trapeziums on the right.

Which line do you think is longer A, or B?

Ask your partner what they think and ask some other pupils what they think too. Do you all agree?

Now measure lines A and B with your ruler. What do you find?

Are you surprised?

Why do you think your eyes deceive you in this way?

A

B
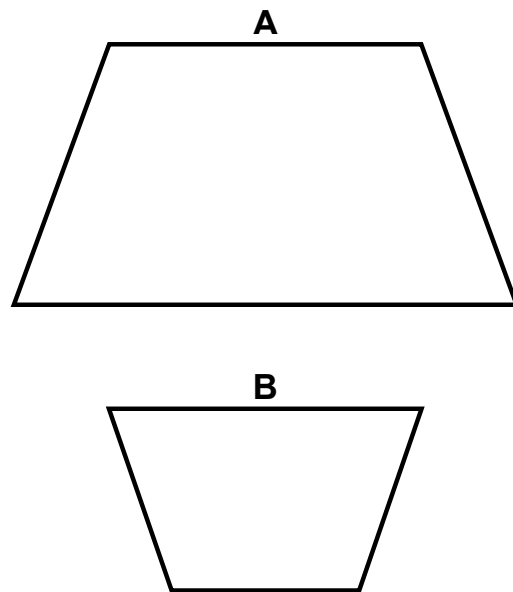
Look at the two parallel lines below. Which one is longer?

Ask six friends to look too and see whether they all say the same thing.

Measure and check.

In the diagram below, study the two purple lines. Describe them.

Are they parallel?

Are they straight or curved?

Measure and check.

Are your eyes deceiving you?
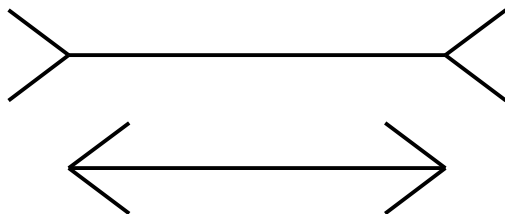
Are the horizontal lines in the diagram below parallel? Are you sure?

Measure and check.
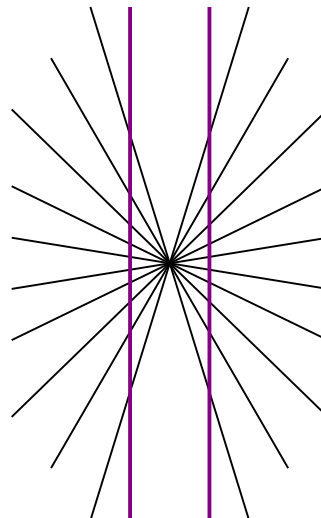
On the next page there are some more optical illusions for you to look at.

Study these with your partner and talk about what you see.

How many legs has an elephant got? Count them and see.
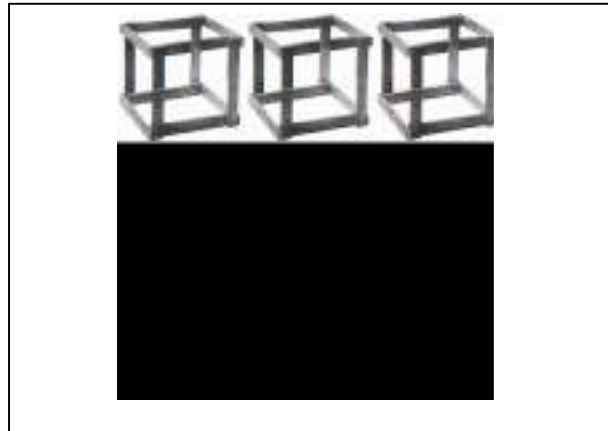
What is wrong with this picture?
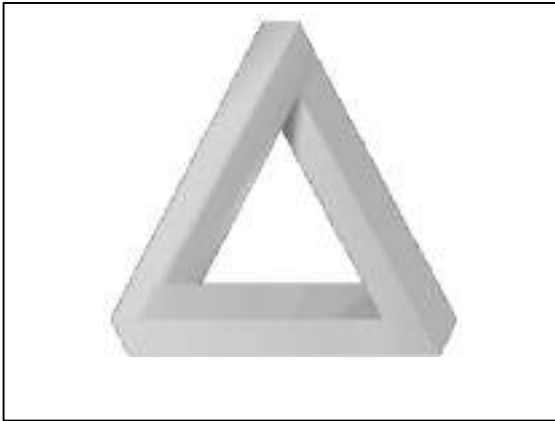
What would happen if you tried to construct this triangle from timber?
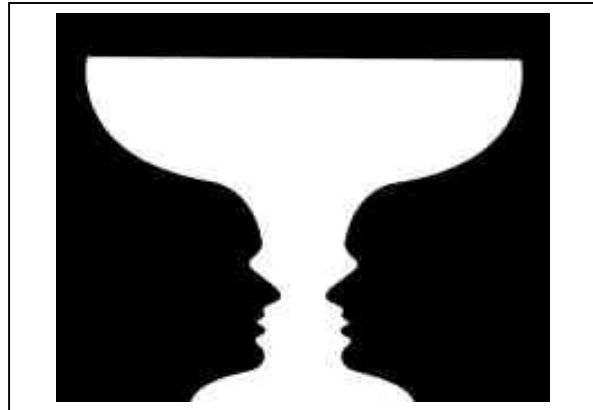
What do you see? A flower vase, or two people talking?
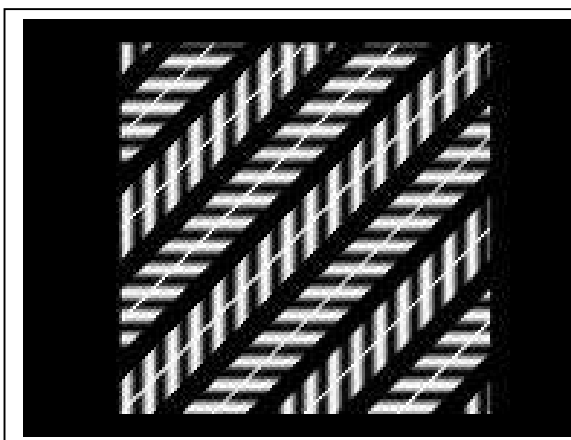
Which lines in this drawing are parallel and which are at right angles to each other?
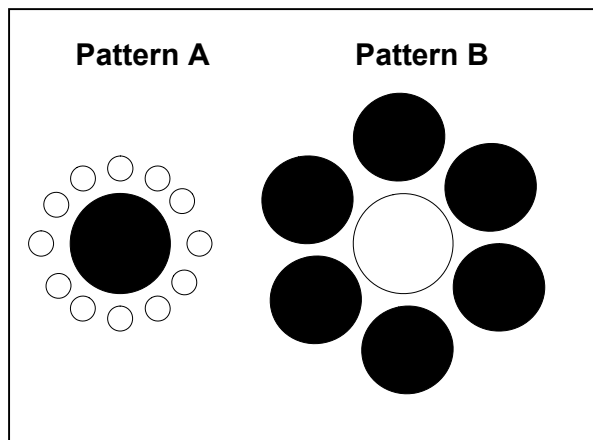
Pattern A   Pattern B

Compare the two circles in the centre of these patterns.

Which one is larger?

Measure and check.

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Chapter 3

Activity 2: Construction

You will need:

Sticks   Coconut midribs, drinking straws or matchsticks would all be perfect.

Putty   This is to hold the sticks together at the corners of your constructions. You could make putty out of clay or soil mixed with a little water; you could use playdoh or make putty out of flour and water. Alternatively you could use small pieces of green paw paw to hold your sticks together.

A knife

Cut your sticks into short pieces of about 3 – 5 cm in length. You will need at least 50 to start with, maybe more. Prepare some putty so that it can be used to join your models together. Now try some of the following challenges.

Triangles Only!

Use sticks to construct a series of two-dimensional equilateral triangles. Make as many as you can with the materials you have.
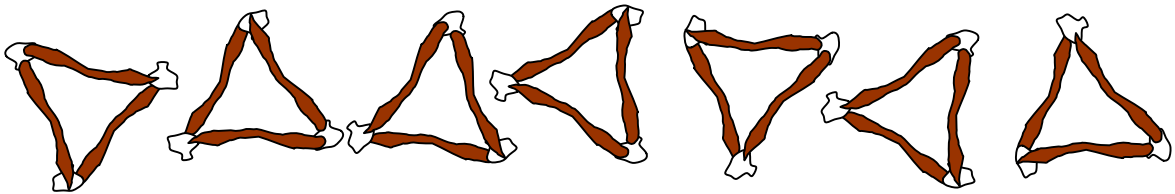
Now use your triangles to construct three dimensional solid shapes, made up only of triangular faces.

1. What shape can you make using 4 triangles?

2. What shape can you make using 8 triangles?

3. Design and make a solid shape that uses 10 triangles.

4. Can you make a regular solid with 20 triangular faces?

The Prism Family

For this activity you need plenty of square faces as well as some other shapes.

Construct your two dimensional squares first using four sticks and putty as before, make plenty of these but make sure you have some sticks left over to construct other shapes too.
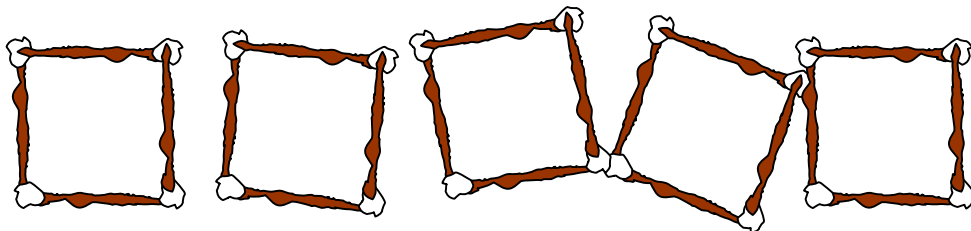
Use your squares to make the side faces of prisms and see if you can construct the entire prism family as follows:

The baby of the family	A triangular prism
Her big brother	A rectangular prism
Mum	A pentagonal prism
Dad	A hexagonal prism
Grandpa	An octagonal prism

You will need 52 sticks to make all the other faces of the prism family. Can you calculate how many sticks you will need in total to make the whole set?

Squares and Triangles

Explore what interesting solid shapes you can make by combining triangular and square faces. Try making both regular and irregular solids.

See if you can manage any of these.
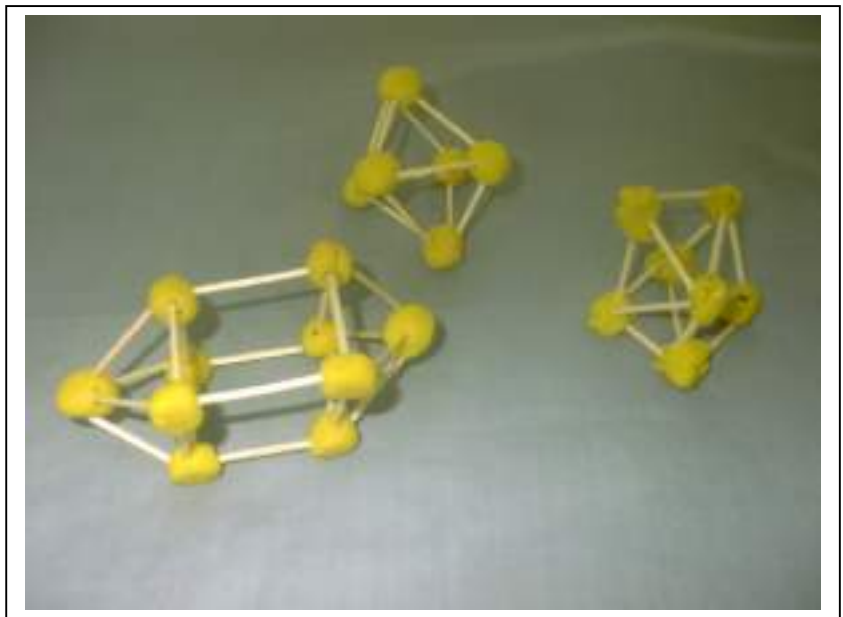
Chapter 3

Activity 3: Exploring Volume and Surface Area

Look at the drawing of a cube model below. It is made from 5 cubes measuring 1 cm x 1 cm. Its volume is 5 cm³. What is its surface area?
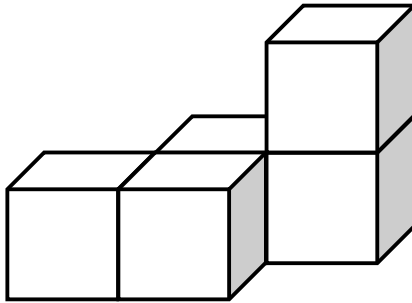
Remember!
If the volume of an object is its body, then the surface area is its skin.

First, count all the faces you can see. Then, picture the back of the model and count the faces that you cannot see. Don't forget to count faces underneath too.

The surface area of this model is 22 cm².

Look carefully at the drawings below. Make the models if you have some centimetre cubes. Calculate:

a. the volume of each model and

b. the surface area and write these in your exercise book.

1.
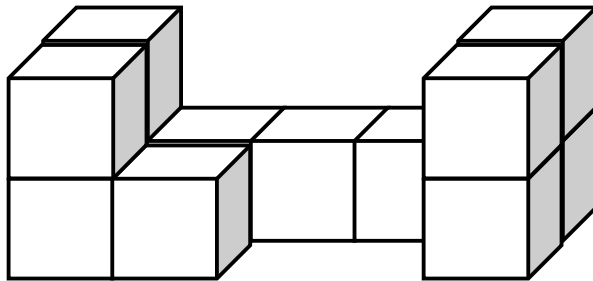
2.
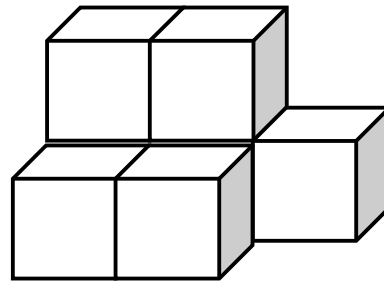
3.
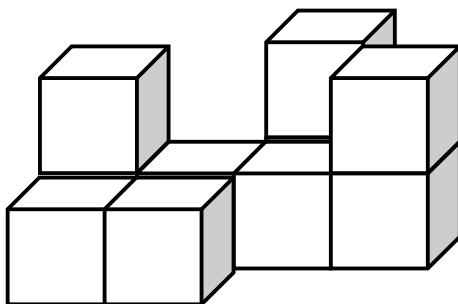
4.
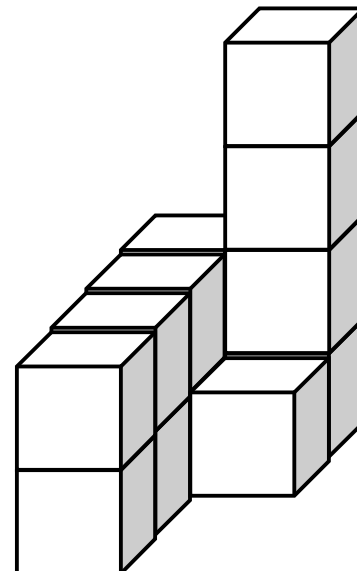
What do You Think?

Does the model with the largest volume, also have the largest surface area?

Think hard about this question and discuss your ideas with your partner. Write down whether you think the answer is yes or no, before you do the next activity.

Using the diagrams below, compare the surface area and volume of each model, and see whether you were right or wrong.

Design a table to record your calculations so that you can compare them easily.

1.
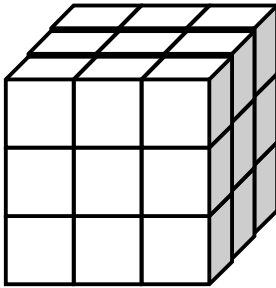
2.
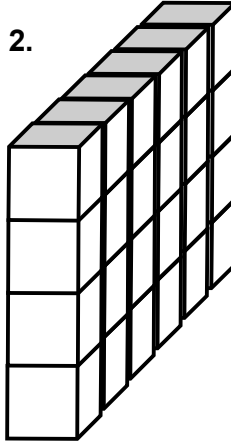
3.
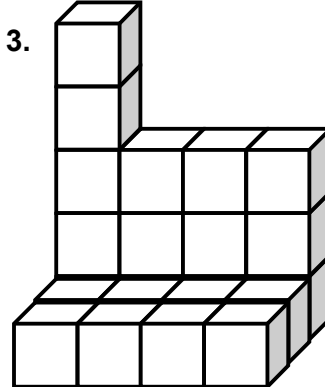
4.
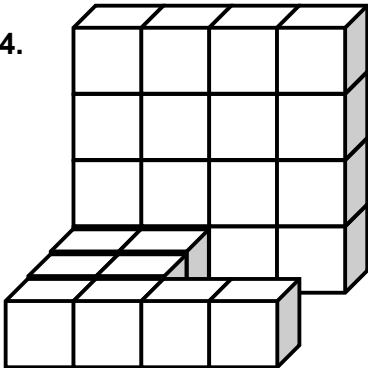
5.
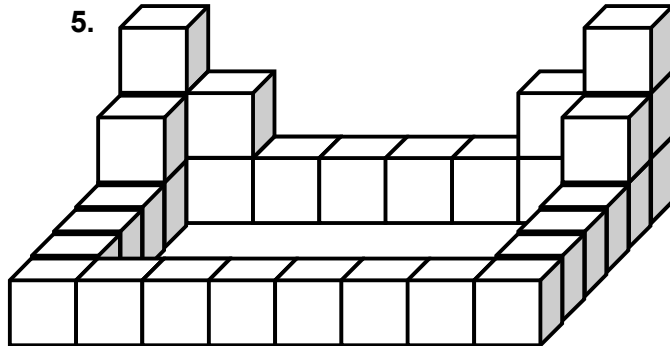
Discuss what you have discovered with your partner and try to explain it.

Here are some more cube challenges to work out with your partner.

1. If you use 27 small cubes what shape has the smallest possible surface area?

2. What shape made with 27 cubes has the largest possible surface area?

3. Which shape has the largest and smallest possible surface area using only 8 cubes?

Sketch your answers in your exercise book, or make models if you have some centimetre cubes.

Challenge - Write your own Formula!

It is easy to work out the volume and surface area of a cube if you have a formula to use.

You already know the formula for finding the volume of a cube. v = l x w x h

Work with your partner and see if you can work out a formula to find the surface area. It is very simple.

Looking at the following diagrams might help you.

> **Tip**
> You also need to use the formula for finding the area of a rectangle.
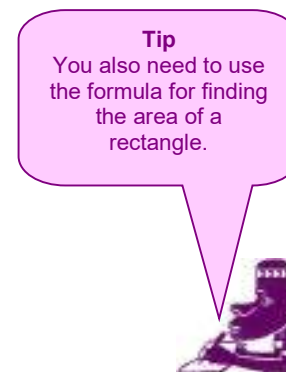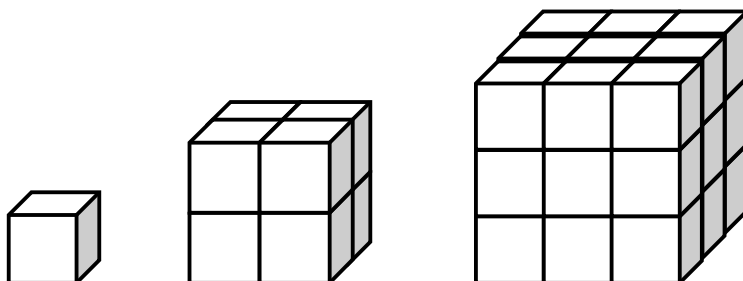
When you have worked out your formula try calculating the volume and surface areas of the following cubes using your formula.

Copy and complete the table in your exercise book.

Length of the Edges	Volume of the Cube	Surface Area
4 cm		
7 cm		
10 cm		
25 cm		

Now Try This

Can you find out the dimensions of a cube that has the same surface area in cm^2 as its volume in cm^3.

Discuss you ideas with your partner. Think of some strategies you might try to find out the answer.

More Investigations with Volume

As you know, the volume of a rectangular prism is found by multiplying the height by the width by the length.

Study the diagrams:

Volume

3 x 2 x 5 = 30 cm³

3 cm

5 cm

2 cm

Volume

2 x 2 x 2 = 8 cm³

2 cm

2 cm

2 cm
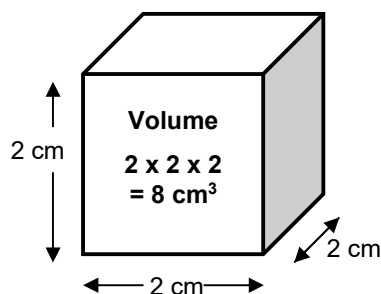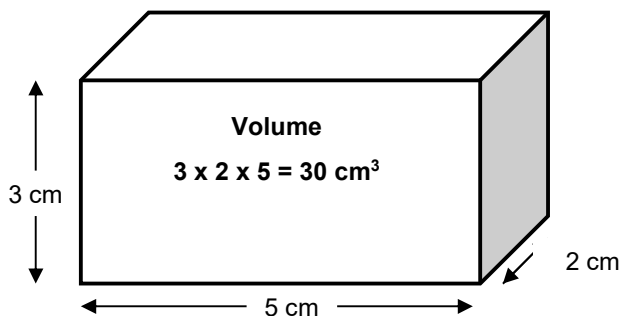
Investigate the Following Questions

1. What would happen if we doubled the dimensions of the cube above? Would the volume double to 16 cm²?

2. What would happen if we tripled the dimensions?

3. What would the volume of the prism above be if we doubled all the dimensions so that it measured 6 cm x 4 cm x 10 cm?

4. Explore how many times greater the volume of the cube and the prism would be if we multiply the dimensions by 2, 3, 4 and 5.

   Design a table to record your calculations.

   Write a few sentences about what you have found out.

Painted Cubes

Look at the cubes in the diagram on the right.

They are each constructed from 8 small cubes.

If we paint the whole cube pink as shown and then take it to pieces, we will find that three faces on each small cube have been painted, and three will be left white.
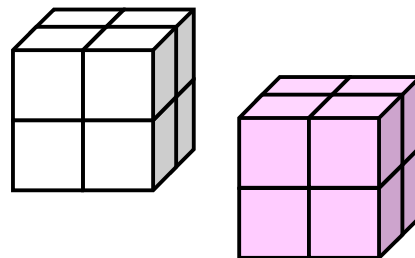
Now study the following diagram. How many small cubes make up this large cube?
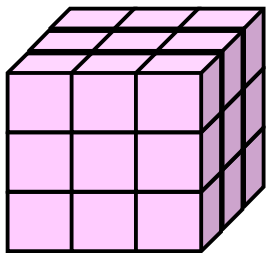
If it is painted pink on the outside and then taken to pieces, some of the faces on the small cubes will be painted and some will not.

Answer the following questions:

1. How many little cubes have only one face painted?
2. How many have two faces painted?
3. How many have three faces painted?
4. How many have four faces painted?
5. How many have no faces painted at all?

What would the answers be if you painted a cube measuring 4 x 4 x 4?

Activity 4: Modelling your School, Classroom or House

Study the models below. They are all made from locally available materials. You may not be able to find all of these things in your own area but think hard about what you can find and use to make your own model.

These models are made from cardboard cases, split bamboo, timber off cuts, used bottle tops, drinking straws, sago palm, old calico scraps and other 'junk' items sometimes thrown away.

Model making takes time. Here are some tips.

1. Plan your model first and collect all the materials and tools you need before you begin.

2. First think about the basic shape of your model. Begin with the main structure and worry about the details later.

3. Your main structure must be strong. Think back to the work you did on structures in Standard 6; strengthen your model with triangular braces if necessary.

4. Once the structure is in place add some features that make the model look like the real building.

5. Finish off your model with some interesting details.

6. Remember, if you have borrowed any tools, it is very important to give them back when you have finished.

Activity 5: Making Mathematical Toys for the Early Years Classes

Below are some examples of the mathematical toys that you might make. These are mostly constructed from off cuts of wood and bush materials. Some are painted to make them more attractive.

You can try to make any of these, or you can design and make your own toy.

Remember the toys you design should be fun, and they should also be educational. As you think about your designs think about these questions:

1. Will children enjoy using this toy? Why?
2. What will children learn from playing with this toy?

This counting puzzle is made from timber off cuts. The children can use it to learn to count to 5.

Round seeds collected from the beach with a hole drilled in each one make good beads for threading on a string. Pupils can use these to learn to count.

The same seeds can be used for counting and addition with a simple abacus made from a piece of timber and some sticks.

A simple construction toy made from sago palm wood and bamboo sticks. Playing with toys like this prepares children to explore shape and space.

Timber off cuts make very good construction toys. Playing with these helps children learn their first ideas about building.

The same toy can be used for sorting, and learning to recognise, compare and name different shapes.

When you have finished your toy, you could give it to someone you know. Perhaps your younger brother or sister would enjoy playing with it or the children in the local kindy.

Chapter 4: Census Project

Here is some information which was published in the 1999 Solomon Islands Census Report.

1. Settlements

Total Number	5,919
Average number of inhabitants	69
Average number of households	11

The table shows the total number of settlements identified in Solomon Islands.

This includes cities, towns, villages and small groups of houses.

The average number of people living in a settlement was 69.

The average number of households in a settlement was 11. A household is a family group that share the same living space.

Can you use this information to work out how many people in total were included in the census?

2. Age Distribution by Province

The table shows all the **provinces** in Solomon Islands.

The people in each province are grouped according to their age. There are **four groups**. Children between 0 and 14; people between 15 and 44; people between 45 and 59 and older people over 60.

The data is shown as a percentage.

Province	Total	Age 0-14	Age 15-44	Age 45-59	Age 60+
Choiseul	100%	43.9%	42.4%	8.2%	5.5%
Western	100%	41.2%	45.8%	8.0%	5.0%
Isabel	100%	42.0%	42.0%	9.5%	6.5%
Central	100%	41.3%	44.1%	9.0%	5.5%
Rennell-Bellona	100%	41.0%	38.5%	9.5%	11.0%
Guadalcanal	100%	42.0%	45.3%	7.9%	4.8%
Malaita	100%	44.9%	41.2%	8.2%	5.6%
Makira – Ulawa	100%	42.4%	44.3%	7.9%	5.4%
Temotu	100%	41.1%	42.7%	9.2%	6.9%
Honiara	100%	31.3%	58.9%	7.9%	1.8%

Study the table carefully and think about the information it shows.

- Are most Solomon Islanders older or younger? Why do you think this might be?
- Why are there so few people in the 60+ age group?

The same data is shown below as a bar graph. This makes the data easier to compare.

Can you find your province? In what colour are your province's percentages shown on the graph?

This graph is really four graphs put together. Each one represents a different age group.

Graph to Show Age Distribution by Province
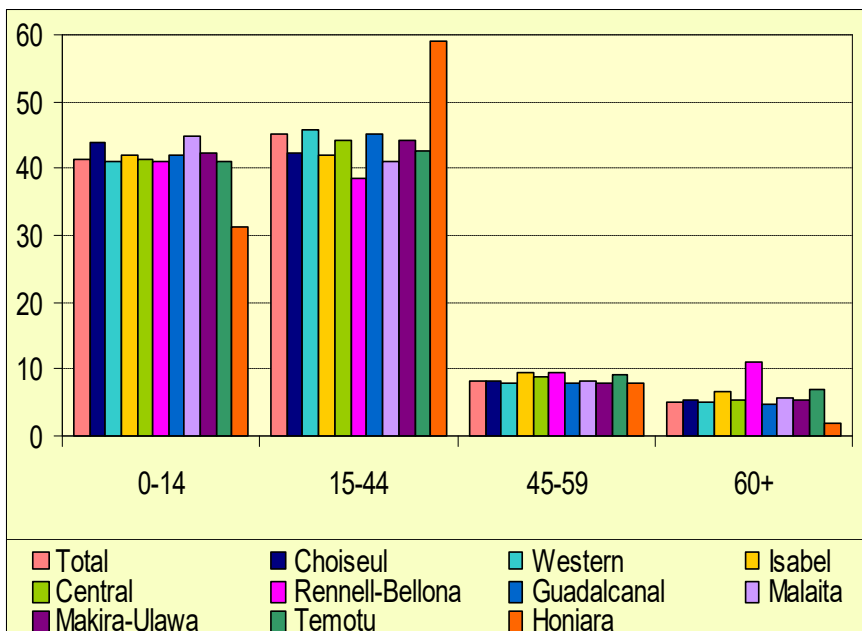
The **horizontal axis** shows the four age groups.

The **vertical axis** shows the **percentage** of the population in each age group**.**

The **key** tells you which province is represented by each colour.

Can you select data from the graph to draw a graph showing age distribution in you own province?

What is it?

Your first language is the language you learn to speak when you are a baby.

3. Languages

Percentage of Population Learning Pidgin as their First Language in Childhood	
Honiara Town Council:	22%
Solomon Islands:	7%

There are many different languages in Solomon Islands. Pidgin is useful because it allows people from different language groups to communicate with each other. It is a common or shared language for everyone in Solomon Islands.

Look at the figures in the table above. Why do you think there are more people learning pidgin as their first language in Honiara, than in other parts of the country?

What is your first language?

How many other languages do you speak?

4. Religions

Christianity is a religion. Most people in Solomon Islands are Christians. There are many different Christian churches in Solomon Islands.

The table on the right shows the different denominations of Christianity (churches) that people belong to.

From the table we can read that:

- Most people in the Solomon Islands are Christians.

- There are 13 different Christian denominations represented in Solomon Islands.

- The largest number of people belong to the Church of Melanesia. (32.8%)

- About 1.6% of people have no religion, or belong to other faiths.

The same information is presented below as a bar graph

Religion	%
Church of Melanesia	**32.8**
Roman Catholic	**19.0**
South Seas Evangelical	**17.0**
SDA	**11.2**
United Church	**10.3**
Christian Fellowship	**2.4**
Jehovah's Witnesses	**1.8**
Christian Outreach	**0.9**
S.I. Customary Beliefs	**0.6**
Bahai	**0.6**
Assembly of God	**0.6**
Church of Living Word	**0.5**
Baptist	**0.4**
Rhema	**0.3**
Other	**1.1**
No religion	**0.2**
Not stated	**0.3**

Graph to Show Different Religions and Denominations

Key
- Church of Melanseia
- Roman Catholic
- SSEC
- Seventh Day Adventist
- United Church
- Christian Fellowship Church
- Jehovah's Witness
- Christian Outreach
- SI Customary Beliefs
- Bahai
- Assembly of God
- Church of the Living Word
- Baptist
- Rhema
- Other
- No religion
- Not stated

Percentages (y-axis: 0, 5, 10, 15, 20, 25, 30, 35)

Denominations / Religions

Study the graph and the table together. Which one do you think is easiest to read? Which one do you think is the best way to present this information? Why?

5. Water Sources

A **water source** is where water comes from.

In Solomon Islands people get their water from a number of different sources, including:

- **piped water**, from a town or village water supply system;
- **rainwater,** collected from iron roofs in large tanks;
- **ground water**, which comes from underground through bore holes, wells or springs;
- **surface water**, which comes from rivers or streams.

The graph below shows the percentage of households using each of these four water sources as their main supply of fresh drinking water.

The graph presents the same information for each province, which makes it easy to compare the differences between provinces.

Graph to Show Water Sources by Province
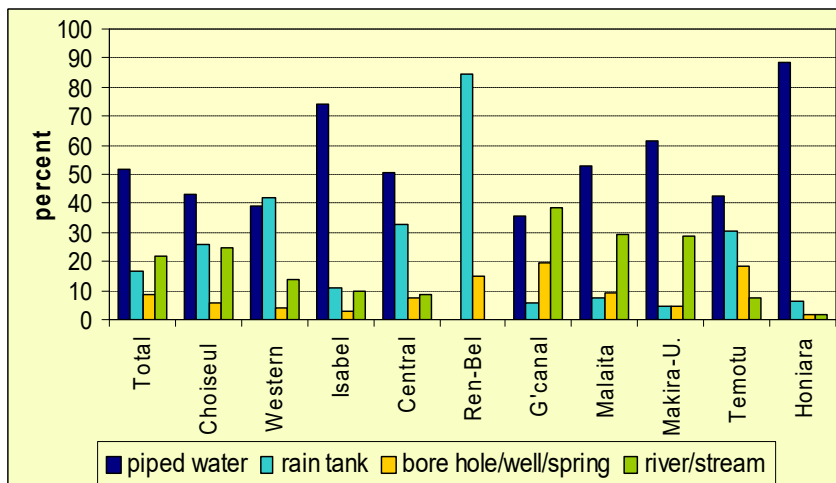
6. Amenities

An **amenity** is anything that improves peoples' living conditions.

In the 1999 census, each household was asked which of the following amenities they had:

1. piped water
2. a modern toilet
3. electricity
4. a radio
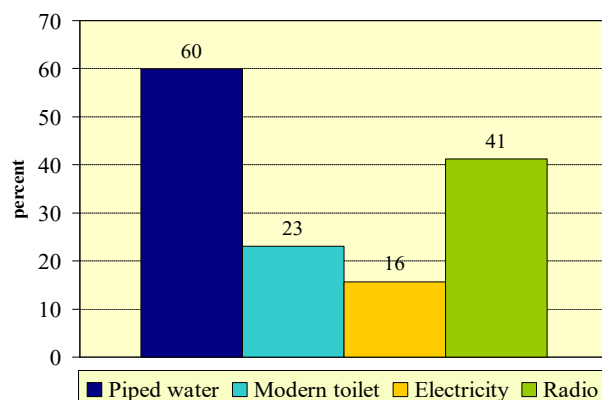
The graph shows which of these amenities were available in homes. The data used for this graph was for the country as a whole. Each column is presented as a percentage of the total population.

Why do you think the census asked people about these amenities?

7. Household Building Materials

One question in the Census asked each household to give information about building materials used in their houses, or what their houses were made from. There was a choice of materials as follows:

Roofing
1. thatched palm leaves
2. corrugated iron
3. timber
4. concrete
5. other materials

Walling
1. thatched, palm leaf
2. timber
3. fibro
4. concrete
5. corrugated iron
6. other materials

People were asked first about the roof of their house, and then about the walls of their house. Here are the results presented in table form.

Materials used for Roof Construction	
Material	**Percentage**
Thatched – Palm Leaf	**64.9**
Corrugated Iron	**33.7**
Timber	**0.5**
Concrete	**0.2**
Other Materials	**0.4**

Materials used for Wall Construction	
Material	**Percentage**
Thatched / Palm Leaf	**65.5**
Timber	**19.0**
Fibro	**7.7**
Concrete	**4.1**
Corrugated Iron	**1.3**
Other Materials	

The graphs below show this data as a 3D column graph. Why do you think why this data has been shown in 3D?
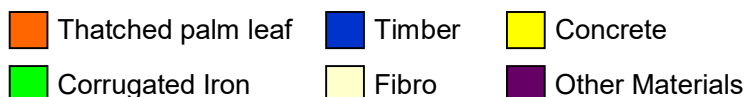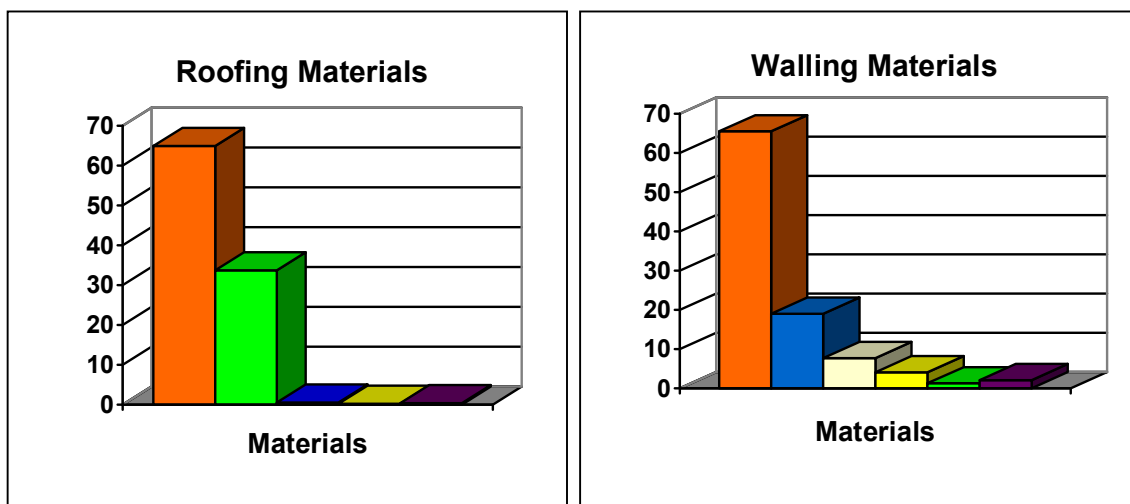
Here are some questions to think about as you study the graphs and the tables on the last page:

1. Are any of the same materials used for roofing and walling?

2. Are some materials only used for roofs?

3. Are some materials only used for walls?

4. Which are the most popular building materials? Why do you think this is the case?

5. Why do you think the census asked questions about building materials? What could we learn from this information?

Percentage

A percentage is a fraction of 100. The total number of households studied in this census would be 100%.

8. Food Production

This data shows the percentage of households which produced, grew, caught or collected the different food items for their own use. It does not include what people grew for sale in the market, only what they used or ate themselves.

Food Produced	Percentage of households
Banana	86
Sweet Potato / Cassava	84
Pana	66
Yam	65
Taro	62
Fish	62
Shellfish/Crab/Lobster	39
Pigs	45
Other Livestock (mainly chickens)	37

The same information is presented in the bar graph below.

The data suggests that 86% of households grow some or all of their own food.

What about the other 14% What do you think they do for food?

Where do you think these 14% of the population might live?

Give reasons for your answer.

Graph to Show Food Produced for Household Use
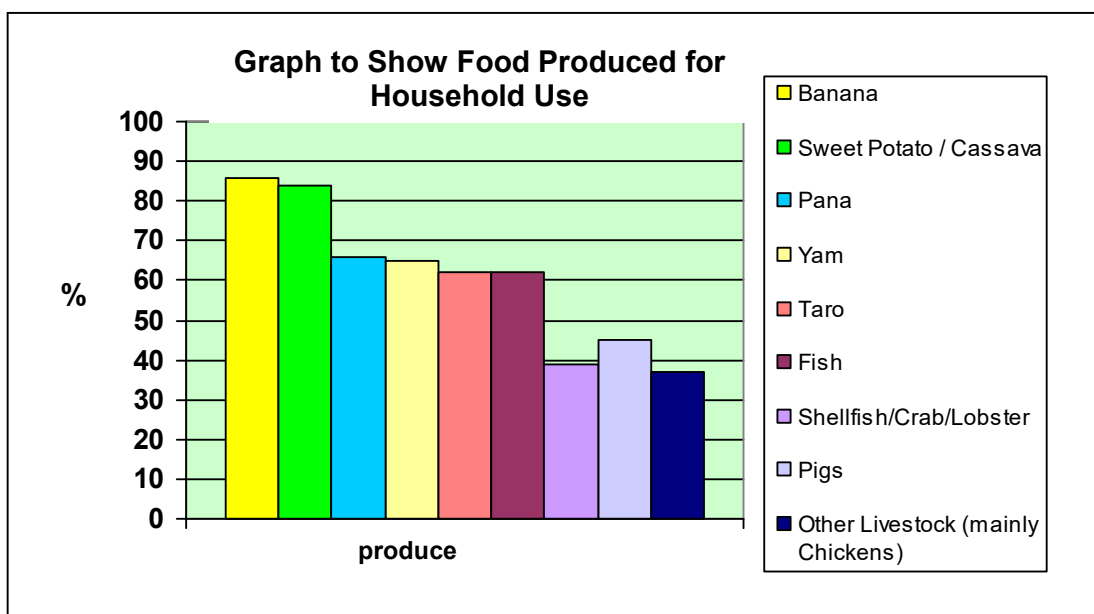
Planning Your Own Census

You are going to plan, design and conduct your own census. Use the information you have studied to give you some ideas about the things you could find out. You may also have some ideas of your own. You can include those in your census too.

Follow the procedure below to plan your census. Discuss each step with your partner.

1. **Decide on the population that will make up the census sample**.

   If your school is in a village you must decide, depending on the size of your village, how many households you are going to include in the census. If your settlement is small you could use the whole settlement. If your school is in an urban area you could target a particular area.

2. **Decide what you want to find out and design a questionnaire to collect your data**.

   Remember to count and record:

   a. How many **people altogether** in your census?

   b. How many **households altogether**?

   You will need this information for calculating percentages when you analyse your data.

3. **Recording the data.**

   Decide how you are going to **record** the answers you get to your questions. Careful planning here will make your project a good one.

4. **Collect the data.**

   To do this you will have to interview all the people in your sample, or at least one person from each household. Record the answers to your questionnaire questions carefully. This will take time.

5. **Organise all the data**.

   Think about the best way to present it. It could be as a table or as a graph or as both. Look back at the Solomon Islands Census information you have studied for ideas.

6. **Analyse the data**.

   What have you found out? What does the data tell you? How can you interpret it?

7. **Compare your census data** with the 1999 Solomon Islands Census data and with other groups. Are your results the same as those in Solomon Islands Census? What did you find out that was the same? What did you find out that was different? If your data was different can you think of reasons for this?

8. **Present your findings.**

   Decide how best to do this. You could make a wall display, putting all your data and analysis on charts. You could write a report or you could produce a census booklet.

   Remember to include a copy of the questionnaire you designed and used.

Chapter 5: Environmental Projects

A: Environmental Research Project

Here is an article which appeared in the Solomon Star. Read the article and study the data.

Solomon Star

Issue No: 2,813   **Date: 17th November 2004**

Forest Resources Study Sends Urgent Warning

The natural forest of these islands is the source of life for the people of Solomon Islands and its wildlife. It provides many benefits for the people such as wood for cooking, timber for houses, medicine, etc.

A study undertaken by the Ministry of Natural Resources to find out how much forest is still left and what will happen if there is no control over logging, shows worrying data.

A recent Forestry Division report suggests that if logging continues at the present unsustainable rate, the timber export industry will be finished in ten to fifteen years from now.

Year	Volume of logs in cubic metres
1999	600,100
2000	589,000
2001	450,000
2002	575,000
2003	675,000
2004	989,000

The problem is greatest in Western Province, where, the report predicts, all valuable export timber will be used up by the year 2008.

Other provinces will follow closely behind.

Unless logging is cut back to the sustainable yield, in our lifetime we will see the end of our country's timber resources.

Total Volume of Log Exports 1994 - 2004

Volume in cubic metres

Sustainable yield, 250,000m^3

Year: 94 95 96 97 98 99 00 01 02 03 04
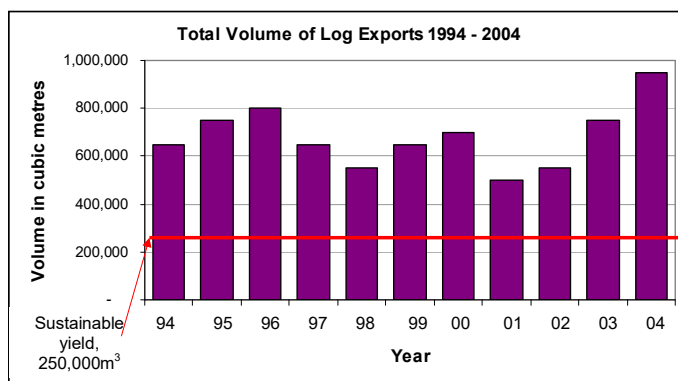
Read the newspaper article on the previous page. Here are some questions for you to think about and talk about with a partner or in a group.

- Why do you think there is an increase in logging?

- Who benefits from logging?

- What do you think happens to the land after trees are cut down?

- Do you think there should be control over logging? Why?

The project you are going to research and design will be related to an environmental issue in your area.

Logging and the problems it can bring may be an issue where you live.

You may decide to investigate other problems too such as:

- The pollution of beaches;

- The destruction of coral reefs;

- Over fishing.

You will know of other things which affect the environment in your area.

Here are some guidelines to follow in your group to work on your environmental research project:

- First, **identify the issue**.

- Decide what information you need to find out.

- Decide how to find out the information. This could be through; talking to people in your community; finding out information from census data; talking to Fisheries or Agriculture Officers and so on.

- When you have collected your data decide how you will record it.

- Study what you have found out and draw some interesting conclusions from it.

- Decide how you are going to inform people around you about your research project.

- Who needs to know this information?

- You could make posters to put around your school or your village.

- You could write and perform a play about what you have found out.

- You could design a leaflet showing what you did and explaining your findings. This could then be published as a report in a school magazine.

These are just some ideas to get you started. The article in the Solomon Star is just one issue which affects the environment in Solomon Islands.

Your project here is an important one since all environmental issues affect the future of Solomon Islands.

Landslides after rain are one effect of logging

B: School Landscaping Project

This project requires you to first draw a plan of your school or village, then develop your ideas for improvements that could be made to the school grounds. When you have evaluated these you may also actually carry them out as practical activities.

The following activities are practical activities that involve many skills including planning, measuring and agricultural and gardening skills.

Read the activities carefully and follow the instructions.

Landscaping Around the Classroom

After sketching out your landscaping plan discuss it with other pupils in your class. Here is an example of what you could do.

1. Measure the area of garden available in square metres. This will depend on the length and width of the classroom. You can decide whether to make one or two garden beds.

2. The beds must be one or two metres away from the wall of the classroom or from where the rainwater drops from the roof.

3. Think about and choose the materials you will need to use.

4. Dig the soil. The depth of the soil in the garden beds should be worked to about 20 cm. Make sure you break up any large clumps of soil.

5. Water the soil well before planting anything.

6. Plant new seedlings or cuttings about 30 to 40 cm apart.

7. After planting put mulch around the plants.

8. Remember to water the gardens regularly on fine days.

Activity 2

Landscaping a Walkway or Path

This could be the walkway between classrooms or the path from the village to your school.

1. Measure the length of the walkway. The width should be 1.5 metres or 2 metres

2. Plant cuttings like hibiscus or other similar plants. These are attractive and can be pruned regularly. These are called **hedging plants**. They can act like a fence. Sometimes they are used as boundary plants. All can be trimmed to a suitable height as well as width. This is important since you do not want your walkway to become overgrown.

Activity 3

Landscaping around the Bottom of Trees

1. If your school or village has shade trees like Christmas tree, Rain tree, Abalolo or Mango then a good idea is to landscape around the base of the tree.

2. Measure the distance from the trunk to a about two metres around the tree.

2 metres out

3. Measure and make a circle or another irregular or regular shape around the tree. Use sticks to mark out the shape and size of the new bed.

4. Sketch a scale plan of the landscaped bed including the dimensions and suggestions of what you will plant.

5. Build the edge of your flowerbeds using big stones, dead tree branches or coconut trunks around the bottom of the tree then put soil in and plant the new plants. Choose plants that grow well in the shade, for example bush ginger, bush ferns, various taro plants, mother in-law's tongue, yellow lily, etc. **Remember taller plants to be planted near the trunk and shorter ones outside.**

6. Don't forget to water the plants.
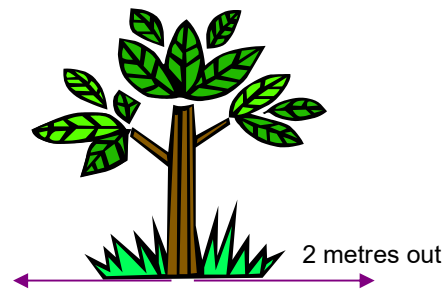
**Happy
Landscaping!**

Chapter 6: Investigating Time

Section 1: Time Facts

Activity A: Do You Know Your Time Facts?

Revise what you have learnt about time by seeing how well you can complete these exercises.

1. **Copy out the table below and fill in all the spaces.**

a.	1 hour = **??** minutes	**g.**	2 years = **??** weeks
b.	**??** seconds = 2 minutes	**h.**	5 weeks = **??** days
c.	1 day = **??** hours	**i.**	1 century = **??** years
d.	**??** hours = 1 week	**j.**	5 min 20s = **??** seconds
e.	1 year = **??** days	**k.**	4 yrs 2 months = **??** months
f.	4 hours = **??** seconds	**l.**	**??** yrs = 8 decades

2. **Change the following to 24-hour time.**

    a. 3.00 a.m.   7.15 a.m.   11.30 p.m.   8.30 p.m.

    b. 9.05 p.m.   6. 25 p.m.   10.10 p.m.   2.15 p.m.

    c. 1.05 p.m.   4. 50 p.m.   12.45 p.m.   Noon

3. **Estimate how long it might take you to do the following activities in one day:**

    a. eat breakfast;   **b.** get washed and get dressed;

    c. travel from your home to school;   **d.** do your homework;

    e. finish your daily jobs at home;   **f.** have your evening meal.

4. **Draw a time-line to show the activities you do on a typical weekday. Use 24-hour time. Remember to cover a 24 hour time period.**

5. **Draw a table like the one below and show the time you spent on different activities over a whole weekend.**

Activity	Time Spent

When you have completed the table write a few sentences about what your table shows. Here are some questions you could ask:

- How many different activities did you do?

- How many activities did you do on your own?

- How many activities did you choose to do?

- Which activities did you enjoy doing most?

- Which was your least favourite activity and why?

- Which activity did you do most at the weekend?

Compare your findings with a partner's findings. Are your results the same, similar or completely different? Talk about them with your partner.

Activity B: Using your Time Facts

Read these questions carefully. Think about how you are going to work out the answers. Talk through your method with a partner.

Show all your working out as well as your answer in your exercise book.

1. Alison starts work at 0830 and finishes at 1600.

    a. How long does she work each day?

    b. If she worked six days a week how many hours is that altogether?

2. The ship departed Honiara at 2200 and arrived in Gizo 14 hours and 20 minutes later. What time did it arrive?

3. The cricket match started at 10.00 a.m. and finished at 6.00 p.m.

    If there were two 10 minute breaks and a 30 minute lunch break, how much time was spent actually playing the game?

4. It took 2 hours and 25 minutes to reach the village. On the return trip we took 3 hours and 10 minutes because of a lunch stop.

    How long was the lunch stop?

5. Fergus took 1 hour and 17 minutes to move a load of stones. He took a 12 minute break and then spent 4 hours and 22 minutes building a wall with the stones. How long did it take from the time the job was started until it was finished?

6. Moses spent 4 hours and 16 minutes paddling his canoe and then 1 hour 35 minutes walking. How long did the whole journey take him?

7. A pilot leaves his home airport at 0735 and returns at 1725. For how long is he away?

8. Martha arrived at the airport at 1045 to catch a plane at 1308. For how long did she have to wait?

9. If Helen was born on October 11, 1962 and Aubrey was born on February 21, 1969, how much older is Helen?

10. A game is played in 20 minute quarters. There are two 8 minute breaks and a 17 minute half-time break. If the game started at 2.20 p.m. what time did it finish?

Activity C: The School Fundraising - Interpreting Time Data

Study the School Fundraising Programme and use the information it provides to answer the questions.

School Fundraising Programme	
Event	**Time**
Welcome Speech and Prayer- Pastor Kona	9. 00 a.m.
Custom Dancing	9. 25 a.m.
Cooking Display	9. 55 a.m.
Kite Making and Flying Demonstration	10. 15 a.m.
Weaving Demonstration	11. 00 a.m.
Paper Making Demonstration	11. 35 a.m.
Live Band	1. 15 p.m.
Wood Chopping Competition	3. 00 p.m.
Feast	4. 30 p.m.
Closing Ceremony – Head teacher Mrs. Ngelea	7.30 p.m.

1. Which event will be taking place at 10.00 a.m.?

2. How many events are there after 1.00 p.m.?

3. Lunch was held one hour after the paper making demonstration took place. What time was that?

4. At what time does the kite making and flying demonstration take place?

5. How much time is there between the start of the welcome speech and the start of the closing ceremony?

6. Which takes more time, the cooking display or the weaving demonstration?

Extra Activity

Study the programme again. Make up three more questions using the data. Work out the answers too. Now exchange questions with a partner. Can you work out each others answers correctly?

Extension Activity

Imagine you are going to hold a fundraiser. Organise a programme which includes a whole range of events. Plan the timing carefully.

For a programme to run well **timing** is very important. Consider the times you put in your programme. Is there enough time for each activity?

Some activities could take place at the same time particularly if they involve different members of the community. For example a father's soccer match could take place at the same time as a women's volley ball game and so on.

When you have decided on your programme, design a poster to show all your information.

You could make up some questions like the ones on page 101 about your poster. Display these with your programme to make an **interactive wall display**.

Section 2: The Passage of Time

People have come up with different strategies to estimate the passage of time. For example to count seconds some people count aloud from one thousand like this:

> "one thousand and one, one thousand and two, one thousand and three, one thousand and four, one thousand and five," and so on.

This is a good way to count seconds because it takes about one second to say each number.

Try testing this out with a partner, one person should count out ten seconds while the other times them using the second hand on a clock to see how accurate the method is.

Throughout the ages various devices have been used to measure the passage of time.

Can you think of any? You should remember making candle clocks, sand timers, and water clocks. Can you remember how a sundial works? You may have made and used these in your maths lessons.

Here is some information about the history of how the first clocks were invented.

The history here begins with Galileo Galalei.

Galileo Galilei was a famous Italian Mathematician.

Galileo began to experiment with pendulums when he was at university.

Th... some years later **Galileo** noticed a lamp swinging from the ceiling inside **Pisa Cathedral,** which got him thinking ... He began to time the swings using his pulse or heartbeat as a timer.

Galileo wondered what **determines** how fast a pendulum swings. Is it the length of the string or the weight of what is attached to the bottom? Could it be the distance of the swing?

Some clocks have a pendulum which swings below the clock face.

In 1656, **Christian Huygens**, a Dutch scientist, made the first pendulum clock, regulated by a mechanism with a 'natural' period of oscillation or swing.

Although **Galileo Galilei** studied its motion as early as 1582, the clock Galileo designed was not built until after his death.

Huygens' pendulum clock had an error of less than 1 minute a day. This was the first time such accuracy had been achieved. His later improvements reduced his clock's error to less than 10 seconds a day.

Investigation – The Pendulum

Work with a partner to carry out this investigation.

Aim

The aim of the experiment is to investigate the pendulum and to:

- find out what happens when you vary the length of the string;
- find out what happens when you use a heavier or lighter weight.

Apparatus

- different lengths of string
- different sized weights, such as stones, bags of sand or lumps of mud,
- a clock or watch with a second hand.

Method

Make a **pendulum** by attaching a weight to a piece of string. You could use a piece of coral or a stone for the weight.

Make the pendulum swing and count the number of swings over a set amount of time. For example you could do this over one minute. Record your results carefully.

Now change the length of the string. Do the same experiment with the string shorter and then the string longer. Predict what will happen. Then carry out the experiment again. Remember you must use the same period of time. If you used one minute for your first experiment then all your experiments must be for exactly one minute too. What did you find? Record your results carefully.

Now change the weight. Use a heavier weight and then a lighter weight for the same length of string. What do you think will happen? This is your prediction or your **hypothesis**. What did your results show? Was your hypothesis correct? Did you prove your hypothesis?

Conclusion

Write a report about your experiment in your exercise book. Use subheadings to organise your report.

Remember to make a list of all the **apparatus** you used.

Explain what your **aim** was in doing the experiments and what your **hypotheses** were.

Describe exactly what you did and how you did it. This is the **method** section.

Include all the data which you collected under a subheading, **Results**. Decide how to present your data. Can you design a table with suitable headings to present your data?

Write a **conclusion** to your report. In the conclusion analyse your results and write about what you found out. Discuss this first with your partner.

Are there any other investigations you would like to try? Make a note of these at the end of your experiment write up.

Edit your report. Make any corrections or improvements and then write out a good copy. Remember to include a **diagram** of your experiment. Your diagram should be carefully drawn and be clearly labelled.

Section 3: The Calendar

The calendar which we use here in Solomon Islands is called a **Gregorian calendar.**

It dates back to when Pope Gregory was the head of the Catholic Church in 1582. It is an annual calendar in that it changes every year.

Did you Know?

Originally the year started in March and there were only ten months. January and February were added later.

Each month consisted of 29 days and the year was 290 days long!

The Names of the Months		
January	Janus	a two-faced god who looked back on the old year and forward to the new year
February	Februa	a festival held in that month
March	Mars	god of war
April	Aperio	means to open – spring flowers bloom
May	Maia	goddess of spring, growth
June	Juno	goddess of marriage
July	Julius	Caesar
August	Augustus	Caesar
September		Latin word for seven
October		Latin word for eight
November		Latin word for nine
December		Latin word for ten

The Jewish and Buddhist calendars do not measure dates from the birth of Christ. The year number on the Jewish calendar represents the number of years since creation. This was determined by adding all the ages of the people in the Bible back to the beginning.

The Jewish calendar is a **lunar calendar**. Each new month begins on a new moon. The lunar cycle takes 28 days so each month is 28 days long.

The problem with a lunar calendar is that 12 months is just 336 days. But it takes 365 and a quarter days for the earth to complete its orbit round the sun. So the year needs to be 365 and a quarter days long.

Trying to match the lunar calendar and the Gregorian calendar is the reason why the dates for certain religious ceremonies seem to change each year.

Did you Know?

The year 46BC was 455 days long.

The Jewish **calendar** has the following months:

Name	Number	Length	Gregorian Equivalent
Nissan	1	30 days	March – April
Iyar	2	29 days	April – May
Sivan	3	30 days	May – June
Tammuz	4	29 days	June – July
Av	5	30 days	July - August
Elul	6	29 days	August - September
Tishri	7	30 days	September - October
Cheshvan	8	29 or 30 days	October - November
Kislev	9	30 or 29 days	November – December
Tevet	10	29 days	December – January
Shevat	11	30 days	January – February
Adar	12	29 or 30 days	February – March
Adar II	13	29 days	March - April

In a leap year, Adar has 30 days. In other years Adar has 29 days.

Interesting Fact

Most Buddhist calendars begin with the year of Buddha's death, so the year 2002 is the year 2545 on the **Buddhist calendar**.

Here are some puzzles to talk about with your partner.

1. If there are 52 weeks in a year and 7 days in a week, why are there 365 days in a year and not 364?

2. On which day does your birthday fall this year? What about next year or last year?

3. Is this year a leap year? Do you know how to work out which years are leap years?

4. If you were born on February 29 how often would you have a birthday?

5. Why is October the tenth month when 'oct' means eight?

Activity: Make a Lunar Calendar

Work with a partner. You will need to use a calendar with the phases of the moon on it. If you do not have one for the present year you can use the one for 2006 on pages 108 and 109.

> **Did you Know?**
>
> The moon is not a light source; it has no light of its own. We can only see the moon because it reflects light from the sun. The moon has no atmosphere and no water.

Phases of the Moon

The moon travels around the Earth in an orbit that takes 28 days (nearly a month). During this time the moon will change from a crescent shape to a full moon. The stages in between are called **phases**.

The moon appears to change shape but what we are actually seeing is the moon lit up by the light from the sun in different ways on different days.

We always see the same side of the moon. The moon always keeps the same side pointing towards us so we can never see the `back' of the moon from the Earth.

The images below show the different phases of the moon.

New	**Waxing crescent**	**First quarter**	**Waxing gibbous**
Full	**Waning gibbous**	**Third quarter**	**Waning crescent**

Use the Lunar Calendar on pages 108 – 109 to help you devise your own lunar calendar. Here are some hints to get you started.

1. First of all count and write down the number of days between full moons.

   - Is this number the same?
   - What about the number of days between quarter moons?

> **Do you remember these words and what they mean?**
>
> **Orbit** - The path of the moon around the Earth.
> **Rotate** - The Earth spins around about its axis once each day.
> **Waning** - Shrinking.
> **Waxing** – Growing.

- What about the number of days between waning crescents?
- What about the number of days between waxing crescents?

2. With a partner try to devise a calendar based on your observations and calculations.

   - You must decide where in the moon's cycle to begin the month.
   - You could think of names for your months.

3. You could make a whole year of moon months and join them together into a calendar or paste them on to chart paper to make a poster.

4. You could calculate the number of days in twelve lunar months and devise a strategy to deal with any extra days.

Here are some things to think about and discuss after you have made your calendar.

1. How useful are the moon's monthly cycles in constructing a calendar?

2. Are there any difficulties involved with basing a calendar on the lunar cycle?

3. Is seven a good number of days per week? Could we have five days in a week or ten? Why?

4. What strategies can be used to insert the extra days into the lunar calendar?

   How could these days be used?

5. In what ways could this calendar be used?

6. What other data could we use to help improve these calendars?

7. How would we compensate for the ▤ day extra each solar year?

8. Could there be another system than leap year to even up the calendar? Can you come up with any ideas?

Lunar Calendar 2006
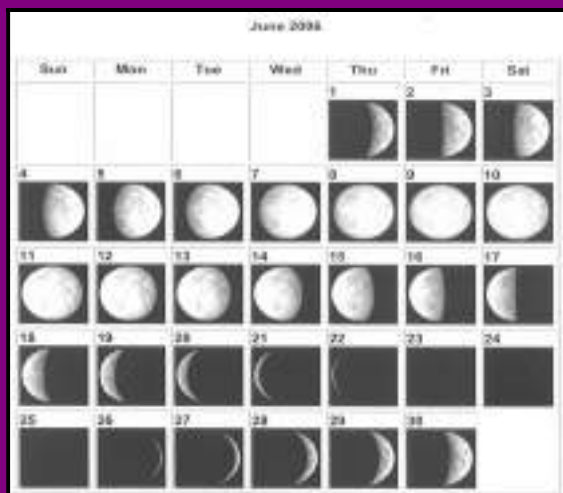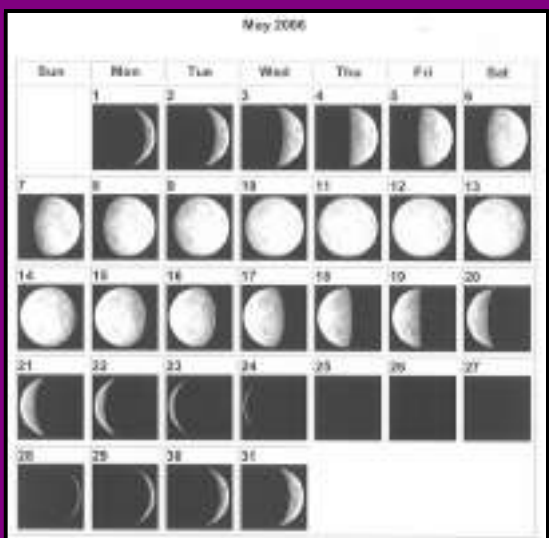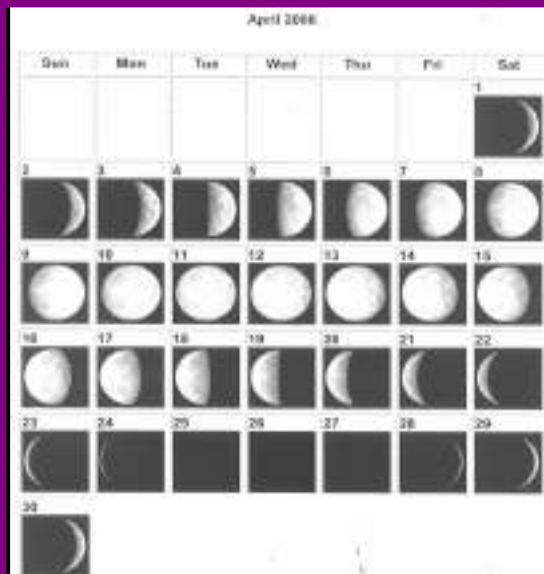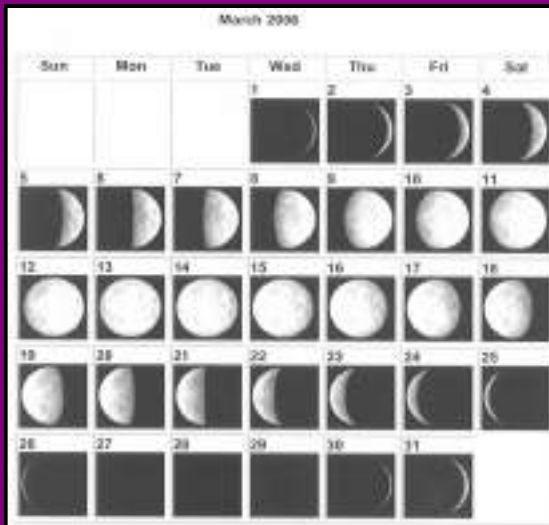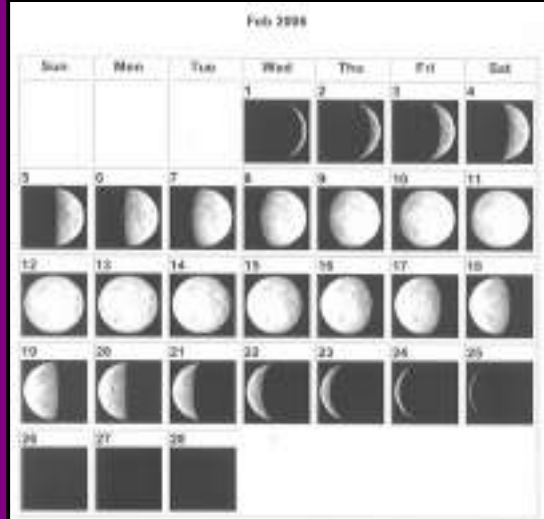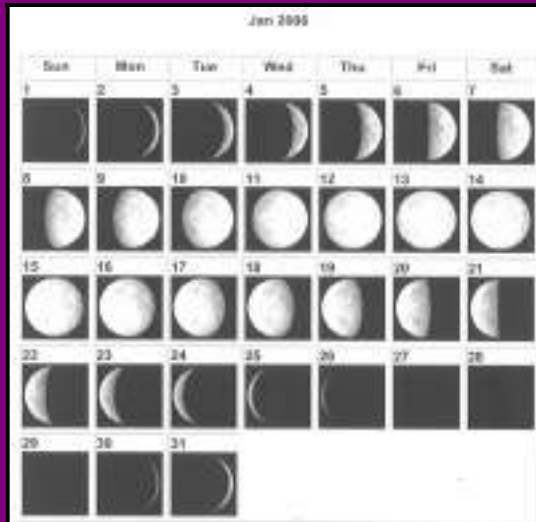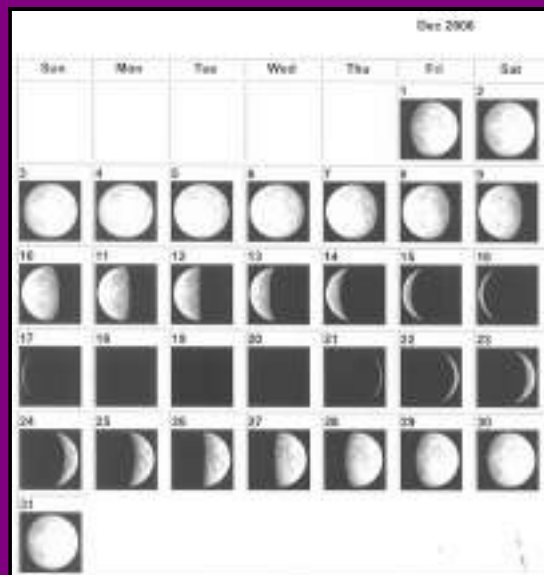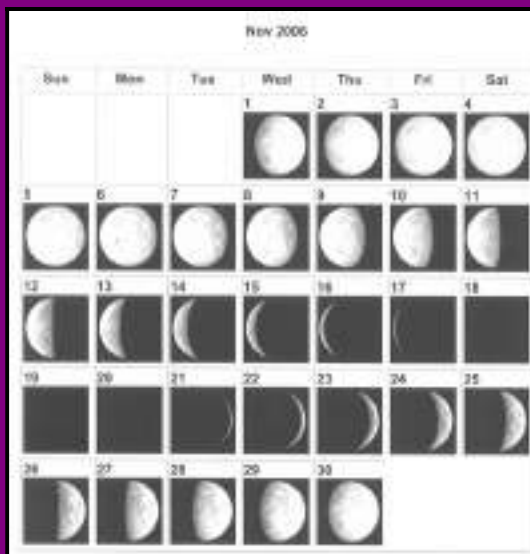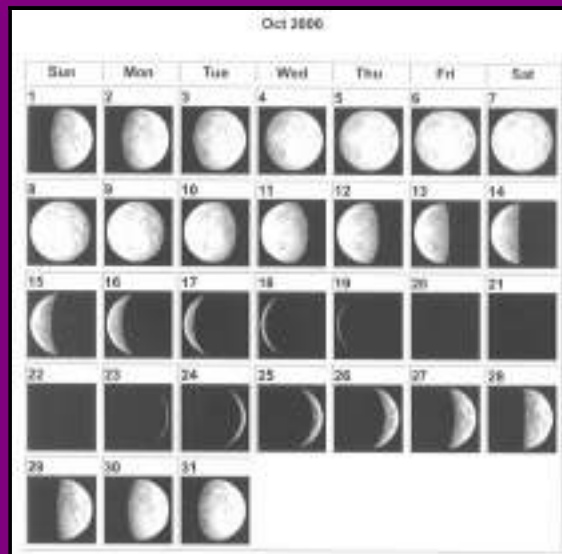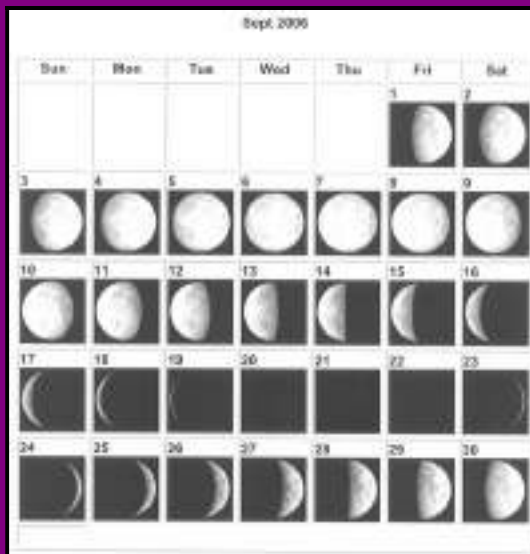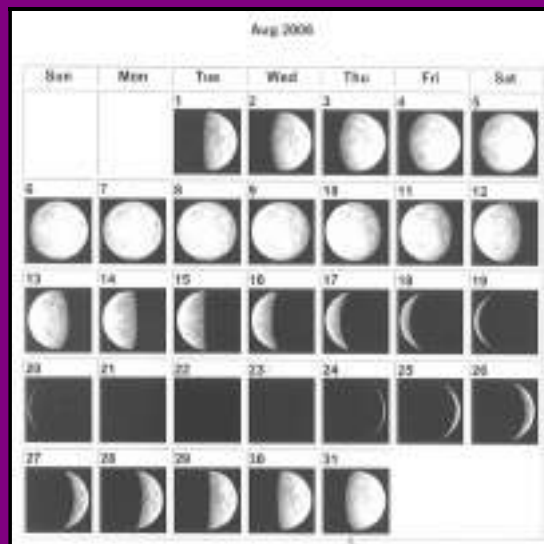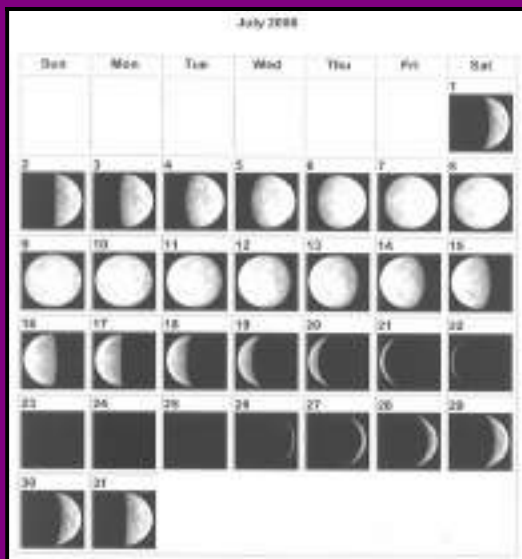
Chapter 6

Section 4: Life Cycles

Activity A: The Life Cycle of a Frog
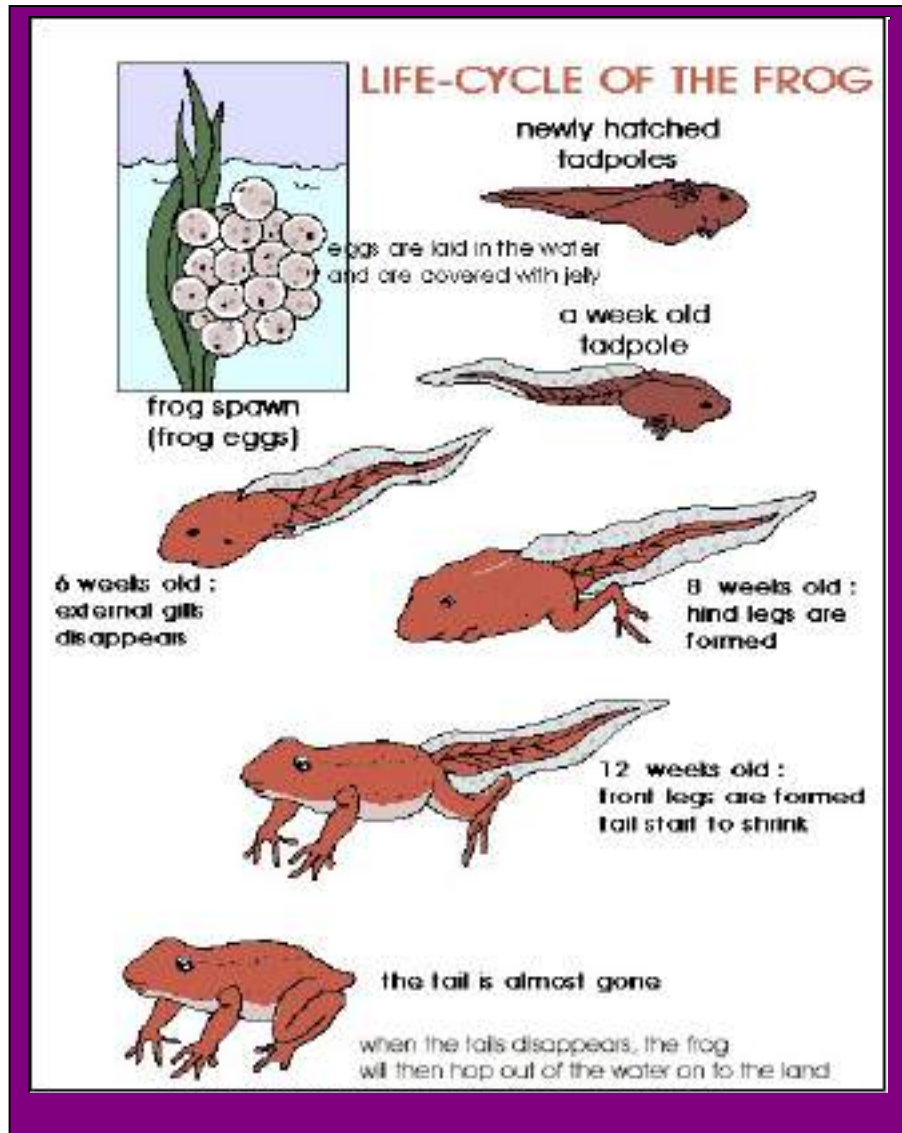
Look at the life cycle of the frog. With a partner discuss these questions:

1.   How long does a tadpole spend in the water?
2.   Six weeks after hatching, describe how the tadpole changes.
3.   After twelve weeks how does the shape of the tadpole change?
4.   Why do you think a tadpole needs a tail?
5.   Draw a timeline showing the different changes that take place from egg, to frog.

Activity B: The Life Cycle of a Mosquito

Here are some facts about the mosquito. They are not in the right order. Can you order them to make a diagram like the one for the frog? When you have all the information you could draw out the life cycle on a large piece of paper.

Within a week, the eggs hatch into larvae (sometimes called wrigglers) that breathe air through tubes which they poke above the surface of the water.

The full life-cycle of a mosquito takes about a month.

After drinking blood, adult females lay a raft of 40 to 400 tiny white eggs in standing water or very slow-moving water.

Pupae (also called tumblers) also live near the surface of the water, breathing through two horn-like tubes (called siphons) on their back. Pupae do not eat.

An adult emerges from a pupa when the skin splits after a few days. The adult lives for only a few weeks.

Larvae eat bits of floating organic matter and each other. Larvae molt four times as they grow; after the fourth molt, they are called pupae.

Activity C: The Life Cycle of a Butterfly

Study the life cycle of a butterfly. You can do this by finding and keeping some caterpillars and observing them as they go through their life cycle stages.

First of all look at the vocabulary that you will need to become familiar with. You will already know some of the words. Others will be new to you.

Word	Meaning
caterpillar	the larval stage of a butterfly or moth
chrysalis	the hard shell covering the pupa
larva	the second stage of metamorphosis, during which an insect is wormlike and has no wings
pupa	the third stage of metamorphosis; encased by a chrysalis
metamorphosis	a series of stages often marked by body change

Finding the Caterpillars

The best way to find caterpillars is to find their food source. Look for give away signs that caterpillars are feeding like holes in leaves. Lift the leaves of these plants gently and look underneath. This is where you will often find caterpillars. Gently pick off the caterpillars along with some of the leaves. Put them in a jar which you should have ready. Make sure the jar has a lid with holes in it to allow air into it. Remember where

you found the caterpillars and what the plant looks like. You may need to collect more fresh leaves for them later.

Making the Habitats

To look after the caterpillars you will need a container that allows air in and allows the caterpillars to move around. If you are working in a small group each group could make a caterpillar habitat.

A good idea is to use two plastic bottles. Make sure they are empty and clean. Cut the top off both and then slot one into the other. In the top make some small holes. You could do this by heating up a pin or a small nail and holding it on the plastic. The plastic will melt and leave a hole. Do this many times so that plenty of air can get into your habitat.

Add the caterpillars and a few fresh, moist leaves – the kind your caterpillar eats.

Replace the leaves when they do not look fresh any more.

Did You Know?

Caterpillars eat. Butterflies do not feed. They only need water.

Gathering and Presenting the Data

If the conditions are right it will take about 2 weeks for your caterpillar to change into a butterfly. Here are some things you could do while you watch them grow.

1. Investigate and Record the Growth Rate of the Caterpillar

Investigate how quickly the caterpillars grow. Do they grow at the same rate? To find out, you could measure them using string. Cut the string to match the length of each caterpillar, stick it to a piece of paper and write the date next to each piece of string. Repeat every few days to create a **bar graph**.

Use a ruler to measure the caterpillars' daily growth. Record the results as a line graph and work out their average daily growth. Are there any growth spurts (a period of quick growth)? Are there any plateaus (a period of no growth)?

2. Write a Diary

Write a diary every day describing how the caterpillar changes. Draw the changes too. Once the caterpillars have become chrysalises sketch these too. Make another sketch when the butterfly emerges. After the butterfly has emerged release it near the plant where you gathered the caterpillars. Can you think of why this is a good thing to do?

3. Presenting and Interpreting the Data

Discuss your findings with your class. Talk about the different stages of the butterfly's life cycle. How long did the whole process take? If you had different caterpillars in your groups were all the life cycles the same length?

Think about the butterflies growth and changes with other animals. How long does it take for other animals to mature into adults?

When your butterflies or moths have hatched, you could sketch them, Study the symmetrical patterns on their wings.

When you have finished release them carefully near the place where you collected the caterpillars.

Chapter 7: Shopping Survey

Newspaper Report

The data below was compiled and published in the Solomon Islands daily newspaper, the Solomon Star. The article compared prices of goods in three Honiara supermarkets.

Solomon Star

Issue No; 2676 $4
Friday 3 September, 2004

Honiara Supermarkets under the Microscope

by A Special Correspondent

This study has been conducted independently for the interest of the public in Honiara. The three supermarkets surveyed were Wings, Sunrise and the Deli in the Plaza.

The prices of different products are compared and the reader is invited to draw his or her own conclusions. All prices were obtained on the same day.

Product	Wings	Sunrise	Deli in the Plaza
loaf sliced bread	$5.20	$5.50	$6.50
1 litre Paul's milk	$10.95	$10.50	$11.95
1 kg Solrais rice	$4.85	$5.85	$6.00
450 g tin Milo drink	$29.95	$27.70	$32.65
1 kg brown onions	$8.95	$13.50	$14.50
120 g Colgate toothpaste	$18.50	$26.95	$18.00.
375 g Breakfast Crackers	$4.50	$4.80	$5.60
300 g tomato sauce	$13.95	$14.50	$15.90
1 kg Australian potatoes	$15.90	$14.50	$14.50
tin whole new potato	$14.95	$10.95	$9.20
1 litre fruit juice	$14.95	$13.50	$14.50

Study the newspaper article on the previous page.

1. Compare the prices of the basket of goods in the picture if you were to buy the same items from each supermarket. After you have worked out the totals compare your results. Write a few sentences about what you found out.

   In the basket these is 1 kg brown onions, one 450 g tin of Milo, 1 kg of rice, 1 litre milk and a sliced loaf of bread.

2. Suppose you 'shopped around'. This means you went to all the different supermarkets to get the basket of goods in the picture above. If you bought each item from the supermarket where it was cheapest, how much money could you save?

   Can you think of any disadvantages of shopping in this way?

3. Study the table again. If you bought one of everything on the list from each supermarket how much would your bill be at each?

4. Can you present this information as a graph?

   Remember

   Your graph must have a title, both x and y axis must be labelled.

Activity 1: Shopping Survey

Either

Choose at least three shops in your area and conduct a survey **of the basic items that are available. Present your** data **as a** table. **You could then draw a** graph **to compare you information.**

Analyse **your data.**

What have you found out?

Are the results as you expected?

Has any of the data surprised you?

Write a report to explain how you conducted your survey, the data you obtained, your tables and graphs and a summary of what you found out.

Or

Compare the prices of goods at your village shop to the supermarket prices presented in the table in the Solomon Star article.

Are all the things available in your shop?

Present your findings as a table. **You could draw a** graph **to compare your findings with the data from one of the supermarkets in Honiara.**

Analyse **your** data.

What have you found out?

Are your results as you expected?

Has any of the data surprised you?

What do you think about what you have found out?

Write a report. Include in it how you conducted your survey, the data you obtained, your tables and graphs and a summary of what you found out.

Activity 2: Letter to the Solomon Star

Write a letter to the Solomon Star to tell people what you found out in your survey and what you think about it. Express your opinions about the prices and the choice of goods in your area.

Talk about your findings with a partner. You could write the letter together.

Remember to plan your first draft after you have discussed what you think. After drafting, edit your work and then make a good final copy of your letter.

Remember

If something costs more it is dearer or more expensive. If something costs less it is cheaper.

Activity 3: Price Increase Over Time

Can you find out the cost of the same items as you found in your shops 2 years ago? Compare the prices of goods at your village shop now to those prices. Do you expect the items to be dearer **or** cheaper**?**

What have you found out?

You could work out a percentage rise over the two years if the prices have gone up. Have other things gone up in the last two years too?

Investigate this where you live.

Activity 4: Retail Survey – What shops are available in your area?

Either

If you live in Honiara or in another town you could do a survey of the different types of shops there are.

Look at what each shop sells. Think of a category to put each shop in. Here are some you could use:

| hardware | butcher | baker | groceries |
| stationery | clothing | electrical goods | pharmacy |

You could draw a plan to show the location of shops were you live.

Or

If there is only one shop near where you live look at all the things it sells. Can you write a list of these and divide them into different categories?

Here are some you could use:

fresh food - vegetables, fruit	dry food - groceries
fresh or frozen meat and fish	other frozen food
bread, buns and cakes	cleaning products
stationery items	gardening items

Which ever activity you choose, you should finish off by writing a report.

Write about what you have found out. Explain how you conducted your survey. Present all your data clearly.

Can you think of any suggestions or recommendations to improve what there is to buy in your area?

Chapter 8: Puzzles

1. Square it Up

You need six small sticks of the same length. Drinking straws or matches would be ideal

Cut two of them in half.

You now have eight sticks, four long and four short.

You can make 2 squares from the eight straws.

Arrange all eight straws to make 3 squares, all of the same size.
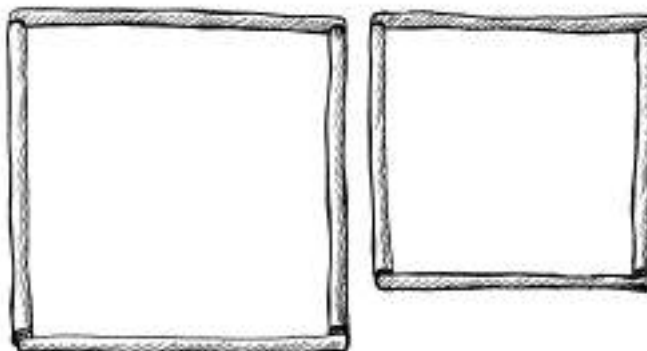
2. Money Bags

Ben divided 15 dollars among four small bags.

He could then pay any sum of money from 1 dollar to 15 dollars, without opening any bag.

How many dollars did Ben put in each bag?

3. Age Problems

a. My age this year is a multiple of 8. Next year it will be a multiple of 7.

   How old am I?

b. Last year my age was a square number. Next year it will be a cube number.

   How old am I?

c. How long will I wait until my age is both a square and a cube number?

d. My mother was 27 when I was born. 8 years ago she was twice as old as I shall be in 5 years time.

   How old am I now?

4. Shape Puzzle

Each shape in the grid on the right stands for a number.

The numbers shown are the totals of the line of four numbers in the row or column.

Find the remaining totals.

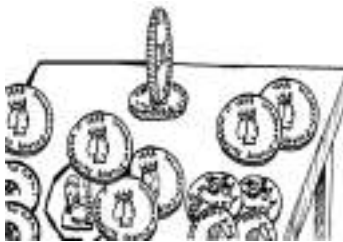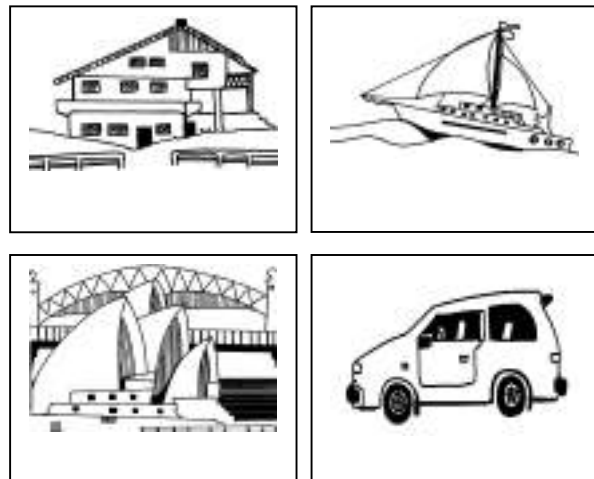Work out the value of each shape.

5. Money Puzzle

Jim won the lottery.

He spent two thirds of his winnings on a very large house.

He spent two thirds of what he had left on a luxury motor boat.

Then he spent two thirds of what he had left on a holiday in Australia. He spent his last $20,000.00 on a flashy car.

How much did Jim win on the lottery?

6. Coins on the Table

Anna put some 10 cent coins on the table.

One half of them were tails up.

Anna turned over two more coins, and then one third of them were tails up.

How many coins did Anna put on the table?

7. Five and Four Squares

Make five squares using matches as shown. Move only two matches to reduce the number of squares from five to four.

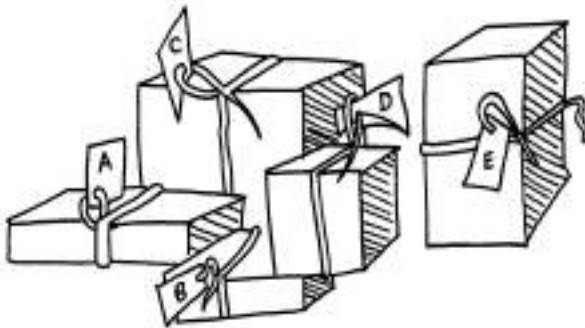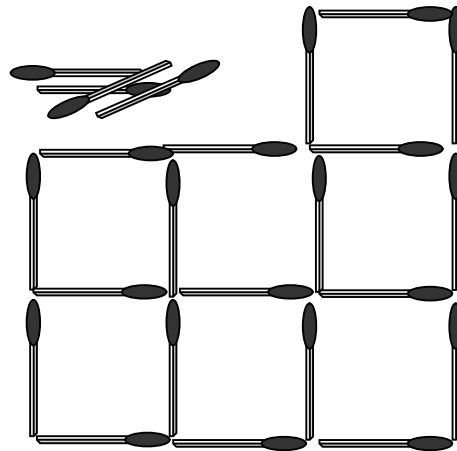Matches cannot overlap or be removed.
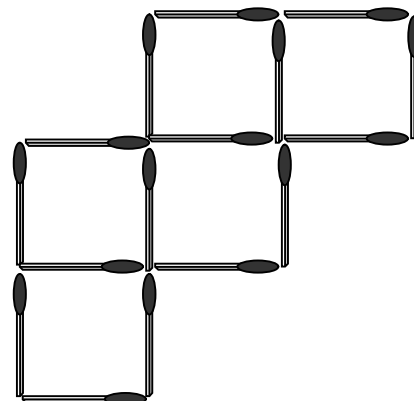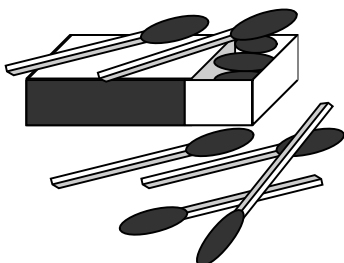
8. Seven and Five Squares

Make seven squares using matches as shown.

Move only three matches to reduce the number of squares from seven to five.

Matches cannot overlap or be removed

9. Presents

Bob paid $21.00 for five presents.

For A and B he paid a total of $6.00

For B and C he paid a total of $10.00

For C and D he paid a total of $7.00
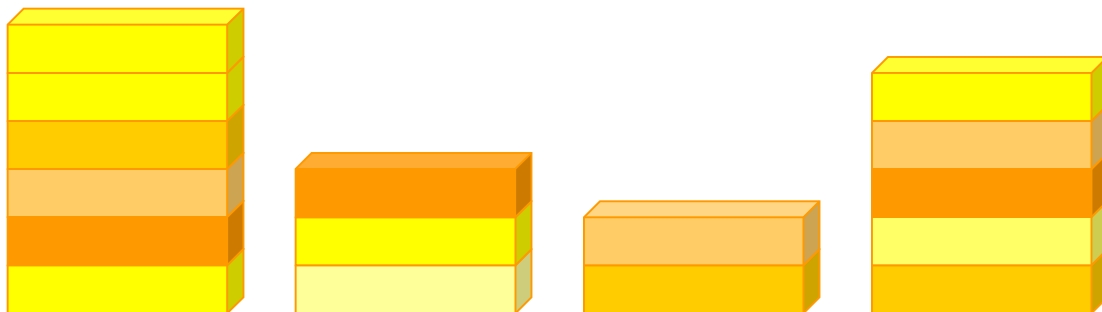
For D and E he paid a total of $9.00

How much did Bob pay for each present?

10. Gold Bars

Peter is a pirate. One day he decides to count his gold bars and he lays them out in piles like this.

Pete wanted to make all four piles the same height. He can move one or more bars at a time, and (being a clever pirate) he did it in just two moves.

How did he do it?

11. Dan the Detective

a. Dan the detective went looking for a number.

He found a two-digit number less than 50. The sum of its digits was 12. Their difference was 4.

What number did Dan find?

b. Dan found a two-digit odd number. One of its digits was half the other and the number was greater than 50.

What number did Dan find?

12. Riddle

I am a number.
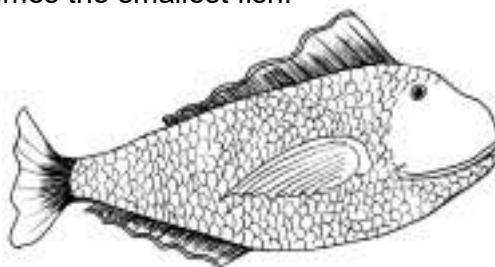
The sum of my two digits is my square root.

Who am I?

13. Fish

A fisherman caught three fish.

The mass of the three fish combined was 62 kg. The smallest weighed 7 kg less than the middle sized fish. The largest fish weighed three times the smallest fish.

Find the mass of each fish.

14. Tangram

A tangram is a Chinese shape puzzle which is thousands of years old. It consists of square that has been cut into seven shapes. The tangram contains the following shapes;

- two large triangles
- one medium triangle
- two small triangles
- a square
- a parallelogram

Copy the tangram on the right on to a piece of card or paper. Then cut it out and use the shapes to solve the problems on the next page.
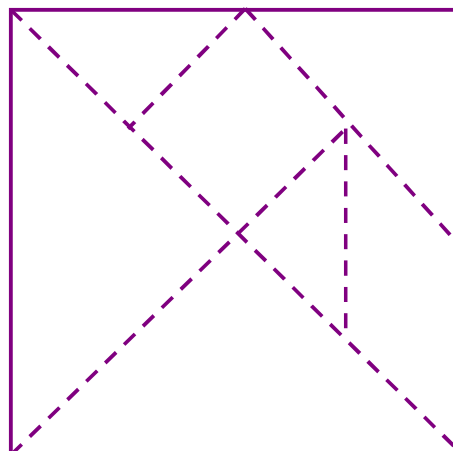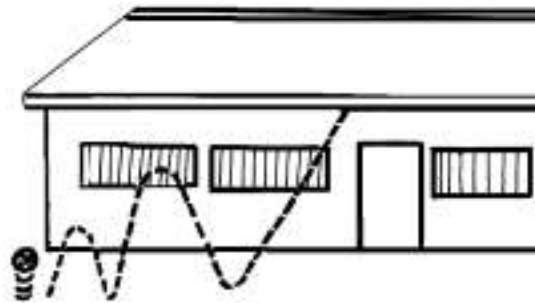
Can you use all seven pieces of the tangram shapes to form the following shapes?

1. rectangle

2. triangle

3. parallelogram
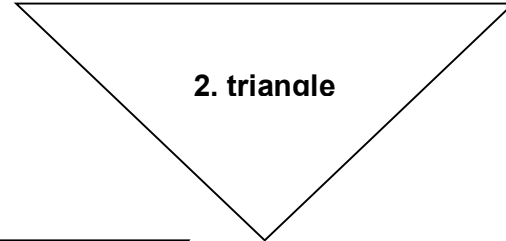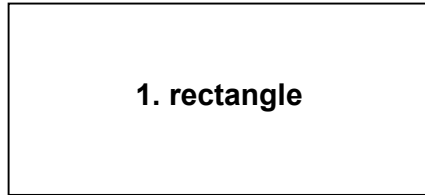
15. Dropped Ball

A ball is dropped from a height of 1.6 metres. At each bounce, it comes up to half the height from which it fell. It was caught when it bounced back to 10 centimeters.

How far did it travel?

16. Three Monkeys

Three monkeys ate a total of 25 nuts.

Each one ate a different odd number of nuts.

How many nuts did each of the monkeys eat?

Find as many different answers as you can.

7. Nick-names

Kayleen, Matthew, Jackson, and Nuatali are friends.

They each have a nick-name.

Their nick-names are Spider, Curly, Ace and Fatty, but not in that order.

Use the clues on the following page to work out each person's nick-name.

Chapter 8

Nuatali has been on holiday with Curly but travels to school with Fatty.	Spider sometimes goes to play at Jackson's house.
Spider, Curly and Kayleen play in a football team.	Jackson plays tennis with Curly and goes swimming with Ace.

18. Super Cook

Mrs. Bun is a super cook. In 5 days she made 80 cakes. Each day she made 4 fewer cakes than the day before.

a. How many cakes did she make each day?

Mrs. Bun went on making 4 fewer cakes each day. She carried on making four less cakes each day cakes until one day she didn't make any at all.

b. How many cakes did she make altogether?

19. Sail Away

Two men and two women want to paddle across a river. The boat is small. It can carry a maximum of two women or one man.

How can all four of them get to the other side?

20. Safety Lights

On the coast of a large island there are three lighthouses. The first light shines for 3 seconds, then is off for 3 seconds. The second light shines for 4 seconds, then is off for 4 seconds. The third light shines for 5 seconds and then is off for 5 seconds. All three lights have just come on together.

a. After how many seconds, will all three lights be off at the same time?

b. After how many seconds will all three lights come on at the same moment?

21. Maria's Book

The pages of Maria's book are numbered from 1.

The page numbers contain a total of 555 digits.

How many pages are there in the book?

How many of the digits are a 5?

22. Flash Harry

In April Flash Harry bought a radio for $100. In May he sold it for $200.

In June he was sorry he had sold it so he bought it back for $300.

In July he got tired of it so he sold it for $400.

Overall did Flash Harry make a profit or a loss? How much was his profit or loss?

23. Zids and Zods

Zids have 4 spots and Zods have 9 spots. In a mixed group of Zids and Zods there is a total of 48 spots.

a. How many Zids are in the group?

b. How many Zods are in the group?

What if Zids had 5 spots and Zods had 7 spots? If the group had 140 spots altogether, how many Zids and Zods could it contain? Find as many solutions as you can.
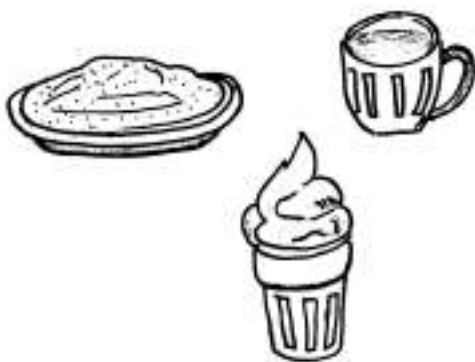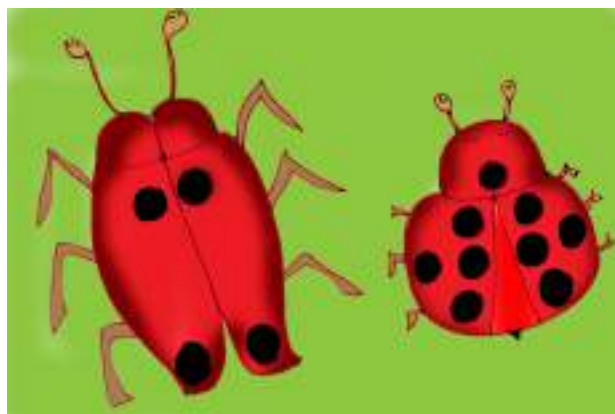
24. Franco's Fast Food

This is what food costs at Franco's café.

- 1 curry and 1 tea cost $10.50.
- 2 curries and 2 ice creams cost $23.
- 1 ice cream and 2 teas cost $6.50.

What do you have to pay in total for 1 curry, 1 ice cream and 1 tea?

What does each item cost on its own?

25. Animal Farm

a. At the market Benjamin bought a hen and a duck for $60 each.

When he sold them the next day he made a profit of 20% on the duck, but a loss of 20% on the hen.

How much did he get when he sold them both?

b. Benjamin bought another hen and a duck. He sold them again the next day for $60 each.

He made a profit of 20% on the duck but he made a loss of 20% on the hen.

Overall, did he make a profit or a loss on the deal?

26. Anyone for Tennis?

Kimi said, "I will only play tennis if Annie plays."

Annie said, "I won't play if Benjamin is playing."

Benjamin said, "I'm not playing if Luke or Christina are playing."

Luke said, "I will only play if Linda plays.

Linda said, "I don't mind who I play with."

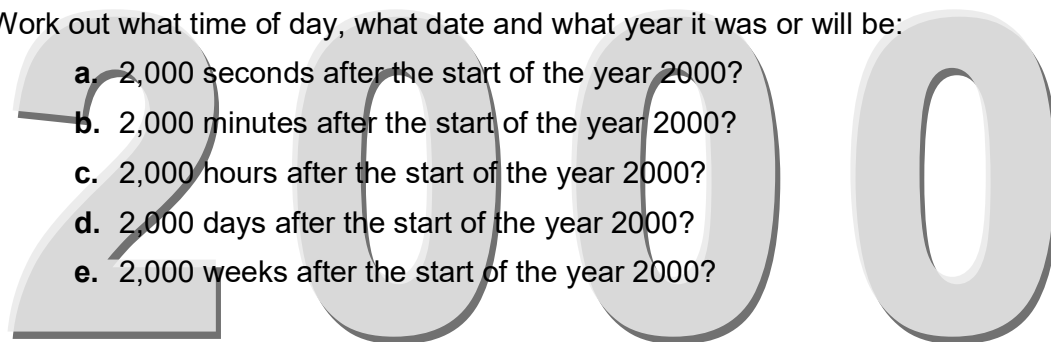**Which two boys and two girls will play tennis?**

27. Sweet Treat

Chocolate bars cost $2.50 each.

Fruit lollipops cost $3.00 each.

Kimi spent $49 on a mixture of chocolate bars and fruit lollipops. How many of each did he buy?

28. Millennium

Work out what time of day, what date and what year it was or will be:

  a. 2,000 seconds after the start of the year 2000?

  b. 2,000 minutes after the start of the year 2000?

  c. 2,000 hours after the start of the year 2000?

  d. 2,000 days after the start of the year 2000?

  e. 2,000 weeks after the start of the year 2000?

29. Saving

Julia saved coins. She saved one 5c, one 10c, one 20c and one 50c coin each week. She carried on doing this until she had an exact number of dollars.

  a. How many dollars did she have at the end?

  b. How long did it take her?

You could use a chart like this to help you calculate your answer.

Week	Cumulative Total
1	
2	
3	
4	
5	

If Julia continued this rate of saving, how much would she save in:

  c. 1 year?

  d. 5 years?

  e. 20 years?

  f. 50 years?

30. Wet T-Shirts

If it takes thirty minutes for one wet T-shirt to get dry out in the sun, how long would it take to dry 20 T-shirts?

Explain your answer.

Nguzu Nguzu Mathematics
Standard 6