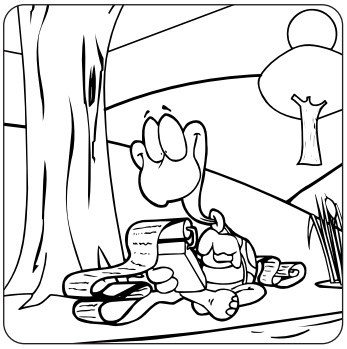

Maths - Contents

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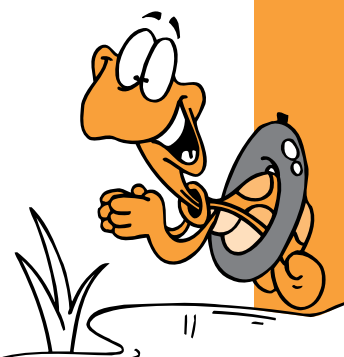


That's About The Size Of It

I

FOCUS

- How extensive are the impacts of salinity in our region?

OBJECTIVES

- Shade grids accurately to signify percentage values
- Convert parts out of 100 to a percentage value

CSF II LINKS

MATHS 4.1 Number
4.3 Number
4.3 Chance & Data
4.3 Reasoning & Strategies

BACKGROUND

Ninety-seven percent of the world's water is salty and is found in seas and oceans, 2% is locked up as ice and only 1% of the world's water is fresh water that we can use. Dryland salinity is a significant and worsening problem in Australia. In the North Central region, it imposes large costs on local governments, businesses, producers, the environment and householders.

NOTES

The worksheet could be completed by the class as a whole, or by one group while others work with you in a focused teaching group, manipulating MAB to represent percentage values.

LEARNING TASKS

1 **Ask students to estimate how much of the world's water is fresh, encouraging fractional terms to be converted to percentage values.**

2 **Discuss the world's water resources in terms of the percentages above.**
- Students label the corresponding sections of the first grid on the worksheet.

3 **Demonstrate shading a 100 square grid on an overhead transparency to represent percentage, revising that % means parts out of 100.**
- Use MAB as an alternative way of representing the same information. How many cubes or 100ths would represent each type of water if the 100 block was the world's available water?

4 **Students complete worksheet, gauging the size of the salinity problem.**

5 **Discuss the statistics.**
- Were students surprised by the data?
- What strategies did students use? What did they learn?
- Relate percentage values to centimetres in a metre or cents in a dollar. Show on a metre rule how many trees out of every 100 have been removed from our state if 70% have been cleared.

MATERIALS

- ***'That's About The Size Of It'*** **Student Worksheet**
- **MAB blocks**
- **Calculators** for extension work
- **Metre ruler**
- **Play money**
- **Overhead transparency** of 100 grid (optional)
- **Overhead projector** (optional)
- ***'That's About The Size Of It'*** **Answers** (see 'Resources on the CD)

EXTENSION

Given two values, students calculate a percentage value e.g. $1 670 300 is spent on salinity education, research and extension programs out of a total state government spending of $ 6 672 670.

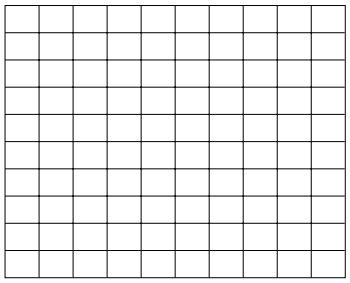
ASSESSMENT

Can students recall and convert fraction / percentage equivalences e.g. one quarter = 25%. Can they use percentages to make statements about data and use MAB to assist calculations?

That's About The Size Of It - Student Worksheet

Name _____

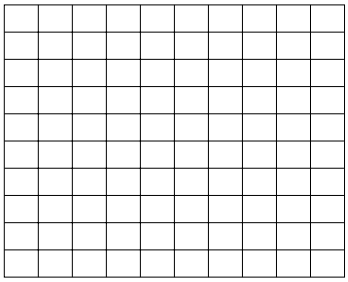
COMPLETE the following questions



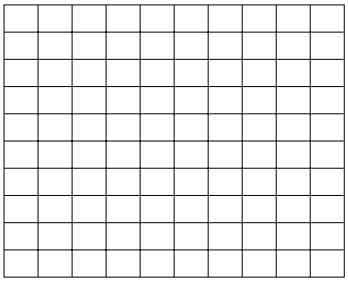
1a Since European settlement, 70% of Victoria's native vegetation has been cleared. Shade 70% of the grid to the right in BLACK
1b Shade the remaining squares in GREEN
1c What percentage of Victoria remains covered by native vegetation? ____%

2 Shade the grids below to show the salt-affected land in each catchment.

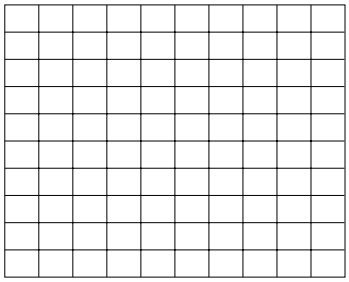
Campaspe 6%



Loddon 4%



Avon-Richardson 25%

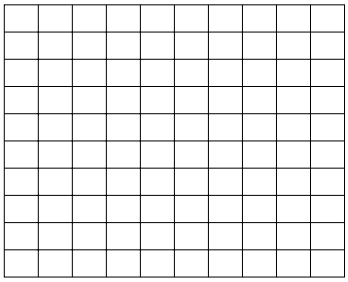


3 Write each percentage value as a common fraction.

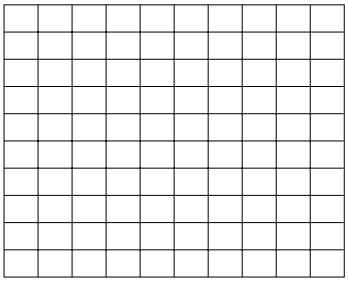
Campaspe 6% = __/__ Loddon 4 % =__/__ Avon Richardson 25% = __/__

4 Shade the grids to show the impact of these alarming salinity facts.

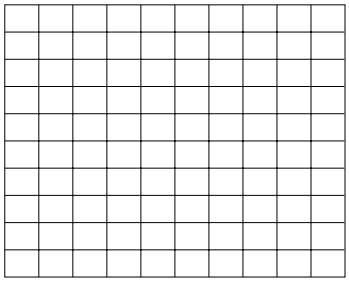
Of every 100 dollars spent on roads 47 is due to the repair and maintenance of salt damage.



Of every 100 dollars spent on buildings 50 is due to damage caused by rising groundwater.



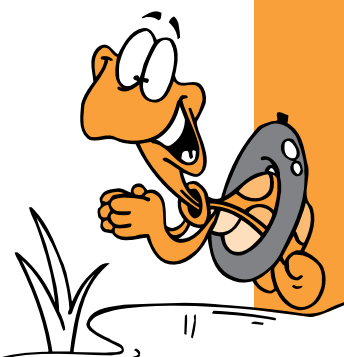
Salinity is measured in EC units. At 1500 EC or above, 75 out of every 100 plant species die.



5 Write each statistic as a percentage value

____ % is spent on salt-affected roads ___ % is due to rising groundwater ____ % of plant species die

6 By 2050, 13% of Victoria's farming land will be at high risk of salinity and 47% will be at moderate risk. If the rest is healthy, how much healthy land does that leave? _____%.



Managing Measurement

I

FOCUS

- How many square metres in a hectare; milligrams in a gram; grams in a tonne; and millilitres in a litre?

OBJECTIVES

- Compare given measurements
- Use >, < or = signs to indicate relationships

CSF II LINKS

MATHS 4.1 Measurement
4.2 Measurement
4.3 Measurement
4.1 Number

BACKGROUND

1 hectare (ha) = 100 metres x 100 metres or 10 000 m^2
1 gram (g) = 1000 milligrams (mg)
1 tonne (t) = 1000 kilograms (kg)
1 litre (L) = 1000 millilitres (mL)

NOTES

This activity involves a study of the units of measurement commonly discussed in relation to salinity. This sheet can be used as an introduction or for consolidation for working with these units. Alternatively, this sheet may be used as a homework challenge. This activity could be divided into two lessons.

LEARNING TASKS

1 To introduce the concept of a hectare, you could mark out an area of 10 m x 10 m on the school oval and have students stand at points along each side. Relate the visual unit to some of the real life measures of the salinity problem.
- 3500 ha of the Campaspe catchment is affected by dryland salinity
- 7500 ha of the Loddon catchment is affected by dryland salinity

2 Provide structured and free time for experimentation with volume, filling containers using the millilitre and litre markings.

3 As it is difficult to provide hands-on measurement experiences of milligrams or tonnes, these units and their practical applications should be discussed.
- Where might you see something measured in milligrams?
- In what situations would objects be measured in kilograms?
- When might tonnes be a more appropriate unit of measurement?

4 Students complete the worksheet

ANSWERS TO WORKSHEET

1 **a** kilograms **b** square metres **c** litres **d** milligrams
e tonnes **f** hectares **g** millilitres **h** grams

2 **a** = **b** > **c** < **d** = **e** < **f** >

3 **a** < **b** = **c** > **d** < **e** < **f** >

4 **a** > **b** = **c** = **d** > **e** < **f** >

MATERIALS

- ***'Managing Measurement'*** **Student Worksheet**
- **Trundle wheel** or measuring tape
- **Markers**
- **Containers**
- **Water**

EXTENSION

As a follow-up, recipe books or newspaper articles could be studied for examples of measurement. Comparisons of measurements can be extended to conversions.

ASSESSMENT

Could students provide practical applications for each unit of measurement? Were they able to compare measurements and identify the relationship with a >, < or = sign?

Managing Measurement - Student Worksheet

Name _____

1 From the box on the left, choose an appropriate unit of measurement for each situation on the right.

milligrams
grams
kilograms
tonnes
millilitres
litres
square metres
hectares

a Your weight _____

b Area of netball court _____

c Water in a bucket _____

d Salt in a Big Mac _____

e Salt entering Murray River _____

f Size of a wheat farm _____

g Water in a glass _____

h Sugar in a cake _____

100 m x 100 m (or 10 000 m^2) = 1 hectare or 1 ha

2 Add a > (greater than), < (less than) or = sign to show the relationship between these areas of land affected by groundwater discharges.

a 20 000 m^2 _____ 2 ha

b 12 500 m _____ 1 ha

c 35 000 m^2 _____ 4 ha

d 40 000 m^2 _____ 4 ha

e 6300 m^2 ____ 1ha

f 55 000 m^2 ____ 5 ha

1000 kg x 1000 kg = 1 tonne or 1 t

3 Add a > (greater than), < (less than) or = sign to show the relationship between how much salt is found on each farm paddock.

a 560 kg _____ 1 t

b 3500 kg _____ 3.5 t

c 3t _____ 2500 kg

d 5.5 t _____ 5600 kg

e 3800 kg _____ 4 t

f 7100 kg ____ 7 t

1000 mg x 1000 mg = 1 gram or 1 g

4 Add a > (greater than), < (less than) or = sign to show the relationship between the salt content in different foods.

a 1200 mg _____ 1 g

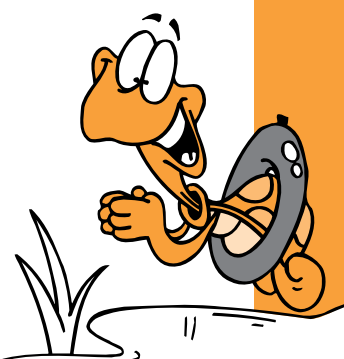
b 8 g _____ 8000 mg

c 2.5 g ____ 2500 mg

d 4600 mg ____ 4.5 g

e 4000 mg ___ 4.5 g

f 8300 mg _____ 8 g



Evaluating EC Units

M

FOCUS

- What are the salinity levels in our area?
- How extensive is the impact of salinity in streams?

OBJECTIVES

- Interpret tabulated data and display it visually
- Analyse displays and identify trends and patterns

CSF II LINKS

MATHS 4.1 Chance & Data
4.2 Chance & Data
4.3 Chance & Data

BACKGROUND

The North Central Community Waterwatch Program has collected the data used in this activity over several years. Local schools, community groups and individuals are involved in this program. Salinity in waterways is measured as electrical conductivity and recorded in EC units. Saline water has a higher EC than fresh water.

NOTES

The data provided for this activity has a huge variety of mathematical applications. Many suggestions have been offered below for your selection.

LEARNING TASKS

Using the data provided, chose one or multiple waterways to study.

1 **Choose a school located near you, and a graph type (e.g. bar, line, picto) to display four year of results.**
   - Compare salinity levels with HPE Activity '*Taste Testing*' standards.
   - Are there any patterns you can identify?
   - What factors may have affected the results?

2 **Groups choose various schools along the waterway (use the same type of graph to display results).**
   - What patterns do you notice between graphs? Are there any surprises? Are some locations consistently more saline? Why?

3 **Display EC results for each location using one year and graph type.**
   - Use a regional map to locate each primary school along the river
   - What relationships are there between schools and EC readings?
   - Why might salinity levels fluctuate between towns along the river?
   - Design a graph that displays results from all schools for all four years.

4 **For a more comprehensive catchment approach, consider the above suggestions across all four waterways.**
   - Are any waterways generally more / less saline? Why is this?
   - What factors may contribute to the patterns you observe?

MATERIALS

- ***'Evaluating EC Units'* Student Worksheet**
- **Graph paper**
- **Regional maps**
- **HPE Activity, *'Taste Testing'* Student Worksheet 2** (page 103)

EXTENSION

Calculate average EC readings of given locations or years. Discuss various data display methods and evaluate their effectiveness and particular pros and cons.

ASSESSMENT

Could students use tabulated data to generate data displays? Were they able to interpret those displays, identify patterns and make assumptions about contributing factors?

Evaluating EC Units - Student Worksheet

Name _____

Waterwatch Results

This information was collected over several years by North Central Waterwatch. Local schools, community groups and individuals involved in Waterwatch monitor water quality of local waterways. Salinity is measured as electrical conductivity and recorded as EC units. Saline water has a higher EC than fresh water.

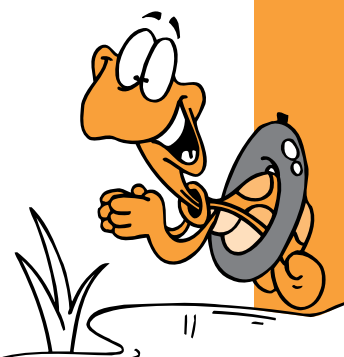
Primary School	2001	2000	1999	1998	CAMPASPE RIVER
Kyneton	580	380	420	410	
Langley	850	600	400	1000	
Redesdale	950	600	700	1000	
Axedale	520	700	600	500	
Elmore	500	800	1100	700	
Rochester	1300	1600	1200	2300	
Ballendella	1400	1300	1600	1000	
Echuca	1400	1500	1500	1500	

Primary School	2001	2000	1999	1998	LODDON RIVER
Guildford	300	300	100	300	
Newstead	700	600	400	500	
Baringhup	400	700	700	850	
Bridgewater	1100	1700	1900	2300	
Boort	700	1400	1500	1400	
Kerang	500	400	1300	1100	
Lake Charm	1000	1000	2800	2400	

Primary School	2001	2000	1999	1998	BULOKE CREEK
Lockwood South	1100	2700	3600	1600	
Lockwood	1500	1000	4600	1500	
Marong	3300	3700	2300	2100	
East Loddon	900	1400	1500	2100	
Pyramid Hill	4200	4800	8700	1000	

Primary School	2001	2000	1999	1998	BENDIGO CREEK
Big Hill	500	1600	1600	3100	
Creek Street	600	1600	3600	1300	
Epsom	3100	1100	2400	300	
Huntly	1000	800	1100	600	
Goornong	300	900	1200	300	

NOTE All numerical data in the tables above represent EC Units.
Readings were taken in June / July of each year



Salty Sayings

I

FOCUS

- How has the history of salt affected our language?

CSF II LINKS

MATHS 4.1 Number

OBJECTIVES

- Solve addition and subtraction operations
- Use the clues to solve the codes and reveal sayings

BACKGROUND

See the SOSE activity, *'Centuries of Salt'* for historical information about salt.

NOTES

This activity is closely related to the SOSE activity, *'Centuries of Salt'* in which students learn of the various ways salt has been used throughout history. The commonly used sayings in this activity all have a historical origin.

LEARNING TASKS

1 Revise the core skills required for this activity by working through the following questions

- A meat pie has 1428 mg of salt and one serve of tomato sauce has 35 mg of salt. If I add sauce to my pie and eat it for lunch, how much salt have I ingested? (Answer = 1463 [mg])
- 450 trees were planted in a recharge area but during a drought 37 died. How many were left surviving? (Answer = 413[trees])

2 Students work through the sheet provided, calculating solutions, matching answers with numbers on the left until they are able to read the salty sayings.

3 Come together again as a class and discuss the sayings.

- Can students think of times when they've heard the sayings used?
- Can they provide examples of a situation when each saying would be appropriate?

ANSWERS

A = 993	**T** = 518	**H** = 747	**E** = 1250	**W** = 664	**F** = 1028
N = 946	**Y** = 534	**L** = 312	**S** = 911	**U** = 118	**I** = 1203
B = 1602	**D** = 96	**O** = 1545	**C** = 1169	**R** = 780	**G** = 249

1 there is salt between us
2 rub salt into the wound
3 with a grain of salt
4 the salt of the earth
5 worth your salt

MATERIALS

- ***'Salty Sayings'***
  Student Worksheet

EXTENSION

Students could devise similar challenges for classmates by using any of the four operations to reveal words from their glossary in the English activity, *'Salty Language'*.

ASSESSMENT

How accurately were students able to solve operations? Could they explain their process to you and confidently verbalise the processes of renaming and regrouping?

Salty Sayings - Student Worksheet

Name _____

SOLVE the operations on the right.
TAKE NOTE of the letter beside the operation.
LOOK for numbers below that match your answer.
INSERT the appropriate letter.
DISCOVER the salty sayings.

1 Arabs say

___ ___ ___ ___ ___/___ ___/___ ___ ___ ___/___ ___ ___ ___ ___ ___ ___/ ___ ___
518 747 1250 780 1250 1203 911 911 993 312 518 1602 1250 518 664 1250 1250 946 118 911

when they are talking about a long and special friendship.

2 When you

___ ___ ___/___ ___ ___ ___/___ ___ ___ ___/___ ___ ___/___ ___ ___ ___ ___
780 118 1602 911 993 312 518 1203 946 518 1545 518 747 1250 664 1545 118 946 96

you make things worse.

3 To take someone's words

___ ___ ___ ___/___/___ ___ ___ ___ ___/___ ___/___ ___ ___ ___
664 1203 518 747 993 249 780 993 1203 946 1545 1028 911 993 312 518

means not to take them too seriously.

4 Honest, hard-working people are often called

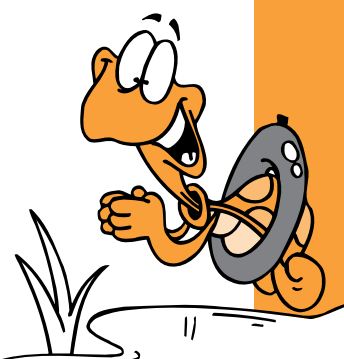
___ ___ ___/___ ___ ___ ___/___ ___/___ ___ ___/___ ___ ___ ___ ___
518 747 1250 911 993 312 518 1545 1028 518 747 1250 1250 993 780 518 747

because they are as valuable to mankind as salt itself.

5 In order to earn a reward, you must prove that you're

___ ___ ___ ___ ___/___ ___ ___ ___/___ ___ ___ ___ .
664 1545 780 518 747 534 1545 118 780 911 993 312 518

A 589 + 404	**T** 764 - 246	**H** 268 + 479	**L** 408 - 96	**S** 630 + 281	**U** 3605 - 3487	**C** 5802 - 4633
O 942 + 603	**E** 482 + 768	**W** 1506 - 842	**I** 705 + 498	**G** 1096 - 847	**B** 943 + 659	**R** 471 + 309
F 179 + 849	**N** 3863 - 2917	**Y** 438 + 96	**D** 389 - 293			



Bars Of Salt

M

FOCUS

- What is the sodium content of foods?
- Are bar graphs an effective way to display data?

OBJECTIVES

- Use tabulated data to construct a bar graph
- Compare and discuss various data display methods

CSF II LINKS:

MATHS 4.1 Number
4.1 Chance & Data
4.2 Chance & Data
4.1 Reasoning & Strategies

BACKGROUND

Graphing salt trends is one way that natural resource managers predict the future impacts of salinity. We can also use this information to show the effectiveness of actions taken to reduce salinity. In small amounts salt is important to both the environment and humans, but like plants we get sick if we consume too much salt.

NOTES

This activity is a direct follow up to the HPE activity, *'Salt at the Supermarket'*. If that activity has not been completed, a similar table must be prepared beforehand. Sodium content may have to be rounded up or down to be represented accurately on the graph.

LEARNING TASKS

1 **Review collected data from the HPE activity, *'Salt at the Supermarket'*.**
   - Discuss the variety of methods that could be employed to display such the data – bar graph, line graph, pie graph, pictograph, etc.

2 **Display the bar graph titled 'Fat Content of Foods' on the teacher task card.**
   - Discuss its layout, features, calibration, order of bars, etc.

3 **Using graph paper, students construct a similar graph using data from their table titled 'Sodium Content of Foods'.**

4 **Using the example provided, demonstrate how statements can be made and questions generated in reference to the data displayed on bar graphs.**

5 **Students use their own bar graphs to construct written statements about the data and generate questions to swap with a partner.**

6 **To conclude the session, discuss the bar graph as a means of displaying data.**
   - Compared to the table, does it alter the way data is perceived?
   - What are its advantages and disadvantages?

MATERIALS

- **HPE Activity '*Salt at the Supermarket'* Student Worksheet** (page 115) or teacher generated table
- ***'Bars Of Salt'* Teacher Task Card** overhead transparency
- **Graph paper**
- **Rulers**

EXTENSION

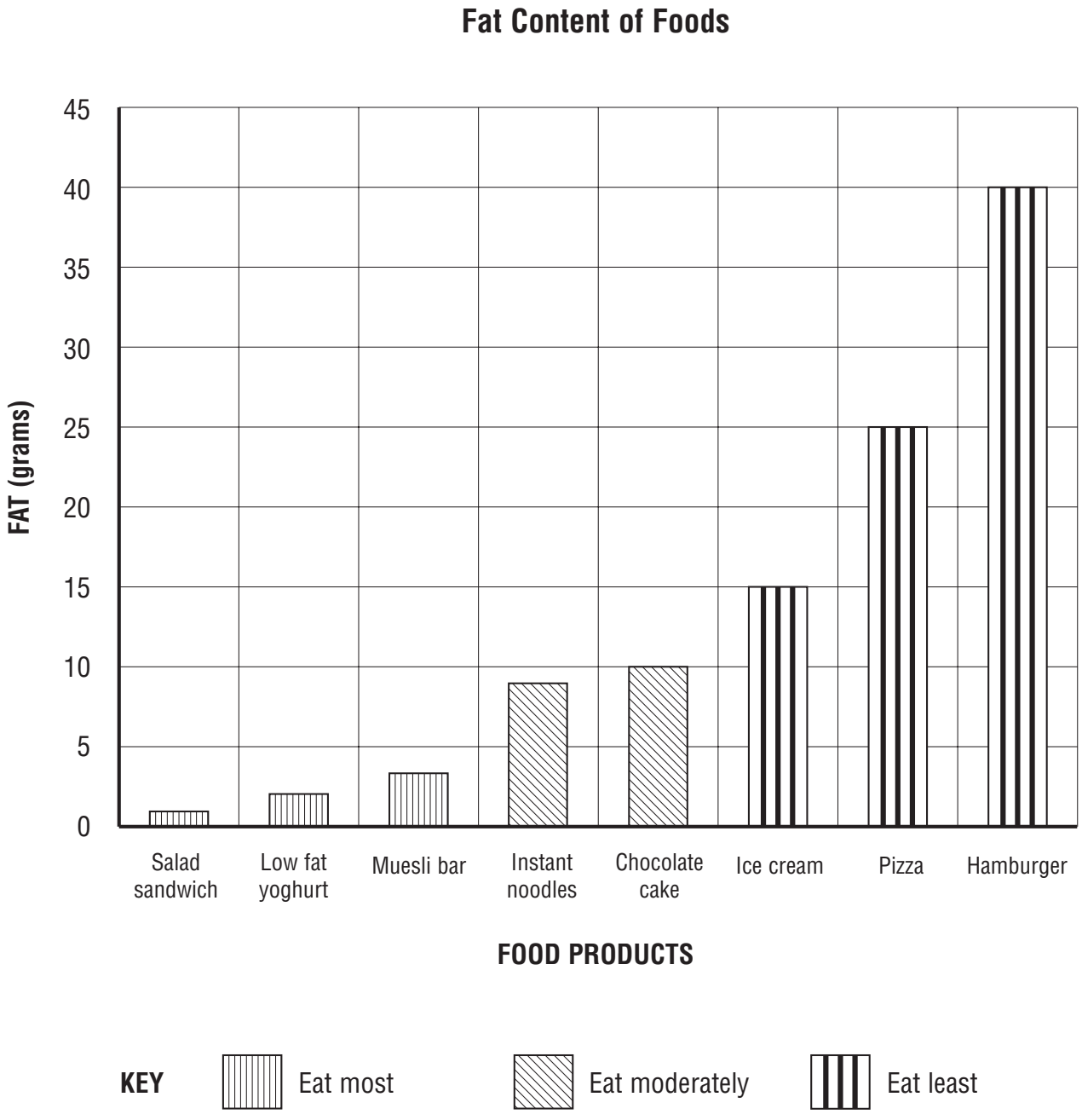
Narrow your investigation down to one particular food product such as potato crisps or soups. Tabulate or graph sodium contents of various brands to produce a consumer guide.

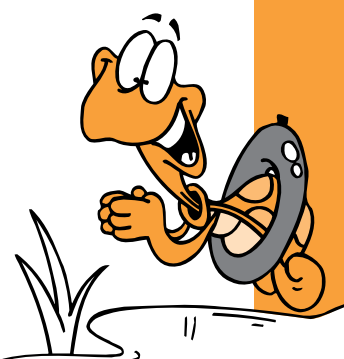
ASSESSMENT

Did students bar graphs have: a title; titled axes; clearly marked calibrations; neatly ruled, labelled and shaded bars; and a key? Can they make inferences from given data?

Bars Of Salt - Teacher Task Card

Example Bar Graph





Mr Monty's Map

M

FOCUS

- Preparing a whole farm plan

OBJECTIVES

- Use coordinates to identify and add features to a farm plot
- To calculate distances using a scale and direction

CSF II LINKS

MATHS 4.1 Space
4.2 Space
4.5 Space

BACKGROUND

Mr Monty is a fictional character for the purpose of this activity. Although this is a simplified version, whole farm plans such as the one used here are a recommended strategy in the management of salinity on farms.

NOTES

This activity requires students to use map-reading skills such as using co-ordinates and compass points, and understanding scales and keys. Remember when writing make co-ordinates we write the easting and then the northing e.g. At 2G there is a dam on Mr. Monty's farm.

LEARNING TASKS

1 **With the class as a whole, revise co-ordinates, compass points and scales.**
   - This could be done at the beginning of the activity, or while working through the student worksheet.

2 **Students complete the worksheet independently.**
   - During this time you may wish to invite some students to work with you in a focused teaching group to consolidate or extend concepts.

3 **Fast finishers can devise other challenges for a partner to attempt.**
   - They may involve reading from the map or a request to add more details.

4 **If students have the knowledge required, a study of area could be incorporated**
   - What is the size of the discharge area?
   - How many hectares is that?

MATERIALS

- ***'Mr Monty's Map'* Student Worksheet**
- **Grids** or graph paper for the game

EXTENSION

Design a whole farm plan for a member of your school community. Use a grid to design a water sensitive urban garden by using areas of mulched native beds and decorative stone paving.

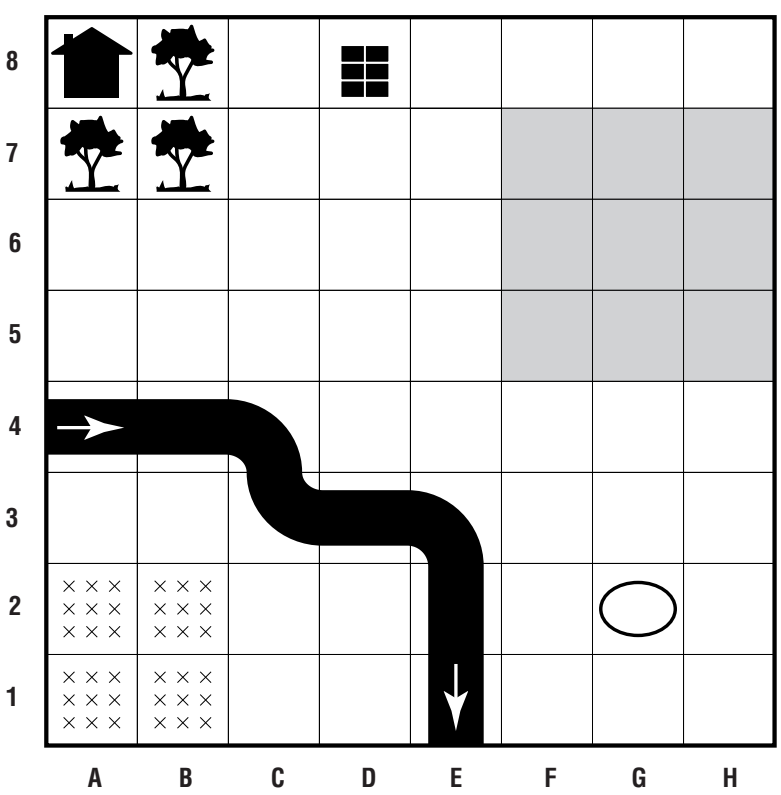
ASSESSMENT

Were students able to locate co-ordinate points on a grid, identify or add objects? How well could students use compass points to locate and describe features? Were they able to interpret a simple scale to calculate distance?

Mr Monty's Map - Student Worksheet

Name _____

Mr Monty's farm is experiencing some salinity problems. Use the map of his whole farm plan map to help him fix his salinity issues. Each square represents one paddock.



SCALE

100 metres long
x 100 metres wide (1 ha)

KEY

House

Dam

Trees

River

Haystack

Salt crystals

High watertable

1 What are the co-ordinates for the location of Mr Monty's farmhouse? _____

2 What are the dimensions of the areas affected by high watertables? ___ m X ___ m

3 Which of Mr Monty's paddocks have this problem? _____

4 In which paddock is Mr Monty's dam? _____ What direction is it from the house? _____

5 Three paddocks have lots of trees. Which one's are they? _____ _____ _____

6 What are the coordinates of the old haystack? _____

7 Describe the flow of the river by using compass points and the scale above.

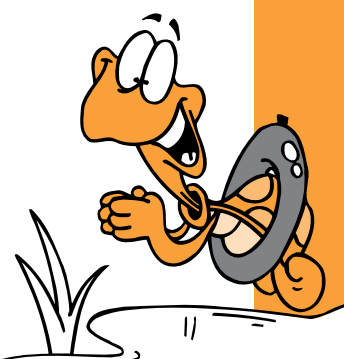
_____

8 A Salinity Officer is flying over the property in a plane. He is over the house at present. In which direction should he travel to view the discharge area? _____

9 The Salinity Officer recommends Mr Monty plants lucerne in paddocks F5, F6, F7, G5, G6, G7, H5, H6 and H7. Make a symbol for Lucerne, draw it in the boxes and add the symbol to the key above.

10 A Landcare group has arrived to plant trees along either side of the river. In which paddocks should they be planting? _____

11 Draw the trees planted by the Landcare group using the tree symbol.



Cubic Crystals

M

FOCUS

- What are the features of a salt crystal?

OBJECTIVES

- Identify the characteristics of a cube
- Draw the top, side and front views of 3D models
- Construct and draw models using isometric dot paper

CSF II LINKS

MATHS 4.2 Space
4.3 Space
4.4 Space
4.5 Space

BACKGROUND

A perfect salt crystal is a cube. However, when salt is observed closely under a magnifying glass, there may be some broken or crushed grains, which are not perfect cubes. See photos on the CD of salt crystals, which have formed naturally in salt lakes within our region.

NOTES

This activity requires a good understanding of working in three dimensions. Review the activity against student understanding of this. You may like to work as a class on more complex components of the worksheet.

LEARNING TASKS

1 **Students study salt crystals under magnifying glasses or microscopes to examine their shape and identify that perfect crystals are cubic.**

2 **Revise students knowledge of cubes:**
- Number of faces, edges and vertices.
- Where they are seen and how / why are they used in everyday life?

3 **Prepare students for the worksheet by building a 3D model.**
- How many faces are visible?
- How many are hidden?
- Are any cubes completely concealed from view?

4 **Revise the method of observing top, side and front views and drawing them onto square grid paper.**
- You may also like to model the drawing of your 3D model using isometric dots on the board.

5 **Students complete the various challenges on the worksheet provided.**
- Involve some students in a focus-teaching group.

MATERIALS

- **Salt**
- **Magnifying glasses or microscopes**
- **Cubes** for model building
- ***'Cubic Crystals'* Student Worksheet**
- **Isometric dot paper** (optional)
- **Square grid paper** (optional)

EXTENSION

Form your own crystals in Science activity, *'Crystal Creations'*. Use a magnifying glass to discover if the salt crystals are cubes.

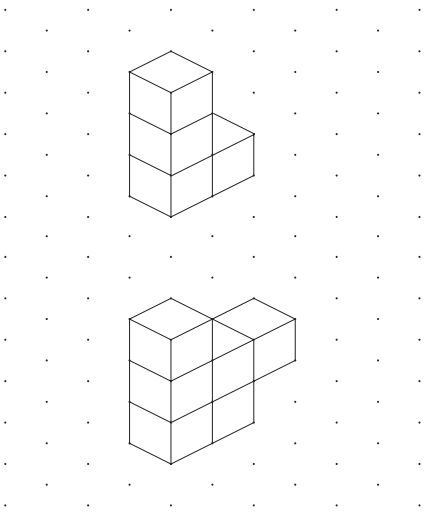
ASSESSMENT

Could students identify and represent views in drawings? Did their isometric drawings show the dimension of depth? Could they visualise unseen faces on a complex 3D drawing?

Cubic Crystals - Student Worksheet

Name _____

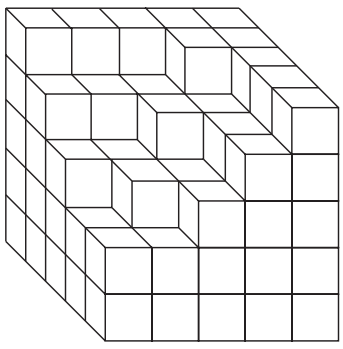
DRAW each view of the two models shown below.



FRONT	SIDE	TOP

BUILD your own simple 3D models, draw them below and complete each view.

FRONT	SIDE	TOP



HOW MANY blocks would it take to build the structure on the left?

_____

IMAGINE a painter is to paint this object. It cannot be moved but will be covered entirely by blue paint. How many faces will be painted?

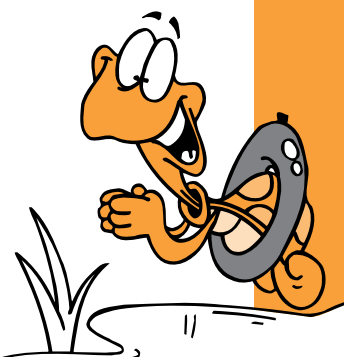
_____

EXPLAIN how you solved this problem.

_____

_____

_____



Practical Problem Solving

C

FOCUS

- Solving salinity problems

OBJECTIVES

- Interpret practical problems and plan an approach
- Apply a variety of strategies to solve problems
- Use a structured process to solve practical problems

CSF II LINKS

MATHS 4.2 Reasoning & Strategies
4.3 Reasoning & Strategies
4.4 Reasoning & Strategies

BACKGROUND

When seeking solutions to environmental problems natural resource managers often model environmental processes. They do this in order to predict and evaluate the impact of innovative actions on ecosystems. Often the impacts of salinity are not visible within our immediate environment, however, we all contribute to the problem and solutions.

NOTES

The math problems provided can be used in any number of ways: the whole class, small groups or individuals working on the same or different problems.

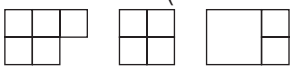
LEARNING TASKS

1 **Hand out tasks to individuals or groups.**
   - The task cards provided can be enlarged or photocopied according to your needs. Student worksheet 3 is provided to assist students in completing their tasks.

2 **Provide students with ample time to work through their task.**
   - Although some problems may have multiple solutions, probable answers are supplied below:

ANSWERS TO WORKSHEETS

Mr Jackson And His Beanstalk - 2048 cm or 20.48 m
Five Litres Of Water - Fill the 4 L bucket and tip into the 7 L bucket. Repeat process, filling the 7 L bucket to the brim. There will be 1 L remaining in the 4 L bucket. Tip all the water from the 7 L bucket. Pour the 1 L into the 7 L bucket. Fill the 4 L bucket and add to the 7 L bucket = 5 litres.
Meeting Landcare - 28 handshakes (7+6+5+4+3+2+1)
Puzzling Paddocks -



Wavering Watertables - 34 metres
Coordinating A Creek Crossing - Take the rabbit over and come back alone. Take the seedlings over, collect the rabbit and return. Swap the rabbit for the fox and take the fox over the river to be left with the seedlings. Travel back alone and pick up the rabbit.

MATERIALS

- ***'Practical Problem Solving'* Student Worksheets 1, 2 & 3**
- **Concrete materials** for problem solving e.g. blocks, graph paper, buckets, matches, calculators.

EXTENSION

Students could write a salinity actions plan for their school, home or farm and predict the impact of these actions.

ASSESSMENT

Anecdotal records during problem solving will assist your assessment. Which strategies did students prefer? What does their strategy tell you about their level of thinking, confidence and skill?

Practical Problem Solving - Student Worksheet 1

Name _____

MR JACKSON AND HIS BEANSTALK

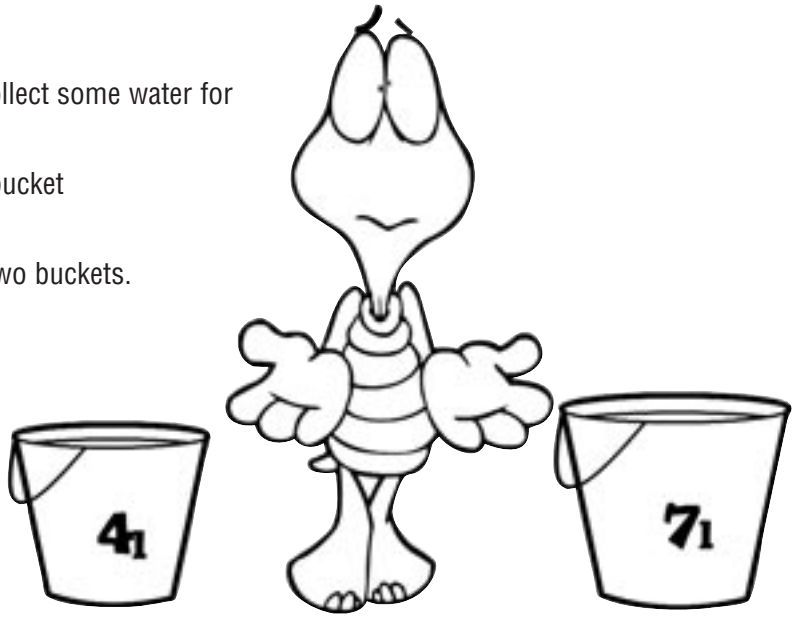
After learning about salinity during a visit by the North Central Waterwatch Coordinator, Mr Jackson's Year 5 / 6 class planted a tree in the school yard.

- They planted the tree on April 23rd.
- The seedling was 8 cm high when planted and it grew at an amazing rate – doubling in height every single day!
- If it kept growing at this rate, how high was the tree when it was measured a short time later on May 1st?

FIVE LITRES OF WATER

A Salinity Officer visited the Loddon River to collect some water for water testing.

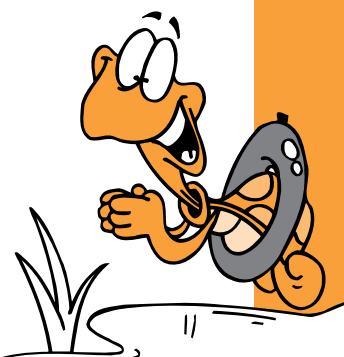
- He has a seven litre bucket and a four litre bucket but he wants exactly five litres of water.
- He has no other containers apart from the two buckets.
- How can he do it?



MEETING LANDCARE

Eight people meet at a Landcare Meeting in Echuca to discuss their next working bee at a nearby sports oval.

- They have never met before, so everyone exchanges handshakes.
- If everybody shakes hands with everybody else at the meeting once, how many handshakes are exchanged?



Practical Problem Solving - Student Worksheet 2

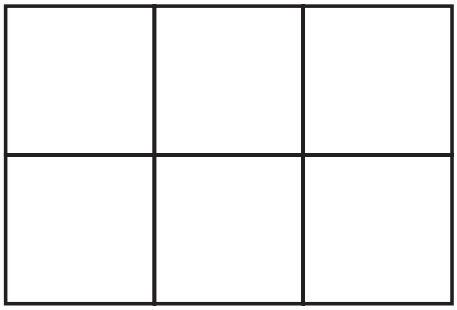
Name _____

PUZZLING PADDOCKS

Due to increasing salinity on her farm near Pyramid Hill, Claire Robson must rethink the way she runs things.

She decides to re-fence her property into different sized paddocks so that she can isolate problems and manage them more efficiently.

Her farm currently looks like the picture to the right.



How could she:

- Remove 2 fences to leave 5 small paddocks?
- Remove 5 fences to leave 4 small paddocks?
- Remove 4 fences to leave 3 paddocks?

WAVERING WATERTABLE LEVELS

- The watertable on a farm near Heathcote started halfway between the soil surface and the bedrock below.
- A very wet winter brought the level up 5 metres.
- In spring, the new lucerne crop lowered the watertable by 10 metres.
- Following harvest, and after two years of fallow, the level rose again, gaining 12 metres.
- Unfortunately, with no revegetation, the watertable kept rising through the remaining 10 metres of soil until it reached the surface above, creating a discharge area.

How many metres were there between the soil surface and the bedrock below?

COORDINATING A CREEK CROSSING

Mr Williams runs a farm near Elmore. The Campaspe River flows through his property. One day, he travelled to the river with a box of young eucalypts to plant in his paddock across the river.

On the way he saw a fox and a rabbit and, not wanting feral animals on his farm, he picked them up. He stood at the riverbank with his possessions – a fox, a rabbit and a box of fresh green seedlings. The only available boat was very small and could only carry Mr Williams and one of his possessions. He realised, if left together, that the fox would eat the rabbit and the rabbit would eat the seedlings.

How could he transport himself and the three things across the river without any damage?

Practical Problem Solving - Student Worksheet 3

Name _____

SEE

What **FACTS** have you been given?	What is the actual **QUESTION**?

PLAN

Which **STRATEGY** will you try?

- ❑ Use an operation
- ❑ Look for a pattern
- ❑ Draw a graph
- ❑ Make a list
- ❑ Draw a diagram
- ❑ Make a table
- ❑ Guess and check
- ❑ Work backwards
- ❑ Act it out
- ❑ Make it
- ❑ Other

DO

ANSWER

CHECK

Does your answer fit the question?

❑ Yes ❑ No