Ready-Ed Publications

OzzieMaths Series

PHOTOCOPY MASTERS

Maths: Year 5

CURRICULUM LINKED

- number and algebra
- measurement and geometry
- statistics and probability

5

By Brenda Gurr

Contents

Teachers' Notes

This book is part of the *OzzieMaths Series* which consists of seven books altogether. It is linked to the Australian National Curriculum and each page in the book references the content descriptors and elaborations that it specifically addresses. This book is therefore suitable for students studying in any State or Territory in Australia.

The activities in this book allow the students to both investigate and practise a range of mathematical concepts. Student-friendly explanations of relevant concepts are included on the majority of pages. Answers are provided at the back of the book.

This book is divided into three sections, which are detailed below.

Section 1: Number and Algebra
The activities in this section cover important skills concerning division and multiplication, allowing the students to work with factors, multiples and a range of different multiplication methods. Activities involving fractions, decimals and money calculations are also included.

Section 2: Measurement and Geometry
In this section, students will explore how to choose appropriate measurement units and will work with 12 and 24 hour time. They will also investigate concepts concerning 2D and 3D shapes, use a grid reference system, calculate perimeter and area, and construct and measure angles using protractors.

Section 3: Statistics and Probability
This section allows students to investigate three different games of chance, develop an understanding of probability, and construct and interpret graphs and tables.

Curriculum Links

Identify and describe factors and multiples of whole numbers and use them to solve problems (ACMNA098)
Elaborations
- exploring factors and multiples using number sequences
- using simple divisibility tests

Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099)
Elaborations
- recognising the usefulness of estimation to check calculations
- applying mental strategies to estimate the result of calculations, such as estimating the cost of a supermarket trolley load

Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)
Elaborations
- exploring techniques for multiplication such as the area model, the Italian lattice method or the partitioning of numbers
- applying the distributive law and using arrays to model multiplication and explain calculation strategies

Solve problems involving division by a one digit number, including those that result in a remainder (ACMNA101)
Elaborations
- using the fact that equivalent division calculations result if both numbers are divided by the same factor
- interpreting and representing the remainder in division calculations sensibly for the context

Compare and order common unit fractions and locate and represent them on a number line (ACMNA102)
Elaboration
- recognising the connection between the order of unit fractions and their denominators

Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103)
Elaboration
- modelling and solving addition and subtraction problems involving fractions by using jumps on a number line, or making diagrams of fractions as parts of shapes

Recognise that the place value system can be extended beyond hundredths (ACMNA104)
Elaboration
- using knowledge of place value and division by 10 to extend the number system to thousandths and beyond

Compare, order and represent decimals (ACMNA105)
Elaboration
- locating decimals on a number line

Create simple financial plans (ACMNA106)
Elaborations
- creating a simple budget for a class fundraising event
- identifying the GST component of invoices and receipts

Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)
Elaborations
- recognising that some units of measurement are better suited for some tasks than others, for example kilometres rather than metres to measure the distance between two towns
- investigating alternative measures of scale to demonstrate that these vary between countries and change over time, for example temperature measurement in Australia, Indonesia, Japan and USA

Curriculum Links

Calculate perimeter and area of rectangles using familiar metric units (ACMMG109)
Elaborations
- exploring efficient ways of calculating the perimeters of rectangles such as adding the length and width together and doubling the result
- exploring efficient ways of finding the areas of rectangles

Compare 12- and 24-hour time systems and convert between them (ACMMG110)
Elaboration
- using units hours, minutes and seconds

Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)
Elaborations
- identifying the shape and relative position of each face of a solid to determine the net of the solid, including that of prisms and pyramids
- representing two-dimensional shapes such as photographs, sketches and images created by digital technologies

Use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)
Elaboration
- creating a grid reference system for the classroom and using it to locate objects and describe routes from one object to another

Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)
Elaboration
- identifying the effects of transformations by manually flipping, sliding and turning two-dimensional shapes and by using digital technologies

Apply the enlargement transformation to familiar two dimensional shapes and explore the properties of the resulting image compared with the original (ACMMG115)
Elaboration
- using a grid system to enlarge a favourite image or cartoon

Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112)
Elaboration
- measuring and constructing angles using both 180° and 360° protractors

List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116)
Elaboration
- commenting on the likelihood of winning simple games of chance by considering the number of possible outcomes and the consequent chance of winning in simple games of chance such as jan-ken-pon (rock-paper-scissors)

Recognise that probabilities range from 0 to 1 (ACMSP117)
Elaboration
- investigating the probabilities of all outcomes for a simple chance experiment and verifying that their sum equals 1

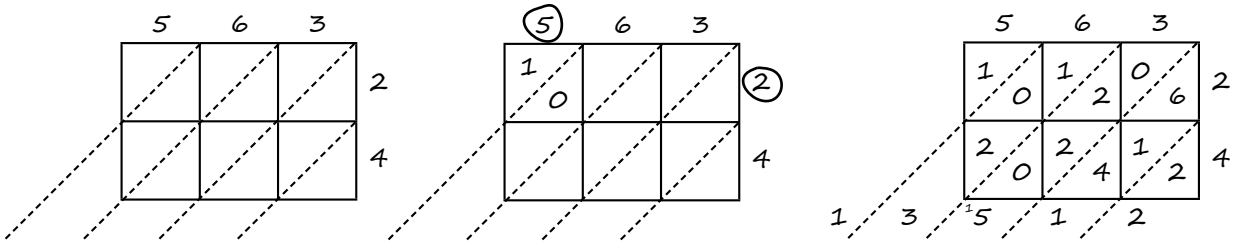
Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)
Elaboration
- identifying the best methods of presenting data to illustrate the results of investigations and justifying the choice of representations

Describe and interpret different data sets in context (ACMSP120)
Elaboration
- using and comparing data representations for different data sets to help decision making

Multiplication Methods: Italian Lattice

Using the Italian lattice method to solve multiplication problems is a lot of fun and easy too! This method of multiplication uses boxes with diagonal lines. You can use it to solve multiplication problems that use large numbers. All you need to do is use basic times tables and add one-digit numbers together. Here is an example:

563 x 24

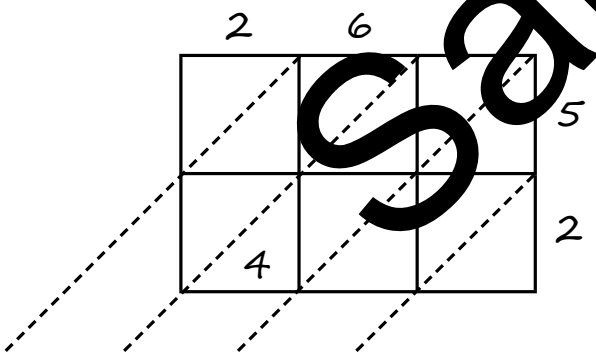


First do 5 x 2. Write your answer in the first square either side of the dotted diagonal line.

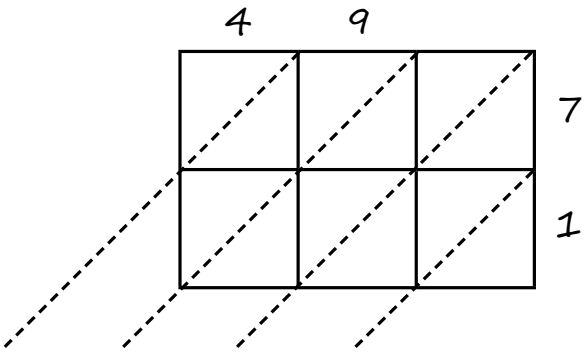
Then, keep multiplying. For example, work out: 6 x 2, 3 x 2, 5 x 4, 6 x 4, 3 x 4. Then add the numbers in each diagonal line. Start from the bottom right hand corner. You may need to carry numbers. The answer is 13512.

Use the Italian lattice method to work out these multiplication questions. Look at the example above to help you.

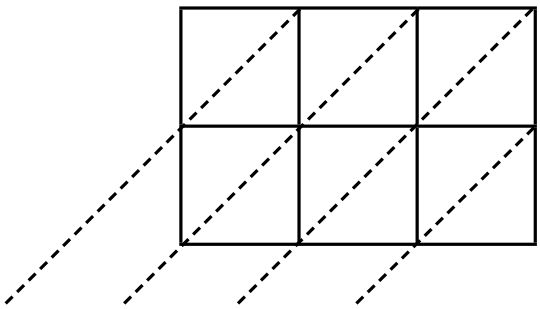
1. 26 x 52



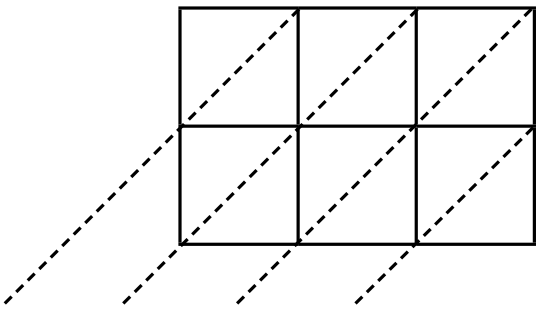
2. 49 x 71



3. 37 x 19



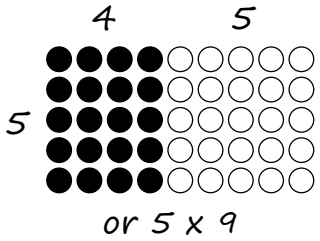
4. 866 x 22



Curriculum Link: Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA098). Elaboration: Exploring techniques for multiplication such as the area model, the Italian lattice method or the partitioning of numbers.

Understanding The Distributive Law

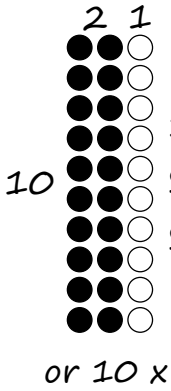
The distributive law in multiplication tells us that the answer we get when we multiply a group of numbers that have been added together is the same as multiplying each number separately and then adding these results together. This might sound confusing but it's really quite simple if you look at these examples.



5 x 9 = 45

So 5 x (4 + 5) = 45

So (5 x 4) + (5 x 5) = 45



10 x 3 = 30

So 10 x (2 + 1) = 30

So (10 x 2) + (10 x 1) = 30

1. Fill in the missing numbers to show the distributive law.

a. 3 x 7 = __

So 3 x (3 + __) = 21

So (3 x __) + (3 x __) = __

b. 11 x 8 = __

So __ x (5 + __) = 88

So (__ x __) + (__ x __) = __

c. 12 x 5 = __

So __ x (__ + __) = __

So (__ x __) + (__ x __) = __

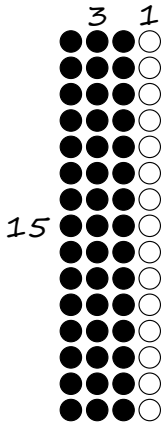
d. 20 x 9 = __

So __ x (__ + __) = __

So (__ x __) + (__ x __) = __

2. Use the given arrays to show the distributive law for each set of numbers below.

a. 15 x 4

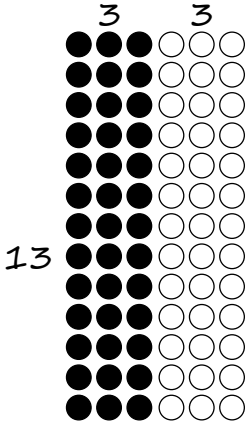


__ x __ = __

So __ x (__ + __) = __

So (__ x __) + (__ x __) = __

b. 13 x 6

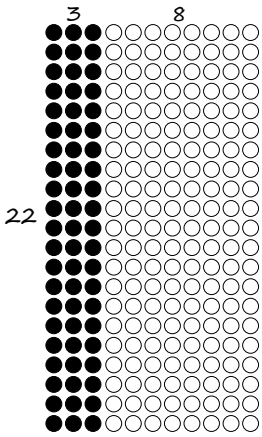


__ x __ = __

So __ x (__ + __) = __

So (__ x __) + (__ x __) = __

c. 22 x11



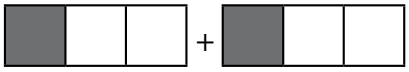
__ x __ = __

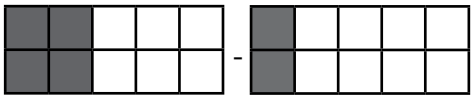
So __ x (__ + __) = __

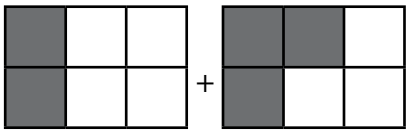
So (__ x __) + (__ x __) = __

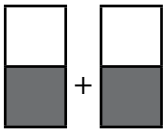
Adding And Subtracting Fractions – 2

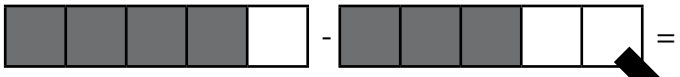
1. Solve each problem below.

a. 

b. 

c. 

d. 

e. 

2. Shade each diagram to show the fraction indicated, then complete the sum.

a. 1/4 + 2/4		=
b. 3/9 + 3/9		=
c. 2/10 + 6/10		=
d. 10/12 – 5/12		=
e. 7/8 – 1/8		=
f. 3/4 – 2/4		=
g. 4/5 – 3/5		=

Curriculum Link: Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103).
Elaboration: Modelling and solving addition and subtraction problems involving fractions by using jumps on a number line, or making diagrams of fractions as parts of shapes.

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Understanding GST

In Australia, tax is added to particular goods and services. This is known as GST (Goods and Services Tax). A tax of 10% is added on to the price of goods and a tax of 10% is added to the price of a service.

For example, if a tailor charges a customer $250 for mending a jacket, he/she will add 10% GST ($25), making the total cost $275.

1. Complete these receipts (for goods) by adding GST, and totalling the receipt.

TOY SHOP RECEIPT

Teddy bear	$30
Science kit	$50
Train set	$110
Jigsaw puzzle	$20
GST	_____
Total including GST	_____

STATIONERY SUPPLIES RECEIPT

Copying paper	$12
Packet of pens	$5.50
Folders	$11.50
Stapler	$3.00
GST	_____
Total including GST	_____

2. Calculate the GST for these services. Write the new total cost for each service. You may need to use some scrap paper to do your calculations.

Service	Price	Added GST	Total
Guitar lessons	$310		
Editing services	$565		
Tiling	$1050		
Carpentry	$975		
Plumbing	$65[illegible]		
Window washing	$125		
Roof maintenance	$870		

3. A gardener completes some work on a large property and hands the owner the receipt (right). He says that the GST on his services is $54. Is he correct? If not, what should he be charging? Show your calculations.

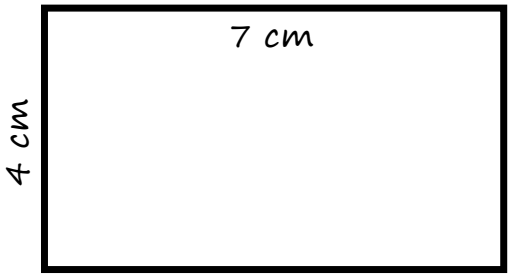
GARDENING RECEIPT

Cleaning gutters	$150
Mowing lawn	$81
Planting vegetables	$99
Weeding garden	$190

Perimeter Of Rectangles

We can calculate the perimeter of a rectangle (the distance around it) by adding together the length of its sides. For the rectangle below, we would do the following sum:

7cm + 4cm + 7cm + 4cm = 22cm



We can also use doubling to make this calculation more efficient. In other words, we can:

- Add the length and width together and double the result (i.e. 7cm + 4 cm = 11 cm; double 11 cm = 22 cm).
- Double the length and width and add these together (i.e. double 7 cm = 14cm; double 4cm = 8 cm. 14cm + 8 cm = 22cm).

Use one or all of the above methods to work out the perimeter problems below.

Imagine that Amy wants to decorate plain diaries to sell at a school fete. There are five different diary sizes. She decides to border each diary cover with ribbon. To do this, she needs to know the perimeter of each cover. How much ribbon does she need? Show your working out for each perimeter calculation.

Diary Design	Perimeter	Working Out	How much ribbon?
1	length 22 cm x width 12 cm		
2	length 10 cm x width 11 cm		
3	length 7 cm x width 6 cm		
4	length 15 cm x width 9 cm		
5	length 17 cm x width 12 cm		

If the ribbon costs $1.00 per metre, how much does Amy need to spend on ribbon? Write your calculation below.

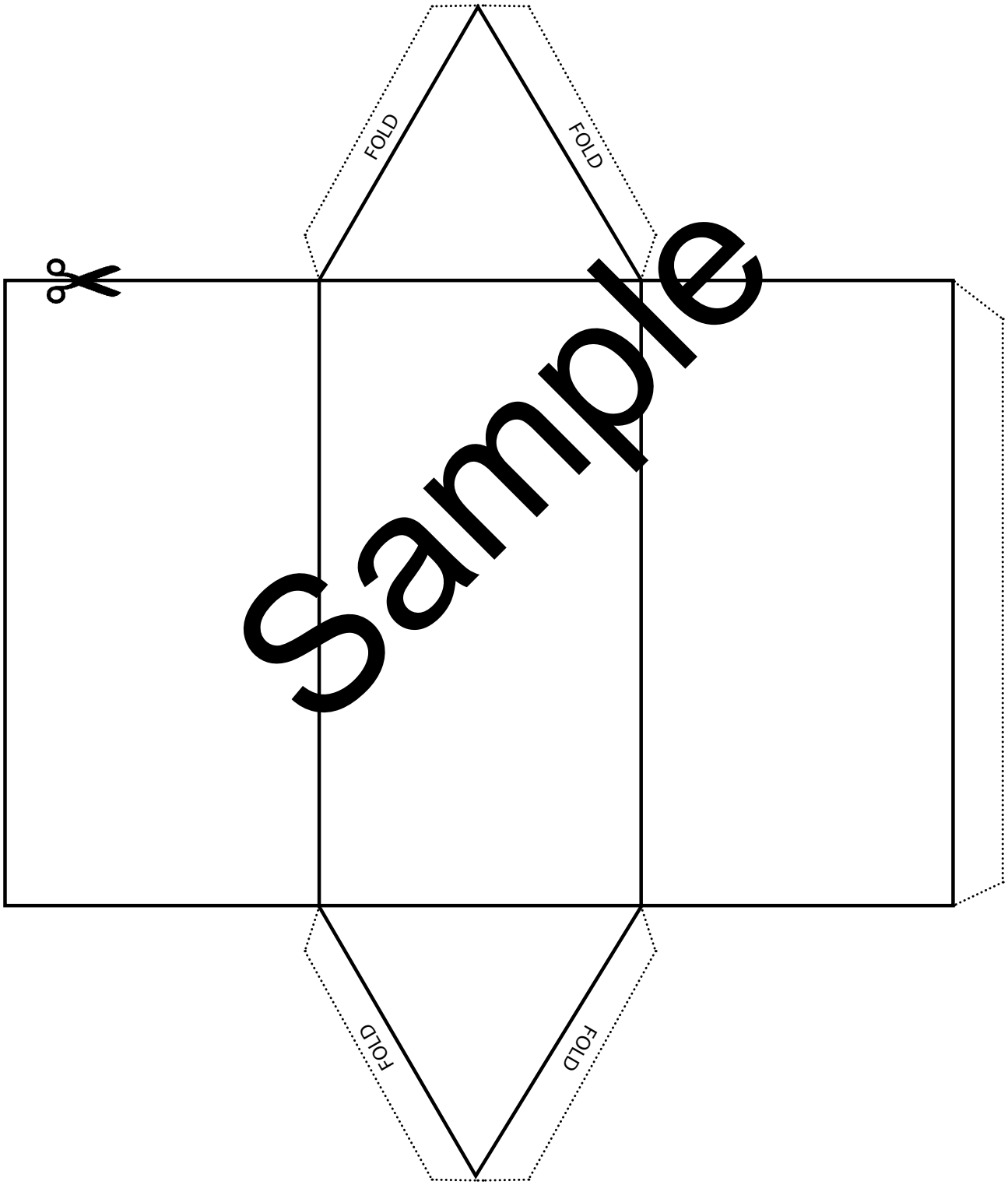
_____

Investigating Nets – 2

A net is a 2D pattern. If we fold up a net, it makes a 3D shape. There is more than one net possible for each 3D shape.

Cut out and construct the net below, then label it using one of the following:

cube **triangular prism** **rectangular prism**

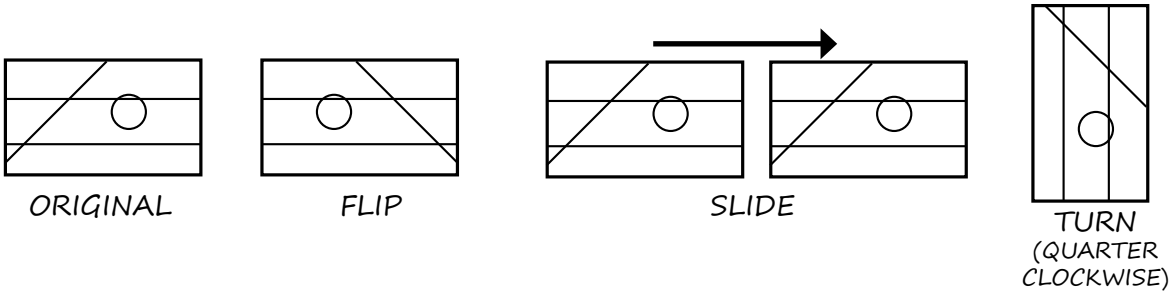


Curriculum Link: Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111).
Elaboration: Identifying the shape and relative position of each face of a solid to determine the net of the solid, including that of prisms and pyramids.

Ready-Ed Publications

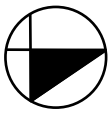
Flip, Slide And Turn

When a 2D shape is moved to another position, we call the change a transformation. A transformation can be a flip, slide or turn. Look at how the 2D shape below has been transformed.

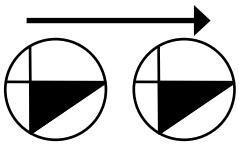


Answer the questions about transformation.

1. Write how the original shape has been moved.


original

a.  _____

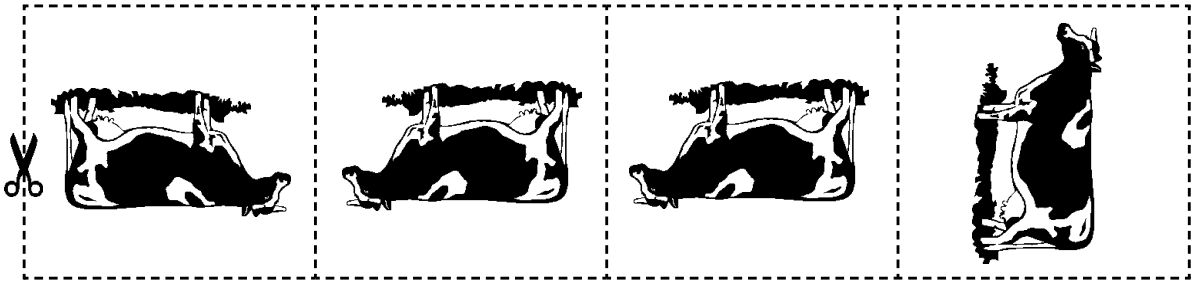
b.  _____

c.  _____

2. Flip, slide and turn the cow on the right according to the instructions below. Cut and paste the answers at the bottom of this page into the correct boxes.


ORIGINAL

FLIP DOWN	FLIP UP	1/4 CLOCKWISE TURN	1/2 CLOCKWISE TURN



Curriculum Link: Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114).
Elaboration: Identifying the effects of transformations by manually flipping, sliding and turning two-dimensional shapes and by using digital technologies.

Games Of Chance – 3

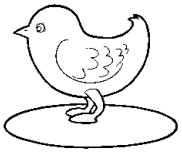
Imagine that you visit a fête. You stop at a stall where you can play a game involving a jar of small toys. The stallholder says:

"Would you like to play this game? It costs $5 to play. Close your eyes and put your hand in the jar. If you get a bird, you win nothing. If you get a cat, you win $1. If you get a mouse, you win $5. If you get a dog, you win $10. If you get a horse, you win $50! There are 24 toys in the jar. 12 are birds, 6 are cats, 3 are mice, 2 are dogs and 1 is a horse. Can't be fairer than that!"

Before you decide whether to play, you work out the chance of choosing each type of toy.

1. What is the chance (for example, 1 in 4) that you will pick each of the toys below?

Chance:

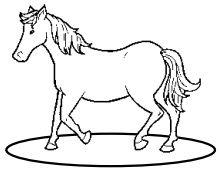


Chance:

Chance:

Chance:

Chance:



2. If you play, which toy are you most likely to pick? _____

3. If you play, which toy are you least likely to pick? _____

4. If you play are you more or less likely to make some money? (Remember that the game costs $5 to play.)

_____

_____

5. How could this game be made fairer?

_____

_____

Curriculum Link: List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116).
Elaboration: Commenting on the likelihood of winning simple games of chance by considering the number of possible outcomes and the consequent chance of winning in simple games of chance such as jan-ken-pon (rock-paper-scissors).