

ACTIVITY EXAMPLE



Matamata
College

KEY WORDS

Numeracy | algebra | decimals | ratios | numbers | valuations | calculations | pricing | measurement | volume | mass | density | time | width | length | depth | area | logistics

ALSO USEFUL FOR

Business studies | Economics | Agriculture | Agribusiness | Science | Digital Technology

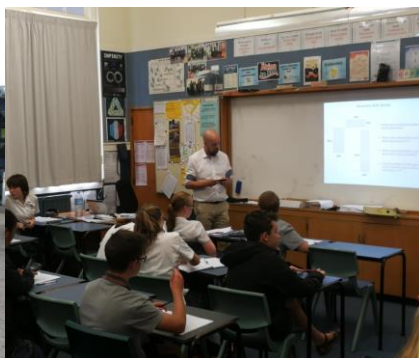
PROGRAMME OUTLINE

3 POINTS OF CONTACT

- J Swap staff come into classroom (x2)
- Workplace visit (x1)

EXAMPLE

1. J Swap come into classroom, introduce themselves, background to the business, their careers and how maths is used in the industry.
Student Activity: Stock food mixes
2. Workplace visit includes tour of the business, meeting staff and hearing about different careers. Seeing the wider business 'behind the scenes'.
3. J Swap returns to the classroom. **Student Activity:** Transport



ACTIVITY EXAMPLE

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Stockfood Mixes



Farmers ask us to mix multiple stock food products together for their cows because each product has different nutrients and the cows need different food depending on the time of the year.

They ask for recipes such as 80% Palm Kernel and 20% Dried Distiller Grains.

$$m = p + d$$

m = mass of load (tonnes)

p = mass of Palm Kernel (tonnes)

d = mass of Dried Distiller Grains (tonnes)

If we delivered a load of 15 tonnes which had 3 tonnes of Dried Distiller Grains how much Palm Kernel was that?

ACTIVITY EXAMPLE

Stockfood Mixes II

Our farmer wants stockfood made of 80% Palm Kernel and 20% Dried Distiller Grains.

$$p = .8m$$

m = mass of load (tonnes)

p = mass of Palm Kernel (tonnes)

Our loader has made a pile of 10 tonnes of Palm Kernel. How heavy will the full load be?

$$d = .2m$$

m = mass of load (tonnes)

d = mass of Dried Distiller Grains (tonnes)

20% of the full load is Dried Distiller Grains. How much DDG should we add to the pile?

ACTIVITY EXAMPLE

Stockfood Mixes III

Another farmer wants 80% Palm Kernel, 10% Tapioca and 10% Dried Distiller Grains.

$$m=p+t+d$$

$$p = .8m$$

$$t = .1m$$

$$d=.1m$$

m = mass of load (tonnes)

p = mass of Palm Kernel (tonnes)

t = mass of Tapioca (tonnes)

d = mass of Dried Distiller Grains (tonnes)

If we delivered a load with 12 tonnes of Palm Kernel to a farmer how much Tapioca was in the same load?

If we want a 20 tonne load how much Palm Kernel, Tapioca and Dried Distiller Grains do we need to make the correct mix?

ACTIVITY EXAMPLE

Transport Weight



$$\rho = \frac{m}{V}$$

ρ = density
 m = mass (tonnes)
 V = volume (m^3)

Our bulk tipper trucks are a truck and trailer unit.
The truck can carry $18m^3$ and the trailer $32m^3$.

Material densities:

Palm Kernel = 0.75
Water = 1.00
GAP40 = 1.60

How heavy is a full load of Palm Kernel?

The maximum weight we can carry is 30 tonnes. Can we carry a full load of GAP40 (aggregate)?

J.Swap
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Palm Kernel Processing

Our Palm Kernel Screener produces 900 tonnes of processed Palm Kernel each day.

$$m=rd$$

m = mass produced (tonnes)
 r = production rate
 d = number of days operating

How many days would it take to produce 4,950 tonnes of Palm Kernel?

If the screener did 40 tonnes in 1 hour what is it's new production rate? What is the general formula for this?

$$d=24h$$



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ACTIVITY EXAMPLE

Unloading Ships



Our Palm Kernel arrives on a ship in Mount Maunganui. There is 27,000 tonnes of Palm Kernel on board.

$$m = tqrn$$

- m = mass in ship (tonnes)
- t = time unloading (hours)
- q = mass in each load (tonnes)
- r = loads a truck can do in an hour
- n = number of trucks unloading

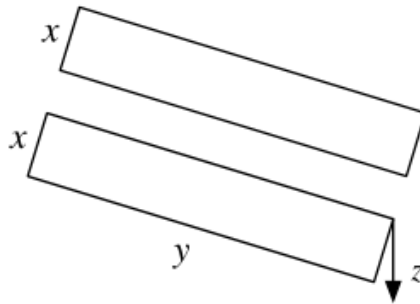
Rearrange for t. We want to know how long it's going to take to unload.

Our trucks can take 30 tonnes in each load and each load takes 20 minutes. How long would it take one truck to unload the ship?

If we wanted to take less than one day to unload the ship how many trucks would we need?

ACTIVITY EXAMPLE

Workshop Pits



We are building a new workshop that will include two pits - holes in the ground that trucks can drive over so we can work under them.

$$V=2xyz$$

V = volume of pits
x = width of each pit
y = length of both pits
z = depth of both pits

If we dug 200m³ of earth out of the pits, and dug 5m deep and each pit was 2m wide how long were the pits?

What is the formula for the surface area of the pits?
Remember they are in the ground and have no top