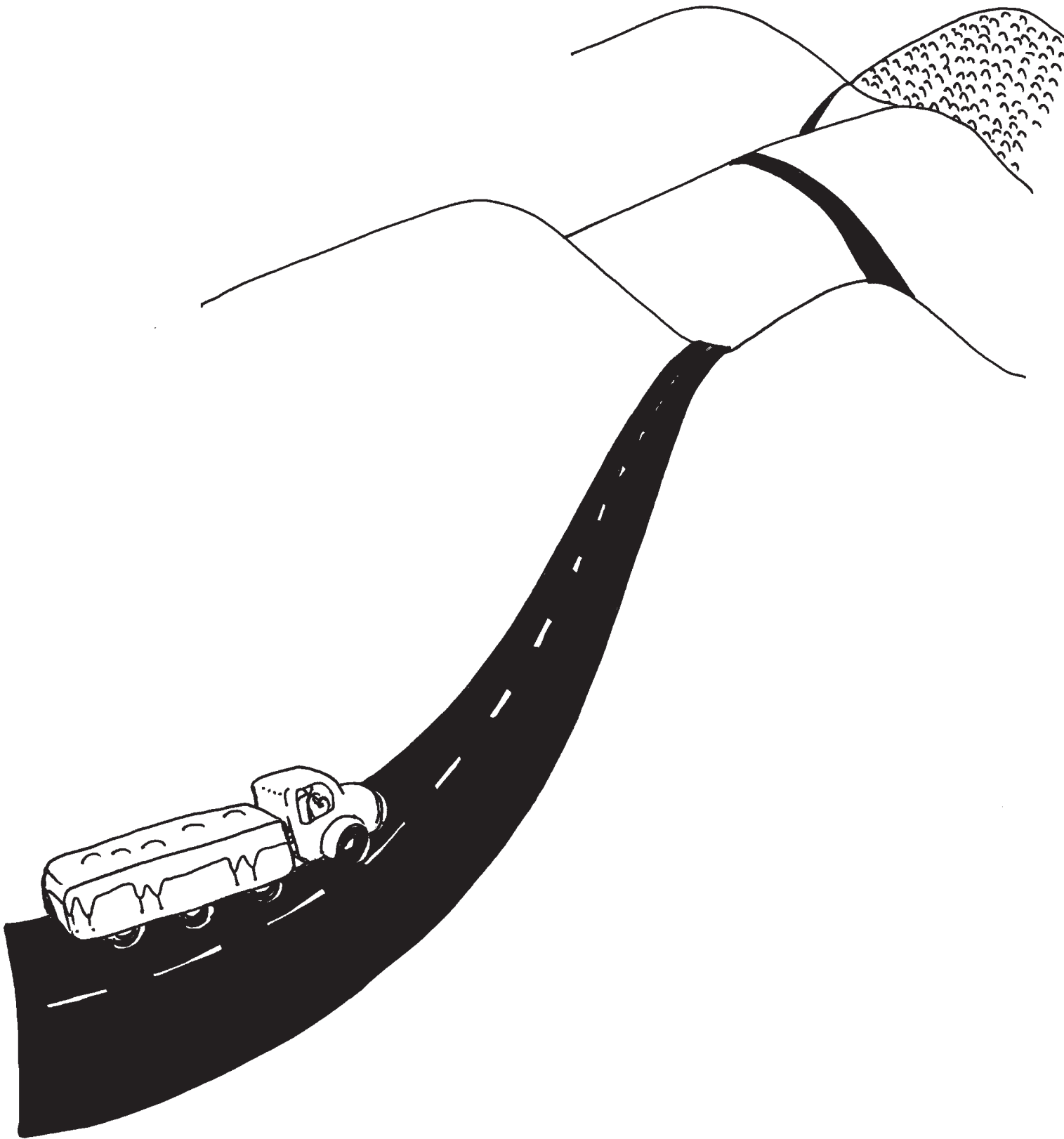




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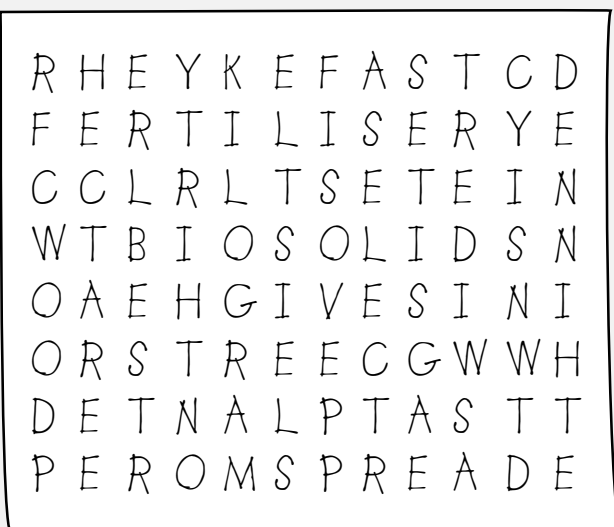
<http://www.dpi.nsw.gov.au/draft-forests/education/adventure/activity-book>



Poo Words

The 20 words below appear in the *Poo* adventure. Look for them on the site, then see if you can find them in the puzzle.

select best planted sites thinned test safe spread fertiliser thirty kilogram biosolids per hectare fast gives more wood wider tree



Mark off the poo words as you find them in either a vertical or horizontal direction, forwards or backwards. Circle the 14 remaining letters then copy them into the spaces below in order from left to right moving down the puzzle:

Using biosolids to increase wood production has another benefit to the community:

_____ /



Use the information in the *Poo* adventure to help you to match the time to the task.

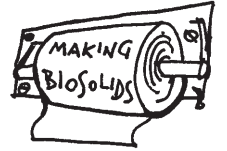
- | | |
|------------|---|
| 1) 12 | a) Pine plantations should grow for this many years, before thinning and biosolids are added. |
| 2) 15 - 20 | b) After spreading, any compost-like smell disappears in this number of weeks |
| 3) 2 - 6 | c) 30 kilograms of biosolid can be made from the poo of one person in this number of months. |



In the Picture

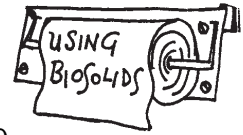
After finding out how biosolids were made, Serge and Kim looked at the 'Big Picture' and decided to draw the steps. Unfortunately, a gust of wind scattered the drawings. Serge and Kim now need help to find the correct order of the pages to make a poster.

Cut out the squares below then look at the 'Big Picture' in the 'Making Biosolids' option in the *Poo* adventure. Paste the squares in the correct order onto a sheet of paper, then colour in your picture showing how biosolids are made.




Using it

Serge and Kim learned on their *Wild Forest Adventure* that State Forests only use biosolids in suitable planted forests. They found this out by following the *Poo* sign along to 'using biosolids' and then stumbling upon the 'puzzling post'.



Serge and Kim enjoyed the challenge of the puzzling post so much that they copied down the pictures and verse to try on their friends. Use the website to check your answers.

Match the verse to the correct picture. Colour only the correct pictures.

When it's thinned,
You can see,
More Sun, more
Room
More Quality!

1 =

Come on now,
Use your head,
Which would you
use
To have biosolids
spread?

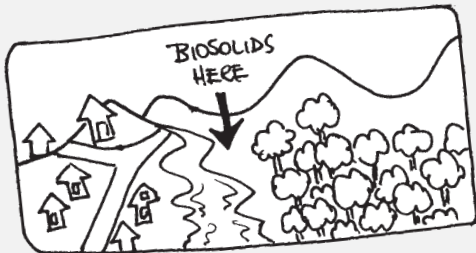
2 =

Biosolids have been
added
To which of these,
The trunks are
much wider....
There's more Wood
in these trees!

3 =

Biosolids aren't
used
Just anywhere,
The site is
selected
With considerable
care....

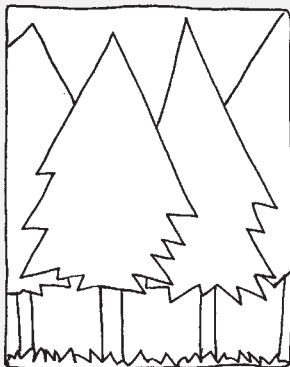
4 =



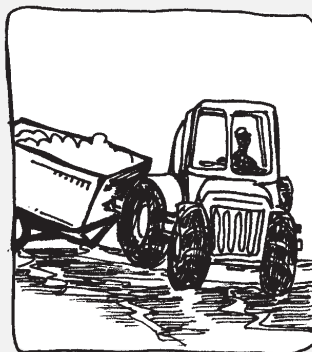
A



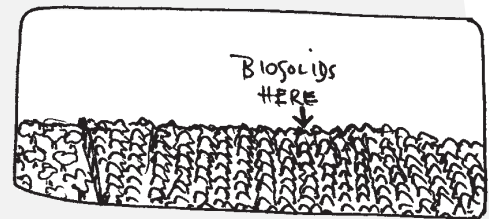
B



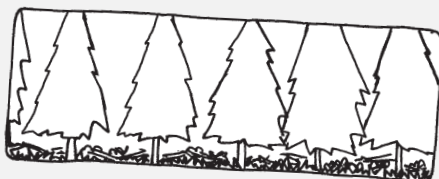
C



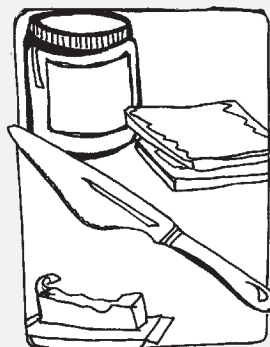
D



E



F



G

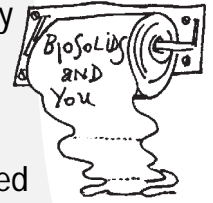


H



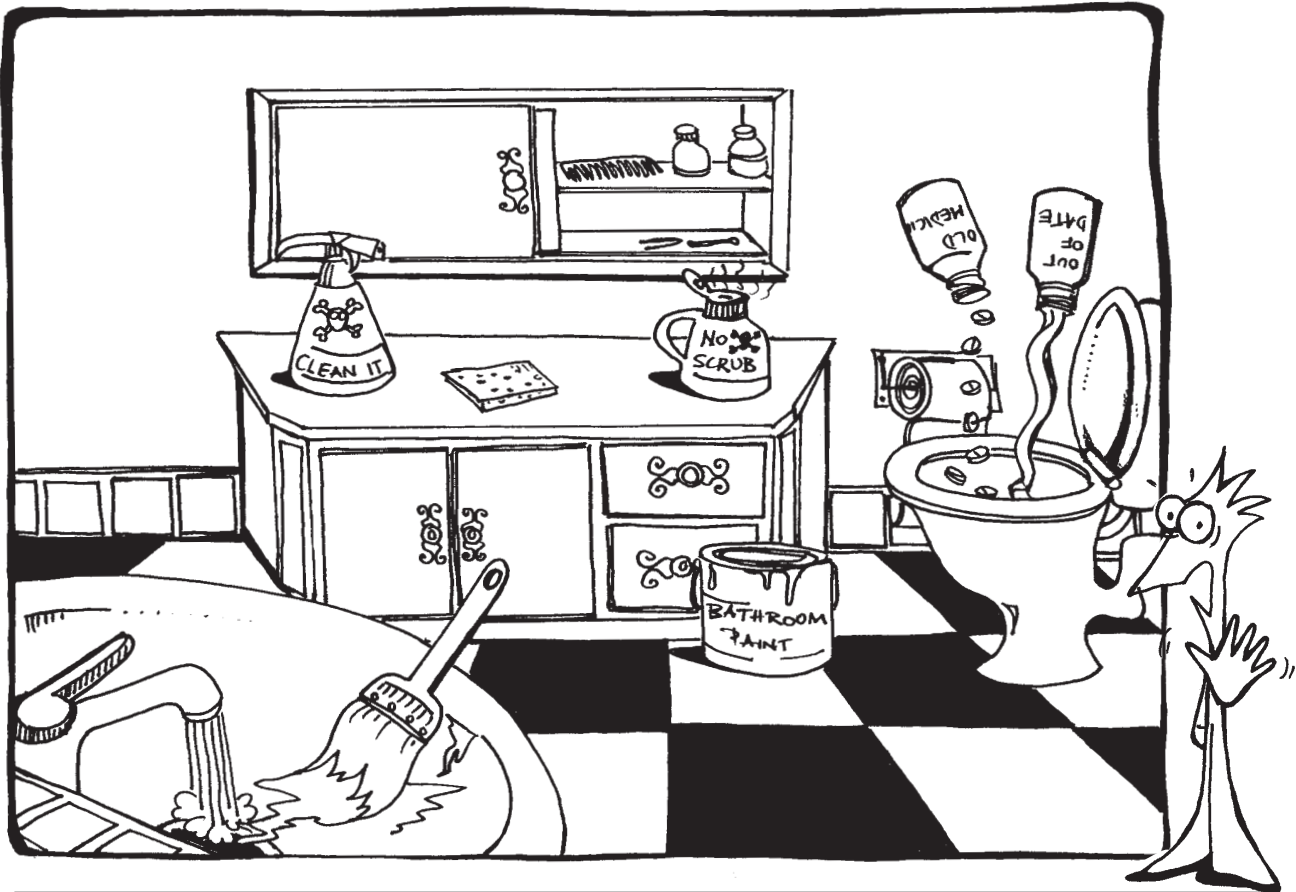
Stop the Waste

Even after careful processing, there are some biosolids which cannot be used. These are wasted, because people have polluted the sewerage in the sewage system. It may sound a little crazy that sewerage can be polluted. Unfortunately sewerage can be polluted and often is.



Solid pollutants are removed by the screens, however, chemicals are not removed by the simple settling, separating and spinning. If the levels of chemicals are too high in the biosolids then the whole pile is rejected and cannot be used as composted material on gardens or in forests. In the *Poo* adventure, choose 'biosolids and you' to find out more...

Kim has posed near this picture to show you some of the things that you should not do. List the mistakes can you see in the picture below:



Mistake	Use the website to find out what should have been done instead




Presenting the Poo




After visiting the *Poo* adventure, Serge and Kim wondered how much biosolids would be needed to fertilise all of State Forests' planted forests in NSW. They also wondered how many people are needed to make this much biosolids. Help them answer these and other interesting questions by completing the problems below:

1. If 30 tonnes of biosolids are needed to fertilise one hectare of forest, then how many tonnes are needed for 250,000 hectares of planted forests managed by State Forests in NSW? _____ tonnes.

2. Look up "making biosolids" on the website to find out how much biosolids an average person's poo can make each year = _____ kilograms.

 Stinker: Calculate how many people are needed to make 30 tonnes of biosolids. $1000\text{kg} = 1\text{ tonne}$


3. How many kilograms of biosolids could your household's poo make each year? _____ kilograms.

 Stinker: Calculate how much biosolids Australia's population could produce each year. Australia's population is about 19 million.

4. State Forests scientists have found that when biosolids are used the growth of a planted forest increases by 30%. Rewrite 30% in a different way.

5. A hectare is an area which fills a space 100 metres wide by 100 metres long. If Serge's step is exactly one metre, then it will take 100 steps to travel 100 metres. If Kim takes smaller steps of 50 cm then it takes 200 steps to travel 100 metres. Measure your step _____ cm. Is it closer to Serge's or Kim's?

Go to your nearest sports field and measure out one hectare square using your steps.

 Stinker: Calculate how many times your house, local swimming pool, or school fit into one hectare.

WARNING: Look out for the stinkers!

Present your answers as a poster so others can learn these interesting facts about POO!



OTHER USEFUL REFERENCES

BIOSOLIDS

CSIRO Forestry and Forest Products Sustainable Use of Biosolids (Sewage Sludge) in Plantation Forests
<http://www.ffp.csiro.au/pff/biosolids>

Sydney Water
<http://www.sydneywater.com.au>

The Official Web Site of the Water Environment Federation (WEF)
<http://www.wef.org>

Wagga Wagga Effluent Plantation Project
<http://www.csiro.au>

Pennsylvania's Department of Environmental Protection - Biosolids Home Page
<http://www.dep.state.pa.us/dep/biosolids/biosolids.htm>

Department of the Environment and Heritage.
Environment Australia Online
<http://www.ea.gov.au>

WASTEWATER TREATMENT

Hunter Water Corporation
<http://www.hunterwater.com.au>

TREES FOR TIMBER

Australian Timber Information
<http://www.naturallyaust.com.au/timtext.html>

Timber Sawing
<http://www.anu.edu.au/Forestry/>

General Site for Timber Information
<http://www.timber.net.au>

State Forests of NSW
<http://www.forest.nsw.gov.au>

Forestry Australia
<http://www.nafi.com.au>

Additional Web References

Timber Building in Australia
<http://oak.arch.utas.edu.au>

Forest and Wood Products Research and Development Corporation
<http://www.fwprdc.org.au>

National Forests and Timber
<http://www.australiaforest.com>

Tasmanian Timber
<http://www.tastimber.tas.gov.au>

Queensland Timber Board
<http://www.qldtimber.com.au>

The Australian Woodworker
<http://www.skillspublish.com.au>

Agriculture, Forestry and Fisheries Australia
<http://www.ffa.gov.au>

The Institute of Foresters of Australia
<http://www.ifa.unimelb.edu.au>

Resource and Conservation Assessment Council
<http://www.racac.nsw.gov.au>

Australian Bureau of Agriculture and Resource Economics
<http://www.abareconomics.com>

Additional Non-Web Reference

Australian Timber Industry Directory - 2000
Colourscan, Newmarket QLD

FERAL ANIMALS

Wildlife Australia - Pest Animals
<http://www.environment.gov.au/biodiversity/>

Agriculture, Forestry and Fisheries Australia
<http://www.ffa.gov.au>



ANSWERS

Wood words

'Super models': these trees are called this because they are four of the most valuable trees in State forests of NSW for their timber and other uses. 1.b), 2.d), 3.a), 4.c)

Hardwoods

2. Pollen is released from the flower stamens, 3. Pollen attaches to the stigma, 5. The flower loses its stamens and a dry woody fruit forms, 6. When the seeds are mature the fruit opens and the tiny seeds are released, 7. The seeds which reach the soil and have adequate growing conditions germinate.

Softwoods

2. In Springtime, pollen is released from the scales on a male cone and blown onto a female cone, 3. The female cone remains tightly closed until the seeds are ready to be released, 4. The germinated seeds develop into seedlings. These are planted in rows, in selected areas of forest.

A budding career

S is for small tree or seedling; as they grow seedlings are helping the environment by taking carbon dioxide out of the atmosphere, D is for defective trees; they are used to produce paper, greenpower, and medium density fibreboard, H is for habitat; these trees are important as homes for birds and animals, and also as seed producers to grow more trees; P is for poles and posts; treated timber is poisonous, T is for timber; back sawing takes high quality timber from faulty logs, V is for veneer; a thin slice of wood that has been peeled off the tree, or "peeled like an orange".

The look of the grain is different for different types of timber and also looks different depending on the way the timber is cut. Coreboard is different from plywood because it has a solid timber core.

Career choice

Tree 1 - veneer, Tree 2 - sawlog, Tree 3 - pulpwood and woodchip

What machine is that?

Across - 2. forwarder, 3. cable, 5. bulldozer, 6. excavator
Down - 1. processor, 2. feller buncher, 4. skidder

Machine match

Feller buncher - chainsaw and tracks
Forwarder - grapple and rubber tyres
Cable logging equipment - winch
Bulldozer - blade, winch and tracks
Excavator - grapple and tracks

1. bulldozer, tracks, steep 2. branches, lengths

Planning with purpose

1) scribbly gum, bloodwood, 2) circle with dot; green circle with 'R'; dark green shading; black dotted line, 3) Jacks Ridge Road 4) 3000 metres, 5) wetlands

Find a feral

STOP FERAL INVASION

1.c), 2.d), 3.e), 4.b), 5.a)

Spot the difference

pig digging; rabbit tunnelling; pair of rabbits; fox attacking kangaroo; cat eating bird; goat damaging tree; soil damaged by hooves and digging; trees dying or dead; animal under log missing; echidna gone; bilby gone; other natives have left

Who am I?

1st verse - pig, 2nd verse - cat, 3rd verse - goat, 4th verse - fox, 5th verse - rabbit

How many?

1. Fox - 5, Rabbit - 200, Goat - 7, Cat - 10, Pig - 11
2. There are eight ways listed on the website,
3. a) 6 - 7, b) 72 - 84, a) cat, fox, b) 2, 5. a) rabbit, goat, b) 2

Super spy

Cat, fox, goat, rabbit, pig

Feral X word

Across - 1. introduced, 5. hunter, 6. program, 8. damage, 9. diet, 11. cunning, 13. destroy, 14. habitat, 15. vegetation, 16. feral

Down - 1. infest, 2. desex, 3. adaptation, 4. agriculture, 7. population, 10. predator, 12. native

Poo words

RECYCLING WASTE 1.c), 2.a), 3.b)

Get the message

1. 30kg of biosolids, 2. a factory that processes sewage, 3. a screen with small holes, 4. grease, oils and heavy waste, 5. water, 6. sunlight and air, 7. the better the quality, 8. scientist, 9. biosolids, 10. there is little or no bacteria, pesticides or metals. FERTILISER

Using it

1. F, 2. D, 3. H, 4. E

Stop the waste

1. Using the toilet as a rubbish bin - help by only putting your personal waste in the toilet and taking unused medicines to the pharmacy
2. Disposing of chemicals and paint down the sink - use your sink only for washing
3. Nasty cleaning products - use environmentally friendly products in your home

Presenting the poo

1. $30 \times 250,000 = 7,500,000$ tonnes,
2. 30 kilograms, $30,000$ divided by $30 = 1000$ people
3. $19,000,000 \times 30 \text{ kg} = 570,000,000$
4. $30/100$ or 30 hundredths or 0.30

