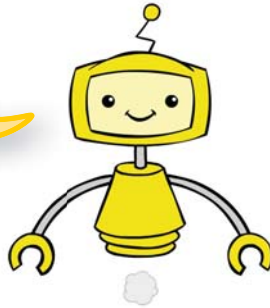


A lightbulb moment

Peter, Anna, what are you doing? Do you have a maths assignment? Pardon, what kind of question is that? What do you mean, what's my ecological footprint? I didn't even know I had a footprint. Oh, I have so much to learn. I don't even know what an ecological footprint is, let alone how to work out mine. Peter, where do I start? Will I need a calculator?



LINKS TO:

Stage 2, Module 13
Learning Object 3: Calculate your ecological footprint

PRIOR LEARNING:

Stage 1

Module 2 Work Sheet 3: *Number puzzles*
Module 5 Work Sheet 8: *Expressing time*
Module 5 Work Sheet 10: *100s, 1000s, 10,000s*



Get to the point

1

In Stage 1, Module 5, Work Sheet 10, *100s, 1000s, 10,000s* you learnt that when writing large numbers in Indonesian the thousands and millions are usually followed by a decimal point.

➔ For example:

5.000	five thousand (5000)
10.000	ten thousand (10,000)
100.000	one hundred thousand (100,000)
1.000.000	one million (1,000,000)

For decimal numbers, where Australians would use a decimal point, Indonesians use a *koma* (comma), which is enunciated in the same way as 'point' is in English when expressing decimals verbally.

➔ For example:

nol koma tujuh lima (0,75) zero point seven five (0.75)

To express a decimal as a percentage in Indonesian use the word *persen*.

➔ For example:

75 persen (75%) 75 per cent (75%)

A fraction of ...

2

In Stage 1, Module 5, Work Sheet 8, *Expressing time*, you were introduced to the word *setengah*, which means 'half'.

➔ For example:

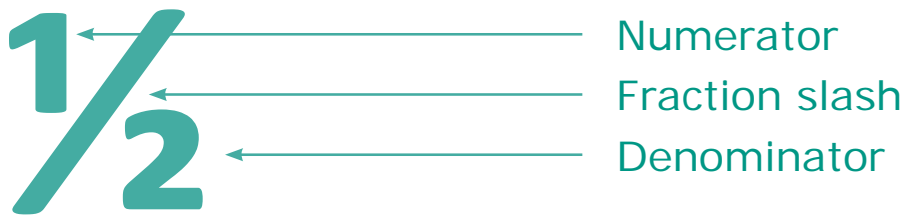
satu setengah jam one-and-a-half hours
tur setengah hari a half-day tour

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2

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Let's start by looking at the component parts of a fraction:



When expressing fractions verbally in Indonesian, the fraction *setengah*, 'a half', is irregular. All other fractions are expressed as: numerator + **per** + denominator.

➔ For example:

<i>Tigaperempat</i>	three-quarters (3/4)
<i>Limaperdelapan</i>	five-eighths (5/8)
<i>Tujuhperenambelas</i>	seven-sixteenths (7/16)

Note that any fraction where the numerator is '1' uses the prefix **se~** instead of *satu*.

➔ For example:

<i>seperempat</i>	one quarter (1/4)
<i>seperenampuluhempat</i>	one sixty-fourth (1/64)

In Indonesia, power is measured with the unit kilowatt jam, meaning 'kilowatt hour'. Note, however, that the symbol used is the same as the English, kW-h. Kilowatt jam (kW-h) is the product of power in kilowatts and time in hours.

➔ For example:

The energy used by a heater rated at 1000 watts (or 1 kilowatt) in one hour is 1 kilowatt × 1 hour, or 1 kW-h.

The energy used by a light bulb rated at 60 watts (or 0.06 kilowatts) in 7 hours is 0.06 kilowatts × 7 hours = 0.42 kW-h.

3

Exercises

Exercise 1



Zak, relax. Let me explain. An ecological footprint is a measure of how fast we consume resources and generate waste, compared to how fast nature can absorb our waste and generate new resources.



Slow down Peter! I've still got my ecological training wheels on. I need more time to think about all the resources I use every day.

1.1 The three pairs of footprints each represent the three areas that contribute to our ecological footprint. Help Zak sort out the activities.

Write each activity, or item, in the space provided, below the most appropriate pair of footprints.

kantong plastik

lemari es

naik bis atau kereta api

menggosok gigi

pakaian bekas

menggunakan komputer

botol

koran

lampu

menanam bahan makanan

televisi

mencuci piring

mencuci pakaian

kotak kardus

pendingin udara (AC)

kemasan

mencuci rambut

sisa makanan

mengisi kolam renang

pengering rambut

naik mobil pribadi



Energi



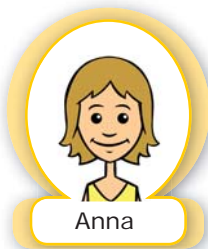
Air



Limbah

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1.2



Anna

Right, let's move on. How large is your ecological footprint? Let's take the Energy Survey to discover the answer.

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Look at the table, then tick the box that corresponds with the answer that is most appropriate for you.

Kegiatan	Tidak pernah	Jarang	Kadang-kadang	Sering	Selalu
Saya mematikan lampu bila keluar dari kamar.					
Saya berjalan kaki ke sekolah.					
Saya mematikan komputer di soket listrik setelah selesai menggunakannya.					
Saya mematikan televisi di soket listrik bila tidak ditonton.					
Bila kedinginan, saya memakai baju hangat daripada menyalakan pemanas.					
Saya mandi dengan pancuran selama lima menit.					
Saya mematikan keran air bila menggosok gigi.					
Saya membuang kertas dan plastik di tempat sampah daur ulang.					
Saya membeli pakaian bekas.					

1.3 Answer the following questions in English.

1.3.1 Based on your answers from the energy survey, how would you describe your ecological footprint?

1.3.2 How could you reduce your ecological footprint?

Exercise 2

2.1 Have you ever thought about how much water you use every day?

Let's fill in the Water Audit. It will show you how much water, including how often and for how long, you use in a day. (For the purposes of this exercise, assume you have a front-loading washing machine.)



Zak, did you know that Australia is one of the driest continents on Earth? And, as we discovered earlier, water is an important resource that we consume each day. Anna and I are really committed to reducing our water use, because when we reduce our water consumption, we reduce our ecological footprint.

Formulir Audit Pemakaian Air

Nama: _____

Tanggal: _____

Kegiatan	Frekuensi	Air Yang Dipakai	Jumlah Total Air Yang Dipakai
Contoh: menggunakan mesin cuci piring	sekali cuci	18 liter	18 liter
mengisi bak rendam		80 liter	
mandi dengan pancuran		10 liter per menit	
menggosok gigi		2 liter	
menggunakan mesin cuci pakaian		56 liter	
mencuci mobil menggunakan air dalam ember		80 liter	
menyiram kebun menggunakan selang		10 liter per menit	
JUMLAH TOTAL AIR YANG DIPAKAI			

2.2 Answer the following questions in English.

2.2.1 Based on your answers from the *Formulir Audit Pemakaian Air*, how would you describe your water usage each day?

2.2.2 How could you reduce your water usage?

Exercise 3



Zak, lowering our electricity usage will also reduce our ecological footprint. Electrical appliances use energy in the form of watts. Did you know that 1000 watts = 1 kilowatt? That's important to know so you can work out the following problems. Zak are you up for this mathematical challenge?

Help Zak work out the following problems:

Membiarkan televisi Anda dalam keadaan 'standby' menggunakan energi 5 watt per jam.

3.1 Berapa banyak watt energi akan digunakan selama:

3.1.1 Enam jam?

3.1.2 Sehari?

3.1.3 Tujuh puluh dua jam?

3.1.4 Seminggu?

3.1.5 Sebulan?

3.2 Bohlam yang berkekuatan 60 watt setara dengan berapa banyak kilowatt jam?

3.3 Kalau bohlam yang berkekuatan 75 watt dibiarkan menyala sehari penuh, berapa banyak kilowatt jam akan digunakannya?

3.4 Berapa banyak kilowatt jam akan digunakan apabila bohlam yang berkekuatan 75 watt dibiarkan menyala selama tujuh hari?

3.5 Di rumah Anda ada delapan buah bohlam yang berkekuatan 75 watt. Kalau semuanya dibiarkan menyala selama enam jam, berapa banyak kilowatt jam yang akan digunakan?

3.6 Rumah rata-rata mempunyai 20 buah bohlam yang masing-masing berkekuatan 60 watt. Apabila semua lampu itu dinyalakan selama tujuh jam sehari, berapa banyak kilowatt jam yang digunakan?

3.7 Ketel penuh membutuhkan tiga menit untuk mendidih. Jika Anda mengisi ketel cukup untuk secangkir air saja, ketel membutuhkan waktu 30 detik untuk mendidih. Berapa bagian dari tiga menit yang digunakan ketel kalau diisi hanya untuk satu cangkir?

Exercise 4



Zak have you heard about Earth Hour? The idea started in Sydney in 2007. People and businesses were asked to turn off their lights and other electrical appliances for one hour.

Help Zak use the information to calculate the answers to the following questions. Answer in English.

4.1 Menurut sensus tahun 2006, jumlah penduduk Sydney 4,1 juta orang. Pada tanggal 31 Maret 2007, 2,2 juta penduduk dan usaha di Sydney berperanserta dalam 'Earth Hour'.

Kira-kira berapa bagian dari penduduk Sydney yang berperanserta dalam Earth hour tahun 2007 itu?

4.2 Lihat tabel di bawah ini.

Earth Hour di Brisbane: Berkurangnya pemakaian energi pada tahun 2008–2010

Tahun	2008	2009	2010
Waktu	20.00–21.00	20.30–21.30	20.30–21.30
Brisbane	berkurang sebanyak 12,4%*	berkurang sebanyak 8%*	berkurang sebanyak 2%*

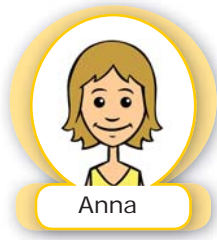
* Dibandingkan dengan tingkat pemakaian energi pada hari dan waktu yang sama pada tahun 2007.

4.2.1 Which year had the largest decrease in electricity use in Brisbane during Earth Hour?

4.2.2 Which year had the smallest decrease in electricity use in Brisbane during Earth Hour?

4.2.3 Looking at your answer to Exercise 4.2.2, why do you think that year had the smallest decrease in electricity use?

Exercise 5



Zak, as Peter told you earlier, we are both going to try to save water where we can. Did you know, we recently found a couple of leaking taps and were amazed to learn how much water we were wasting each day!

Here are some more mathematical problems to solve. Help Zak work out the following problems:

5.1 Fakta: Keran yang bocor membuang sebanyak 30 liter air setiap hari.

Berapa banyak air yang terbuang dalam:

5.1.1 Satu jam?

5.1.2 Empat puluh delapan jam?

5.1.3 Satu minggu?

5.1.4 Satu bulan (30 hari)?

5.1.5 Satu tahun (365 hari)?

5.2

5.2.1 Keluarga saya menggunakan sebanyak 450 liter air secara keseluruhan hari ini. Ada keran yang bocor di rumah kami. Berapa bagian dari penggunaan air kami hari ini disebabkan oleh keran yang bocor itu?

5.2.2 Keluarga saya menggunakan sebanyak 3780 liter air secara keseluruhan minggu ini. Ada dua keran yang bocor di rumah kami. Berapa bagian dari penggunaan air kami minggu ini disebabkan oleh keran yang bocor itu?

5.2.3 Keluarga saya menggunakan sebanyak 7840 liter air secara keseluruhan bulan ini. Ada tiga keran yang bocor di rumah kami. Kira-kira berapa bagian dari penggunaan air kami bulan ini disebabkan oleh keran yang bocor itu?
