

Notes for parents (1).

The purpose of the activity is to help your student to:

- Interpret the information presented in graphs.
- Make statements about a problem using evidence from data displays.

Here is what to do:

Read through the activity page together with your student. Ask some questions to see if they can interpret the graphs. Clarify important features of each graph if needed.

For example, the methane emissions are measured using CO₂ equivalent kilo-tonnes (kt) emitted per year.

What does 'kilo' mean? (one thousand).

How heavy is one tonne? (1000 kilograms)

Focus on each graph individually before trying to synthesise the information.

What does this graph show?

The first line graph shows the emissions due to cattle increasing from about 12 000 kt per year to nearly 19 000 kt in the period 1990-2015. In the same period the emissions due to sheep dropped by over 6 000 kt per year. Encourage your student to express these changes as percentages (58% increase for cows, 56% decrease for sheep).

The pie chart shows that nearly half (49.4%) of New Zealand's emissions of greenhouse gases are due to agriculture and the gas produced is methane. Other large contributors to emissions are Energy and Transport. Ask what might be included in energy, e.g. Use of natural gas, wood, or coal for heating and manufacture. Electricity generation makes up 8.1% of gas emissions.

The second line graph shows the number of livestock of each kind (cattle, sheep, deer). The number of sheep has more than halved between 1972 and 2015. The overall number of cattle has increased slightly but the proportion of those cattle that are dairy cattle has changed dramatically from about 50% dairy cows in 2003 to about two-thirds (67%) dairy cows in 2015.

The newspaper claims that the impact of emissions from dairy cows on global warming is minimal. Expect your student to take a position on this claim that is based on the data in the graphs. For example:



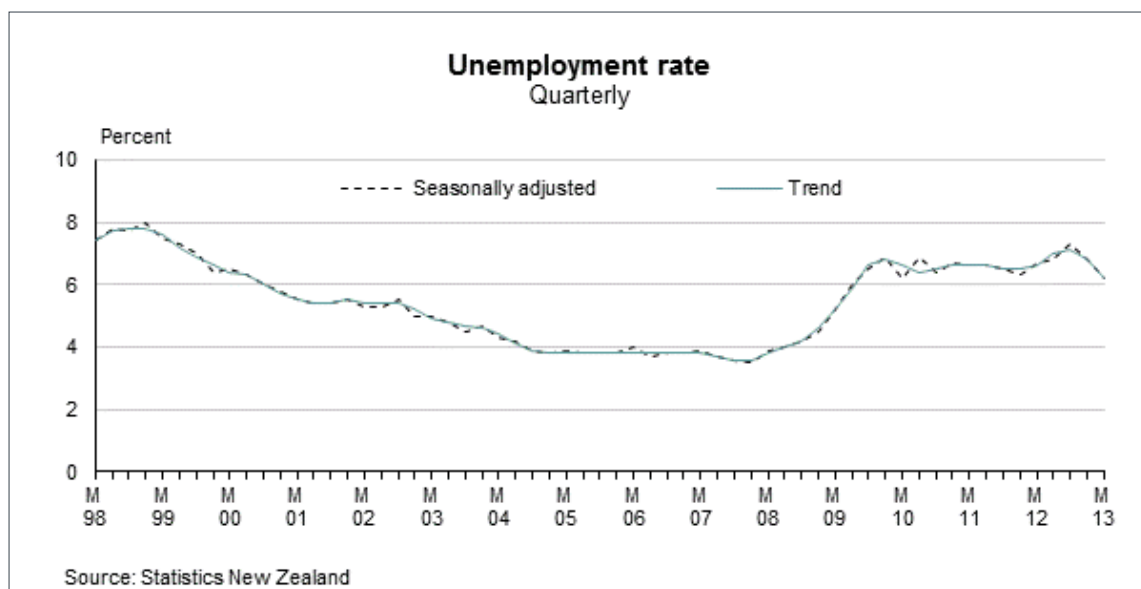
Notes for parents (2).

The newspaper is wrong. Having twice as many dairy cattle as in 1990 seems to have increased the emissions due to cattle, even though the number of cattle has not increased that much. Of New Zealand's total emission agriculture accounts for about 50% so the impact of dairy is considerable.

The newspaper is right. The first line graph shows that the methane emissions from cattle and sheep have stayed about the same from 1990 to 2015 at about 26 000 kt per year. The increase in dairy cattle numbers has been balanced by a decrease in sheep numbers. The result is about the same level of emissions as in 1990.

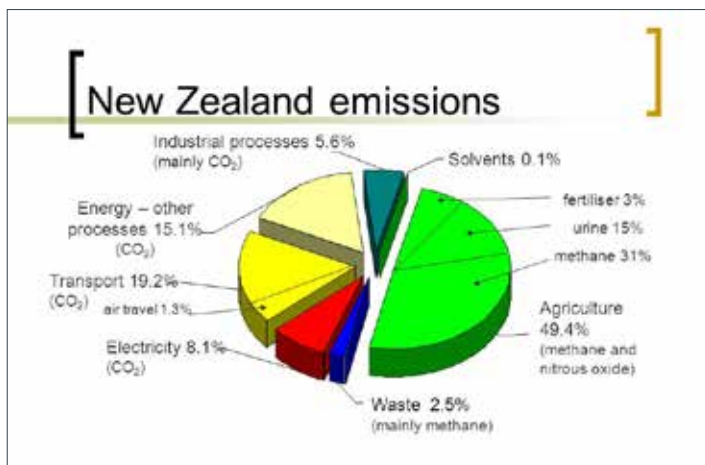
Points to note:

The graphs presented in this task show two different kinds of data, time series and category data. Time series data can be used to look for trends over time and is usually presented using line graphs with time as the independent variable. Trends show as patterns of rises, falls or stability in the measures of the dependent variable. For example, in this graph time is the independent variable and is represented on the horizontal axis. Unemployment rate, as a percentage of the total workforce, is the dependent variable and is represented on the vertical axis. The trend is that unemployment tracked downwards in the period 1998–2008 but rose again following the impact of the Global Financial Crisis in 2009–2013.



Notes for parents (3). Activity next page.

Category data is about the number of items in groups. The number of items in the pie chart are measured in kt of CO₂ emissions per year. Frequency is the term used for number of items. In the pie graph the emissions are distributed into the activity groups (categories) that create emissions. So, agriculture, energy, and transport are categories. Pie charts are good ways to show the categories as fractions of the total. Often percentages are used to represent those fractions. For example, electricity generation accounts for about 8% (8 hundredths) of New Zealand's total emission of greenhouse gases.



Methane is a greenhouse gas that causes global warming, along with other gases, particularly carbon-dioxide (CO₂). Here are three graphs used to support the newspaper headline, “Impact of cows on global warming just hot air.” Use the graphs to support or refute the newspaper’s claim.

