

nappies and the various options available. These sites may confuse students and if you use them you will need to explain that the American word for nappy is 'diaper'. If you type 'disposable diaper' or 'real diaper' into a search engine, many sites will be listed. Several have a political agenda and are very biased so warn students to think about this if you do ask them to search for further information on the internet. Many of the sites base their arguments on the idea that all chemicals are nasty and bad for the baby whilst conveniently ignoring all the chemicals that are used to produce a cotton nappy.

There are various websites offering information on disposable nappies. Pampers is one example of a well known brand that students may be familiar with:

<http://www.uk.pampers.com> – only limited information on what the nappies are made of is provided.

(All websites accessed December 2005)

Running the activity

Give each student a worksheet and a table to complete and each pair or group a thoroughly shuffled pack of information cards. The cards could be laminated to protect them and make them easier to reuse. Alternatively, they could be copied onto cardboard.

Much of the information on the cards is based on 1000 nappy changes. This is because it is hard to make direct comparisons between the two types of nappy without defining what is being compared in this way. Students may need to have this explained to them. In the case of disposables, '1000 nappy changes' refers to 1000 nappies; for reusables it refers to 1000 changes using a smaller number of nappies.

Students could work in groups to complete the table. If you have internet access then they can look up current prices. If internet access is difficult or time is limited you could provide them with the following information:

- On average, a disposable nappy costs 17.9p
- Babies require an average of six changes a day
- Over two years (average length of time a child is in nappies) the total cost of the disposable nappies required is about £700 based on the information above
- The total cost of 20 reusable nappies and waterproof pants is at least £60
- When washing costs are factored in, the cost of using reusables for two years is about £185
- The average price of a nappy laundering service is £8.50 per week.

These figures are based on 2004 prices and information taken from the Women's Environmental Network website.

Some basic questions are provided that could be used to help students make sense of what they have written in the table. The more able probably will not need them.

The leaflet can be marked on the quality of the science it contains, as well as on presentation and persuasiveness.

Answers

Factor	Disposable nappies	Reusable cotton nappies
What the nappy is made of	Plastic backing, hydrogels, paper	Cotton nappy with wool or plastic outer (Note: the outer has not been included in the figures below)
<i>Making the nappies</i>		
Mass of plastics used (kg)	15	0
Mass of paper used (kg)	108	0
Mass of cotton used (kg)	0	2.3
Energy used (kWh)	338	57
Water used which will be polluted afterwards (dm ³)	10500	1100
Are pesticides used?	no	yes - lots
Total raw materials used (kg)	123	2.25
<i>Using the nappies</i>		
How many times is the same nappy used?	1	167 (as 6 nappies used)
Energy used in laundry (kWh)	none	141
Mass of detergents used (kg)	0	32
Water used which will be polluted afterwards (dm ³)	1500	6200
<i>Disposing of the nappies</i>		
Mass of waste (kg)	221	30
Where solid body waste (faeces) ends up	In landfill sites	In the waste water supply with other toilet waste

Table 1 Data table on nappies – all data per 1000 nappy changes

1. Reusable nappies use less raw materials.
2. The reusables cause more water pollution – from pesticide use and from the laundry.
3. The reusables produce less solid waste.
4. This is a fairly subjective question – students are likely to answer that the reusable nappies cause less harm. This is probably true but the answer is not entirely clear-cut.
5. Many parents use disposables because they are so convenient. Also, parents are often unaware of the environmental problems such nappies cause.

Acknowledgements and references

This activity is based on the document:

C. Lehrburger, J. Mullen and C. V. Jones, *Diapers: Environmental Impacts and Lifecycle Analysis*, 1991.

This document is a report to:

National Association of Diaper Services
2017 Walnut Street
Philadelphia
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Subsequent to this activity being written, the UK Environment Agency commissioned an independent study to establish the true environmental impacts of disposable and reusable nappies. They concluded that there is little to choose between them. A summary of the findings (as well as the full life cycle assessment) is available at <http://www.environment-agency.gov.uk/yourenv/857406/1072214/> (accessed June 2006).

Nappy choice – information cards

A disposable nappy is used once and then thrown away. A reusable nappy is used on average 167 times.

Disposable nappy manufacturers tell parents to flush the faeces down the toilet but few of them do – it goes in the bin with the nappy. This means that viruses in the babies' poo (scientists think there are up to 300) end up in landfill sites. From there these viruses could possibly get into water supplies.

Most reusable nappies are made of cotton. A liner is often used with them and sometimes waterproof pants as well. The liners and pants can be made of a variety of materials, including wool or plastic.

For 1000 nappy changes, reusable nappies use 2.3 kg cotton but disposables do not use any

For 1000 nappy changes, disposable nappies use 108 kg paper but reusables do not use any.

For 1000 nappy changes, reusables consume 2.25 kg raw materials. Disposables use 123 kg.

Making enough reusable nappies for 1000 changes uses 57 kWh of electricity. Making enough disposables uses 338 kWh

In 1000 nappy changes, disposables produce 221 kg solid waste and reusables 30 kg.

For 1000 nappy changes, 32 kg detergent is needed to wash reusables. As disposables are not washed, they do not require any detergent to be used.

Disposable nappies are made with a plastic backing, a breathable inner and an absorbent core made out of a hydrogel and paper.

For 1000 nappy changes, disposables use 15 kg plastics while reusables use none. This does not include the packaging for the nappies.

No electricity is needed during the use of disposable nappies. For 1000 changes, 141 kWh is needed when reusable nappies are used. This electricity is used to power washing machines and driers.

A lot of pesticides are used to grow cotton. The exact amount varies. These pesticides often end up in lakes and rivers and can cause pollution. This is only a problem for nappies that contain cotton.

Solid waste from babies' poo ends up in the waste water supply when a reusable nappy is washed. This means that it is treated in the same way as adult solid waste and made harmless in a water treatment plant.

For 1000 changes, 1500 dm³ of water is needed during the use of disposable nappies. This water is used for flushing the toilet to get rid of solid waste. Reusables require 6200 dm³ of water to be used for washing the nappies.

Making disposable nappies takes 10 500 dm³ of water and making reusables takes 1100 dm³ per 1000 nappy changes.

Nappy choice and the environment

Some nappy facts:

- In the first two years of its life a baby can use 5500 nappies
- 8 million nappies are thrown away every day in the UK
- That means nearly 3 billion are thrown away every year
- 90% of these nappies end up in landfill sites where they will stay mainly unchanged
- It costs local authorities a lot of money each year to get rid of nappies (for example, Bristol City Council estimates it costs them about half a million pounds).

What options are available to people choosing nappies? What is the best solution for the environment?

Suppose you are the manager of 'The Green Nursery and Childcare Centre.' You have made a commitment to your customers that your nursery will be the most environmentally friendly one in the area. You have bought wooden toys, you have a large garden for the children to play in and you have good quality, wholesome food for them to eat.

Now you have to think about what type of nappies you will use for the children in your care. You want to use a good, reliable product (you do not want leaking nappies on all those babies!) but you also want to make sure it is good for the children and for the environment.

At the same time, you have to keep an eye on your profits. You need to find a solution that does not cost too much or you will not make any money.

There are two main options available to you:

- Disposable nappies
- Reusable cotton nappies.

If you use the reusable nappies you can either wash them yourself or get a nappy laundry service company to do it for you.

To decide which product is best for the environment you need to do a 'life cycle analysis.' The analysis involves looking at how the nappies are made, used and disposed of and considering how these processes affect the environment.

When you have decided which type of nappy to use, you will need to produce a leaflet to explain your choice to the parents of the children at your nursery.

Use the information cards to help you complete the data table and compare the two options. Most of the information on the cards is for 1000 nappy changes – this is not the same as 1000 nappies.

Find out about the costs associated with each type of nappy. For the reusable nappies, compare the cost of washing them at the nursery with using a nappy laundry service. If you decide you want to wash them yourself you will probably need to employ another member of staff at least part time to do the laundry.

Questions

1. Which of the nappy options uses less raw materials?

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2. Which causes more water pollution from pesticides and other pollution?

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3. Which produces a smaller amount of solid waste?

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4. Which do you think causes less harm to the environment?

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5. About 85% of parents in the UK use disposable nappies. Why do you think this percentage is so high?

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Do you need to know anything else before you make the decision about which sort of nappies to use? If so, try to find the information you need. When you have decided, make your leaflet for parents.

Nappy choice – data table

Factor	Disposable nappies	Reusable cotton nappies
What the nappy is made of		
<i>Making the nappies</i>		
Mass of plastics used (kg)		
Mass of paper used (kg)		
Mass of cotton used (kg)		
Energy used (kWh)		
Water used which will be polluted afterwards (dm ³)		
Are pesticides used?		
Total raw materials used (kg)		
<i>Using the nappies</i>		
How many times is the same nappy used?		
Energy used in laundry (kWh)		
Mass of detergents used (kg)		
Water used which will be polluted afterwards (dm ³)		
<i>Disposing of the nappies</i>		
Mass of waste (kg)		
Where solid body waste (faeces) ends up		

All data per 1000 nappy changes