

# Reusing - Mugs versus Disposable Cups

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## Plenary

- ◆ Ask the pupils what are the other environmental disadvantages of using disposable cups, apart from energy consumption (N.B. more packaging required when purchasing the cups; use of the earth's resources, e.g. timber; more waste going to landfill sites).
- ◆ How could employers be persuaded to use mugs instead of disposable cups in the workplace?
- ◆ The pupils may suggest that the paper cups be recycled. However, the energy used in recycling each cup is 615 kJ/cup which is more energy than was needed in the original extraction and manufacture (549 kJ/cup)

# Reusing - Mugs versus Disposable Cups



**Learning Objective:** to compare the energy consumption of reusable mugs and disposable cups

**National Curriculum subject**

Maths

**Resources**

- ◆ copies of the worksheet 3.15a - 'Energy Use - Reusable Mug versus Disposable Cup'
- ◆ calculators

**Approximate length of session**

30-45 minutes

## Introduction

Pupils quicklist as many reusable versus disposable examples as they can (e.g. mugs v. disposable cups, nappies, milk bottles v. plastic containers bought from supermarkets, cutlery, plates, kitchen towels v. cloths)

Discuss with the pupils why people tend to use mugs rather than disposable cups. Do they come up with the reason that it is more 'environmentally- friendly'? Why do they think some workplaces have drinks machines with disposable cups rather than a kitchen area with mugs? (N.B. It's usually because employers don't want to employ someone to make tea.)

## Pupil Activity

- ◆ Give out the worksheet. Pupils can work alone or in pairs. Point out that the skill involved is being able to extract the necessary sums from the written information. The pupils should show their working-out.

*Continued overleaf*

### Answers

#### Oscar's reusable mug

extraction and manufacture: 14088 kj/cup

reuse (washing): 230 days at work x 4 washes a day = 920 washes

920 washes x 184 kj/cup = 169,280 kj/cup

extraction and manufacture + reuse = 14088 + 169,280 = 183,368 kj/cup

#### Felix's disposable cup

extraction and manufacture: 549 kj/cup

use: 230 days at work x 4 cups a day = 920 cups

920 cups x 549 kj/cup = 505,080 kj/cup

Therefore, the use of the ceramic mug consumes less energy.

# **WORKSHEET: Energy Use - Reusable Mug versus Disposable Cup**

It is generally thought that it is more 'environmentally-friendly' to reuse a mug every time we have a cup of tea than to use a series of disposable cups that we throw away after just one use. But is this really the case? How much energy is actually being consumed?

Read the information below about Oscar and Felix. Calculate how much energy is being consumed through Oscar's use of a reusable mug and how much energy is being consumed through Felix's preference for disposable cups. Keep a record of your 'working-out'.

## **Oscar - reusable, ceramic mug**

Oscar has a favourite mug, which he keeps at work and uses every day. His mug is yellow with a picture of a smiling green frog. The extraction of the raw materials from which it is made and its manufacture (e.g. firing) used up a total of 14,088 kilojoules/cup.

Oscar goes to work 230 days a year. He is a tea addict. He drinks a mug on arrival at work, one at morning break, one at lunchtime and another in the afternoon. He likes a clean mug so he washes it after each drink. 184 kJ/cup of energy is consumed every time the mug is washed.

By using a mug for his drinks of tea how much energy is consumed in a year?

## **Felix - disposable, paper cup**

Felix does not keep a mug at his office. He uses the drinks machine at work and helps himself from the pile of disposable paper cups that sit next to the machine. Each cup uses 549kJ/cup in the extraction of its raw materials (e.g. timber) and manufacture (e.g. moulding).

Like Oscar, Felix works for 230 days a year and has four drinks a day from the drinks machine. For each drink he uses a fresh cup. His cups do not need washing because he simply drops them in the bin when he has finished.

By choosing disposable cups, how much energy is being consumed each year?