

Approach: One to one

Year: 4 & 8

Focus: Investigating and evaluating design

Resources: Egg beater

Questions / instructions:

Give student beater.



Here's a tool that's found in lots of homes. It's an egg beater and it's used to beat different kinds of foods.

1. Show me how the egg beater works.

not marked

Student demonstrates.

The egg beater is made up of many different parts. Each part works together with other parts to make the egg beater work.

2. Tell me what each part does. Point to each part as you talk about it.

3. Explain to me how it works — how the parts all help to make it work.

top handle – hold egg beater here 78 (67) 84 (72)

crank handle – makes beaters rotate 95 (86) 94 (91)

large cog – turns small cogs 73 (68) 84 (93)

small cogs – transmit rotation to beaters 61 (58) 79 (83)

beaters fit in bowl and beat food 67 (47) 73 (66)

bent rod at bottom supports beaters 10 (9) 18 (13)

folded metal surround – supports and gives operating clearance 12 (10) 28 (14)

Point to beaters.

4. If you want these beaters to be able to spin around faster (not just by turning the handle faster) what changes would you make to the way the egg beater is made?

change gearing (*general*) 3 (6) 21 (20)

increase ratio of main cog teeth to small cog teeth 3 (0) 16 (21)

other workable idea, excluding electrical operation 12 (9) 17 (18)

converting to electrical operation 49 (33) 54 (53)

5. What materials is the egg beater made from?

Metal: stainless steel 7 (8) 34 (33)

steel / metal (*general*) 91 (87) 64 (67)

Plastic: mentions handles and cogs 9 (7) 9 (10)

mentions either handles or cogs 78 (77) 87 (88)

6. Why have these materials been used?

PROMPT: What is it about these materials that make them suitable for the egg beater?

Stainless steel: strong 56 (50) 62 (63)

easy to clean 6 (9) 22 (21)

durable/does not rust 12 (10) 35 (28)

Plastic handles: comfortable to hold 34 (36) 44 (44)

easy to clean 3 (6) 10 (8)

durable 4 (2) 7 (2)

Plastic cogs: durable 0 (0) 3 (2)

quiet 0 (0) 1 (1)

Total score: 14–22 0 (0) 7 (2)

12–13 4 (4) 19 (12)

10–11 18 (14) 29 (42)

8–9 35 (33) 28 (25)

6–7 29 (20) 14 (15)

0–5 14 (29) 3 (4)

Commentary:

Predictably, students tended to focus on larger features rather than smaller details, and on less technical ideas about materials and mechanisms. About 30 percent more year 8 than year 4 students scored 10 or more. For year 4 students, there was a marked reduction of very low performance between 2000 and 2004, with little difference at higher performance levels. For year 8 students, there was an increase in high performance between 2000 and 2004, with little difference at low performance levels.