

Approach: Team

Focus: Design a fair test experiment into the dissolving rates of jelly crystals

Resources: Jelly crystals, jug of hot water, jug of cold water, 2 plastic glasses, 2 teaspoons, recording sheet, stopwatch

**Questions / instructions:**

**Preparation: Jug of hot water.**

**Don't hand out equipment yet.**

This activity involves testing jelly crystals. In your team you will design a test to find out if jelly crystals dissolve faster in hot or cold water. You will need to do a fair test. In a fair test, only one important thing is changed at a time (for example, the temperature of water).



In your team think about how you will do your test. Here is some equipment you will be able to use. When you have decided on how to do the test I will ask you to tell me what you will do.

**Hand out equipment. Allow time.**

1. Tell me how you will do the test so that it is a fair test.

**Record team response.**

<b>Plan:</b>	same amount of water	29 (36)	78 (91)
	same amount of jelly crystals	49 (72)	84 (98)
	start timing for both as soon as water or jelly crystals are added	36 (41)	65 (59)
	emphasis on treating both alike (e.g. stir both at same speed and intensity)	24 (34)	51 (55)
	careful observation and timing of when dissolving is complete	40 (44)	57 (58)

2. How will you know which one dissolves fastest?

compare the times it takes to dissolve all jelly crystals	42 (51)	53 (74)
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3. How is your test a fair test? You explain it to me and I will write it down to help you during your test.

**Record team response.**

not marked      •      •

You can now do your experiment. After you have done the test, you will tell me what you found out.

% response  
2007 ('03)  
year 4    year 8

**Actual experiment:**

used same amount of water	63 (64)	86 (96)
used same amount of jelly crystals	71 (93)	94 (94)
started timing for both as soon as jelly crystals or water added	48 (62)	75 (80)
emphasis on treating both alike (e.g. stir both at same speed and intensity)	32 (35)	63 (67)
watched carefully for dissolving to be completed/timed accordingly	75 (65)	91 (89)
compared specific times it took to dissolve	22 (31)	39 (45)

4. Do jelly crystals dissolve faster in hot or cold water? hot 88 (92) 100 (100)
5. What else did you find out?
6. Now I want you to look at what you told me you would do to make sure it was a fair test. Is that what you did?
7. Tell me about how that part went.

**Retrospective evaluation:**

(suggested corrections)

same amount of water	9 (13)	11 (6)
same amount of jelly crystals	3 (9)	6 (2)
start timing for both as soon as water or jelly crystals are added	8 (9)	10 (17)
emphasis on treating both alike (e.g. stir both at same speed and intensity)	9 (13)	31 (46)
careful observation and timing of when dissolving is complete	14 (4)	5 (15)
compare specific times it takes to dissolve	6 (4)	6 (6)

**Participation in planning, experiment and discussion:**

all students participated	84 (70)	81 (83)
all except one student participated	13 (26)	17 (15)
half of the students participated	3 (4)	2 (2)
less than half of the students participated	0 (0)	0 (0)

<b>Total score:</b>	12-18	4 (10)	17 (22)
	10-11	13 (7)	36 (50)
	8-9	17 (30)	33 (21)
	6-7	26 (33)	13 (7)
	0-5	40 (20)	1 (0)

% response  
2007 ('03)  
year 4    year 8

**Commentary:**

Because this is a team task, no graph of subgroup performance is possible. Year 8 teams generally showed much stronger understanding of fair testing requirements. At both year levels, but especially year 4, there was a marked decline in performance between 2003 and 2007.