

# Kellogg's Corn Flakes Investigation



*Which size is the most eco-friendly?*

*Which size gives the best value, and by how much?*

Kellogg's Corn Flakes come in various sizes of box. The main ones are listed below. Use the measurements given for each type to calculate the volume and surface area.

Box Size	Weight (g)	Cost	Height	Width	Depth	Volume	Surface Area
Small	250	£1.39	<b>25cm</b>	<b>19cm</b>	<b>5.5cm</b>		
Medium	500	£1.98	<b>29.5cm</b>	<b>23cm</b>	<b>7cm</b>		
Large	750	£2.68	<b>35cm</b>	<b>24.5cm</b>	<b>9cm</b>		

Remember:

- To calculate volume, *multiply all 3 dimensions together.*
- To calculate surface area, *find the area of all 6 faces and add them together.*

1. How much cardboard per gram of cornflakes does the most efficient box use?
2. Which box gives the best value (most cornflakes for your money)?
3. If you planned to make a 1500g box of cereal by doubling *one* of the dimensions of the 750g box, which dimension would you double to minimise the surface area, and what would the resulting surface area of the box be?

Extension: If you could choose the dimensions of your 1500g box, how would you minimise surface area? If you could choose *any* shape whatsoever, what would be best?

# Kellogg's Corn Flakes Solutions



*Which size is the most eco-friendly?*

*Which size gives the best value, and by how much?*

Kellogg's Corn Flakes come in various sizes of box. The main ones are listed below. Record the measurements for each type below, and calculate the volume and surface area.

Box Size	Weight (g)	Cost	Height	Width	Depth	Volume	Surface Area
Small	250	£1.39	<b>25cm</b>	<b>19cm</b>	<b>5.5cm</b>	<b>2612.5cm<sup>3</sup></b>	<b>1434cm<sup>2</sup></b>
Medium	500	£1.98	<b>29.5cm</b>	<b>23cm</b>	<b>7cm</b>	<b>4749.5cm<sup>3</sup></b>	<b>2092cm<sup>2</sup></b>
Large	750	£2.68	<b>35cm</b>	<b>24.5cm</b>	<b>9cm</b>	<b>7717.5cm<sup>3</sup></b>	<b>2786cm<sup>2</sup></b>

Remember:

- To calculate volume, *multiply all 3 dimensions together.*
- To calculate surface area, *find the area of all 6 faces and add them together.*

1. How much cardboard per gram of cornflakes does the most efficient box use?

**Large: 3.71cm<sup>2</sup>/g compared to Medium (4.18cm<sup>2</sup>/g) and Small (5.74cm<sup>2</sup>)**

2. Which box gives the best value (most cornflakes for your money)?

**Large: 36p/100g compared to Medium (40p/100g) and Small (56p/100g)**

3. If you planned to make a 1500g box of cereal by doubling *one* of the dimensions of the 750g box, which dimension would you double to minimise the surface area, and what would the resulting surface area of the box be?

**Double the depth from 9cm to 18cm, giving a new surface area of: 3857cm<sup>2</sup>**

Extension: If you could choose the dimensions of your 1500g box, how would you minimise surface area? If you could choose *any* shape whatsoever, what would be best?

**If we are restricted to cuboids, a cube is the best (1500g: 25cm cube: 3720cm<sup>2</sup>)  
The best possible shape is a sphere (1500g 31cm diameter sphere: 2000cm<sup>2</sup>)**