**Prize draws** are used by shops to **attract customers** and to **promote sales.**

# PRIZE DRAW

**Which prize would you choose? Why?**

**Which prize is best for the shop? Why?**

**Buy *any* MP3 player today**
*and be entered into a prize draw to win one of* **4** *fantastic prizes.*

## Prize A
£1 in the first month,
£2 in the second month.
doubling to £4 in the third
month and so on for
12 months.

## Prize B
£50 in the first month,
£100 in the second month,
£150 in the third month and
so on increasing by
£50 each month
for 12 months.

**The winner chooses their prize.**

## Prize C
£300 every month
for 12 months.

## Prize D
A single cash payment
of £3,500.

shopping around

Some shops use offers like **'Buy one, get one free'** to make customers feel they are getting a **good deal.**

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half price!

good deal

4 for £3

30% off

good deal

bargains

great value

shopping around

cheapest

get one free

£1.94 each
Buy one
get one
free!

No offers — just
great value!
95p each.

£1.32 each
Or buy two and
get the second
for half price!

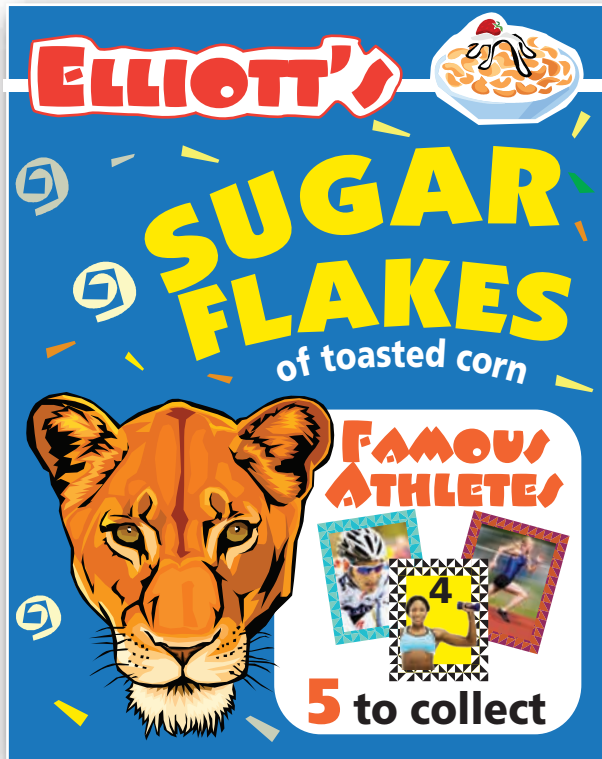£1.40 EACH
OR 3 FOR THE
PRICE OF 2!

£1 each
or buy
4 for £3

Which is the cheapest
if you buy **1** bar?
**2** bars?
**3** bars? ...

£1.30 each
Or buy **2** and get
**30%** off

Manufacturers sometimes **promote their products** by giving away sets of **free gifts** for their customers to collect.

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ELLIOTT'S

SUGAR FLAKES
of toasted corn

FAMOUS ATHLETES

4

5 to collect

**In each packet of cereal you get one of five Famous Athlete cards.**

**You don't know which card until you open the packet!**

1

2

4

3

5

Run a simulation to find out why manufacturers give away sets of **free gifts.**

## Shopping around : Attracting the customer

### Description

Shops try to attract and keep their customers in many ways.
This set of activities explores three ways in which retailers and product manufacturers may seek to persuade customers to either buy more of their product or encourage customer loyalty.

**Activity 1: Prize draw**

**Activity 2: Offers**

**Activity 3: Collect the set**

Prize draw asks pupils to decide which of four different prizes they would choose. Begin with some discussion and encourage pupils to say what which they think will be the best option from the point of view of the prizewinner.

Ask your pupils, working in small groups or pairs, to create tables of the monthly payments and the cumulative totals for each of the prizes and draw graphs. Encourage each group to agree which prize would be the best option from the shop's point of view based on their results.

You could suggest a fifth way, for example, where the payout each month is dependent on the throw of a dice, say £100 times the score on the dice. This approach could lead to discussions about means, variability and expectation prompted by the question, What is the most, the least and the most likely amount the shop would have to payout?

Offers invites pupils to compare the costs of a variety of special offers. You may want to work with the whole class to establish that none of the special offers on chocolate are cheaper than the "No offers – just great value 95p a bar" price for one bar of chocolate. Challenge your pupils, working in small groups, to find out which supermarket is cheapest if you want to buy more bars of chocolates. Encourage them to discuss and compare their calculation methods  and check their answers with each other.

### Resources

Six sided dice
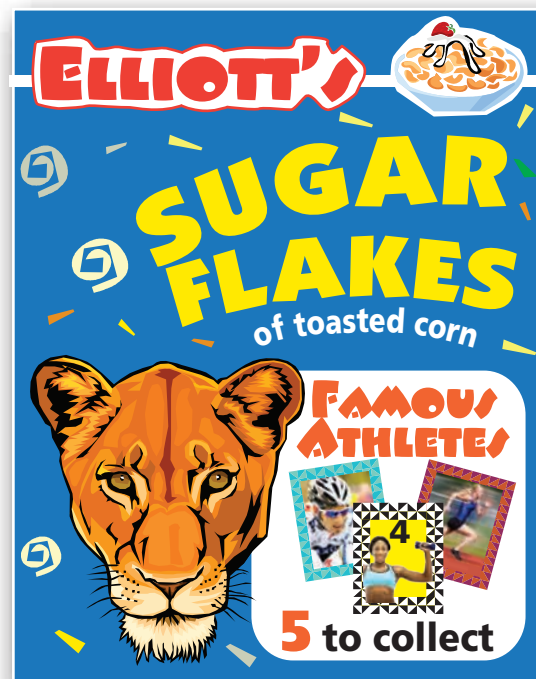
The context of collecting sets of cards in Collect the set will be familiar to your pupils. Explain that they are going to work in pairs, using a simulation, to investigate how many packets of cereal they might have to buy to collect a full set of cards. Give each pair a set of the cards which they should place face down and then mix up. Instruct them to take a card and make a note of it, replace the card and repeat noting the card drawn each time until all five cards have appeared. They should run this simulation three times recording their results for each simulation. They should note the number of cards they have to "collect" before they have the full set. There will be considerable variation in this. Because of this variation some pairs of pupils will complete their three simulations more quickly than others. Give these pupils a six sided die and ask them to design and run a simulation for six cards in a full set.

## Shopping around : Attracting the customer

Either you or your pupils can enter their results from both simulations into a spreadsheet displayed on an interactive whiteboard and then use it to calculate the mean average, minimum and maximum for your class results. At this stage you could check whether anyone collected the full set by "buying" only 5 packets of cereals – there is approximately a 1 in 26 chance of this happening. You might choose to work through the probability of this happening (5/5 X 4/5 X 3/5 X 2/5 X 1/5). For six cards it is approximately 1 in 65.

The ideas of probability in this activity are very challenging. Mathematical thinking about mean and variation using the results from both simulations will support your pupils' understanding about these ideas. Depending on the amount of data collected by your pupils for six cards you may need to add to it by running a spreadsheet simulation, for example using the function **=RANDBETWEEN(1,6)** in Excel.

Ask your pupils what is the smallest number of packets of cereal you could buy and what is the largest! Engage the class in a discussion about why manufacturers give away sets of free gifts to collect and draw out that the interesting question is how many packets of cereal you might have to buy to collect the full set. The total number of packets of cereal, on average, to collect the full set of five cards is 5(1/5 +1/4 +1/3 + 1/2 +1) and for six cards it is 6(1/6 + 1/5+ 1/4+1/3+1/2+1. There is a discussion of this problem in the article, *Outer space: A collector's piece* by John D. Barrow at http://plus.maths.org/issue37/outerspace/index.html

These simulations are premised on the manufacturer having put equal numbers of the 5 (or 6) cards in the packets of cereals. You might choose to ask your pupils if they think that the manufacturer would do this and if not, why not.

### The mathematics

In Prize draw pupils explore sequences and series. Offers involves money calculations and comparison of prices. In Collect the set pupils run and devise simulations, find mean and range and discuss these and the probabilities of events.