1

Nutrition and Cycling

Andy is planning a short training ride.
He wants to take either bananas or cheap cereal bars with him as on-the-road snacks.
How many bananas would he need to take, to minimise the calorie deficit at the end of his ride? How many cheap cereal bars?
(The calorie deficit is the difference between the calories Andy uses during his cycle ride, and the calories he consumes before and during the ride.)

Short training ride = 2 hours

Andy cycles at = 19 mph

Distance covered = 38 miles = 38 × 1.61
= 61.18 km

Calories needed = 61.18 × 100 ÷ 4.19
= 1460.1432 kcal

Calories consumed already (big meal) = approx. 800 kcal

Calories still needed = 1460.1432 - 800
= 660.1432

Andy doesn't want to consume more than 250 kcal an hour on rides of less than 5 hours.

1× banana = 120 kcal

Maximum banana Andy can consume in 2 hours = 500 ÷ 120
= 4 banana
= 480 kcal

Calorie deficit = 660.1432 - 480
= 180.1432

1× cheap cereal bar = 100 kcal

Maximum cheap cereal bar Andy can consume in 2 hours = 500 ÷ 100
= 5 cheap cereal bar
= 500 kcal

Calorie deficit = 660.1432 - 500
= 160.1432 kcal

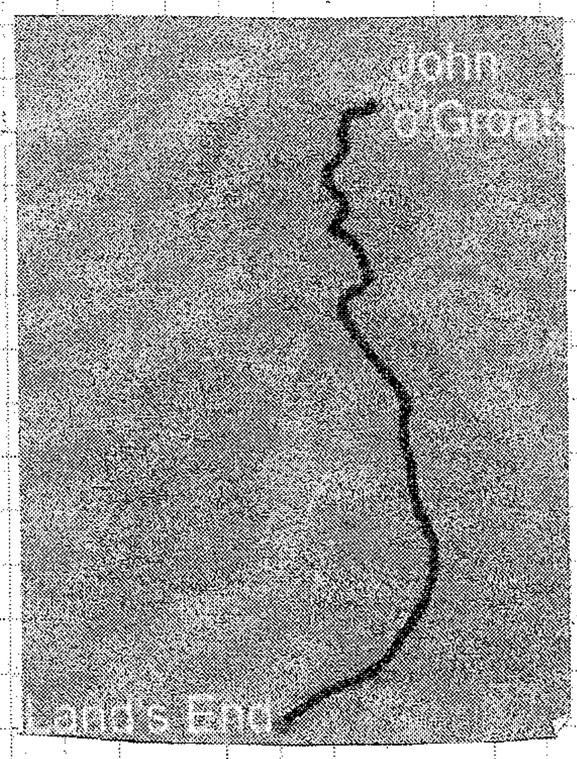
Conclusion = It would leave more calorie deficit if Andy brought bananas on his short training ride. Therefore, Andy should bring 5 cheap cereal bars instead because it is his limit that he wants to consume in 2 hours (500 kcal)

2

Nutrition and Cycling

After his training rides, Andy is ready to cycle from Land's End to John o'Groats.
How many days will it take?
Work out some of Andy's different options for carrying and consuming on-the-road snacks and drinks
How can he maximise his consumption while cycling?
Together with his meals, can he consume enough calories each day so that he doesn't lose any weight?
How much of his calorie intake will need to be provided each day through off-the-road snacks?

Distance from Land's End to John o'Groats = 1407km



Andy = He can cycle at 14 mph for a maximum of 7 hours per day

14 x 7 x 1.61
= 157.78km

To cover the journey to John o'Groats, Andy needs:

1407 ÷ 157.78
= 8.92
~ 9 days.

His options for on-the-road snacks / drinks:

Calories needed per day:
As an adult, he needs 2500kcal (at least)
+ for additional 7 hours per day

157.78 x 100 ÷ 4.19
= 3765.6 kcal

Total needed = 3765.6 + 2500
= 6265 kcal (at least)

Calorie intake = Really big meals (x3) = approx. 3000 kcal
+ Off-the-road snacks = 1000 kcal

Calories still needed (on-the-road) = 6265 - 4000
= 2265 kcal

On the road, Andy does NOT want to consume more than 350kcal per hour

Per day, his maximum intake for on-the-road snacks = 350 x 7
= 2450 kcal

Andy will, therefore, not have a calorie deficit.

Snack Options

Andy's list #1

- ☐ ×5 Bananas = 600 kcal
- ☐ × 3 Energy bars = 600 kcal
- ☐ × 4 cheap cereal bars = 400 kcal
- ☐ × 6 Energy gels = 660 kcal +

  2320 kcal
- ☐ ×3 litres of drinking water

Land's End to John o'Groats shopping list ~Andy

- ☐ × 7 banana = 840
- ☐ × 2 energy drink (100ml) = 380
- ☐ × 2 energy gel = 220
- ☐ × 2 cheap cereal bar = 200
- ☐ × 3 energy bar = 600 +

  2300 kcal
- ☐ × 2 litres of drinking water

Shopping list - Andy - Cycling :

- ☐ ×7 Energy bar = 1540
- ☐ × 2 Energy drink = 380
- ☐ × 2 Banana = 240
- ☐ × 1 Energy gel = 110 +

  2270

4

The fastest cyclist - extention

Distance from Land's End to John o'Groats = 1407km

Andy = 14mph Calories needed per hour = 537.9kcal

		Calories needed for cycling	Calories for an average adult	Total Calories	really big meals + off the road snacks	Snack needed	Andy's intake limit
	7 hours	3765.6	2500	6265.6	4000	2265	2450
*	8 hours	4303.52	2500	6803.52	4000	2804	2800
X	9 hours	4841.46	2500	7341.46	4000	3341	3150
X	10 hours	5379.4	2500	7879.4	4000	3879	3500
X	11 hours	5917.34	2500	8417.34	4000	4417	3850

* Only 4kcal away from his energy needs, just let andy have slightly more from his really big meals

Andy cycles at 14mph for 8 hours a day.

14 x 8 x 1.61
= 180.32 km per day.

To cover the journey, Andy needs = 1407 ÷ 1803.2
= 7.8
~ 8 days

In Andy's cycling Jersey:

Shopping list			
☐ x 2 Cheap cereal bar	32p	200kcal	50g
☐ x 2 Banana	20p	240kcal	240g
☐ x 4 Energy gels	£4.00	440kcal	168g
☐ x 2 Energy drink (100ml)	£2.78	380kcal	-
☐ x 7 Energy bar	£7.00+	1540kcal+	455g+
	£14.30	2800 kcal	913g

Total cost = £13.98
Total calories = 2800 kcal
Total weight = 1031g (not including drinks)

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Andy's cycle plan

- For breakfast, lunch, and dinner, Andy will have 60 minutes / 1 hour to eat (per meal)
- Andy will sleep for a length of 9 hours
- Once every two hours, Andy will stop to fill up his water bottles and rest for a maximum of 15 minutes. Therefore, within 8 hours, he will have 4 x 15 minute breaks = 1 hour
- Andy will be able to have a maximum of 30 minutes to take a break / rest after 4 hours and above of cycling (whenever he feels like)

Deandra Sight - Year 7A

About the Land's End to John O'Groats course

The distance from **Land's End to John o' Groats** is 1407 km

1 mile = 1.61 km

Andy doesn't like to average more than 7 hours of cycling a day on rides that take more than one day

Andy cycles at 14 mph on rides that take more than one day

On a ride that takes several days, Andy eats three **REALLY BIG meals** a day: in the morning, after he finishes cycling, and in the evening

A **REALLY BIG meal** contains approximately 1000 kcal

Andy does not want to consume more than 350 kcal an hour on rides of more than 5 hours

Short training rides

A typical **short training ride** is 2 hours long

Andy likes to eat a **big meal** before a **short training ride.** The energy for this meal is released during his ride

A **big meal** contains approximately 800 kcal

Andy cycles at 19 mph on rides that take less than one day

Andy does not want to consume more than 250 kcal an hour on rides of less than 5 hours

On-the-road-snacks

As well as his meals, Andy can have up to 1000 kcal of off-the-road snacks a day if he needs to

Andy's options for on-the-road snacks are: **bananas, energy bars, energy gels, cheap cereal bars** or **energy drinks.**

Andy's cycling jersey has 8 pockets. Each pocket holds 1 **banana**, 1 **energy bar**, 3 **energy gels** or 2 **cheap cereal bars**

A **banana** contains 120 kcal, costs 10p and weighs about 120g

An **energy bar** contains 220 kcal, costs £1 and weighs 65g

A pack of **energy gel** contains 110 kcal, costs £1 and weighs 42g

A **cheap cereal bar** contains 100 kcal, costs 16p and weighs 25g

500 ml of **energy drink** contains 190 kcal and costs £1.39

About Andy

Andy is a 20-year-old man

Andy uses about 100 kJ of energy to cycle 1 km (in addition to his normal energy use)

1 kcal = 4.19 kJ

When he isn't cycling, Andy likes to solve maths problems

Andy's bicycle has holders which carry up to three 1-litre water/drinks bottles

An average adult male who does not do lots of physical activity needs 2500 kcal a day

Andy doesn't eat anything while cycling that he can't carry in his pockets

On the road, Andy can stop to re-fill his bottles (with water only). He doesn't want to do this more than once every two hours

Andy won't be able to top-up with snacks or energy drinks while on the road

Andy drinks about 500 ml of fluids per hour of cycling