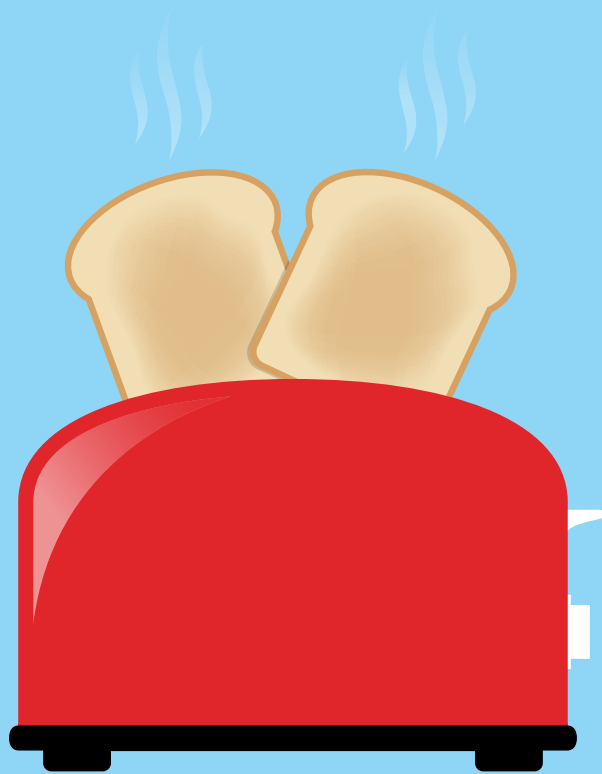
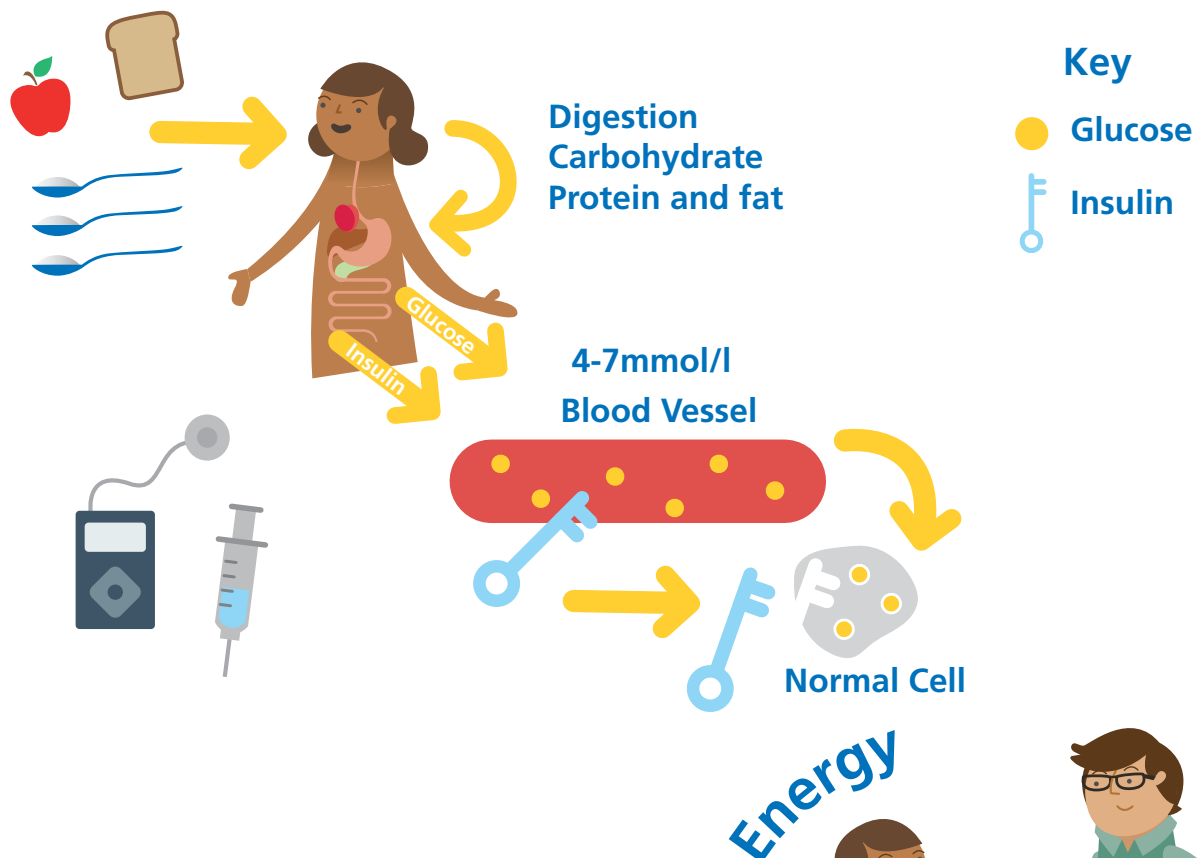


Carbohydrate Counting



What is carbohydrate and why is it important?

- Carbohydrate is the main nutrient in food that provides energy for the body so you can breathe, walk, run, play football and dance.
- Carbohydrate is broken down into glucose by the digestive system and enters the blood stream.
- Glucose is needed in the body's cells (muscles, organs) to make energy, but glucose cannot be transported from the blood without insulin, the key!
- Insulin is the key that opens the lock on the cell door to allow glucose to move from the blood stream into the cell to produce energy.
- Insulin also allows the body to store glucose in the liver and the muscles if it is not needed for energy.






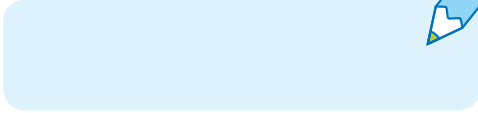
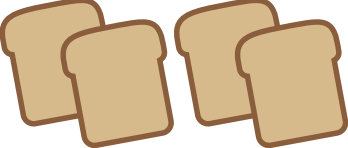
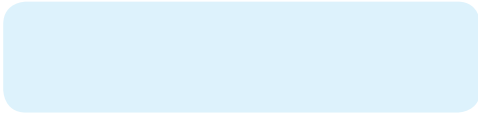
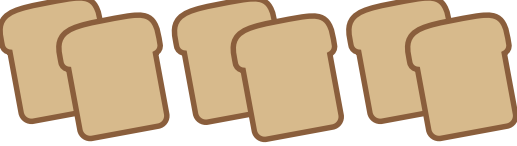
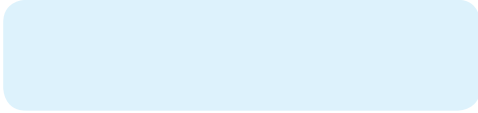
Watch me: carbohydrate summary

Matching insulin to carbohydrate

- The more carbohydrate you eat the more insulin (keys) you need to open the cells.
- Counting carbohydrate allows you to match the insulin to the carbohydrate you eat.
- Matching insulin to carbohydrate will allow you to keep blood glucose between 4-7mmol/l.

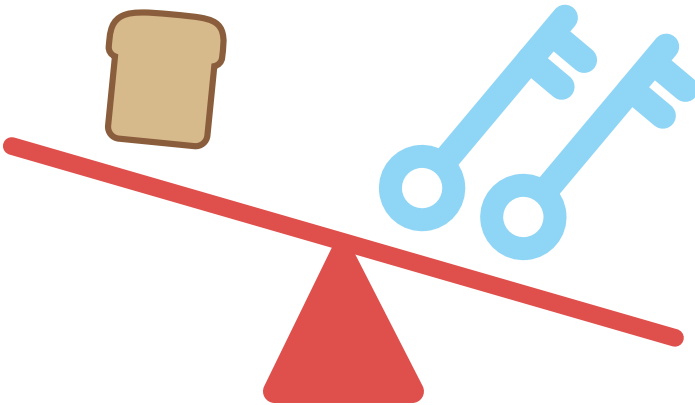
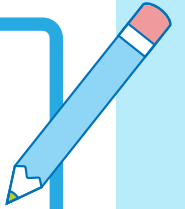
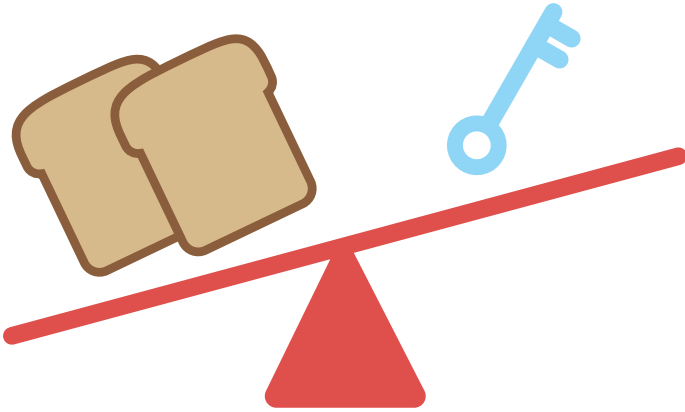
Activity

1. Each one of these slices of bread contains 10 grams of carbohydrate.
2. The insulin to carbohydrate ratio is one unit of insulin for every 10 grams.
3. Draw how many insulin keys you would need for the different amounts of bread below

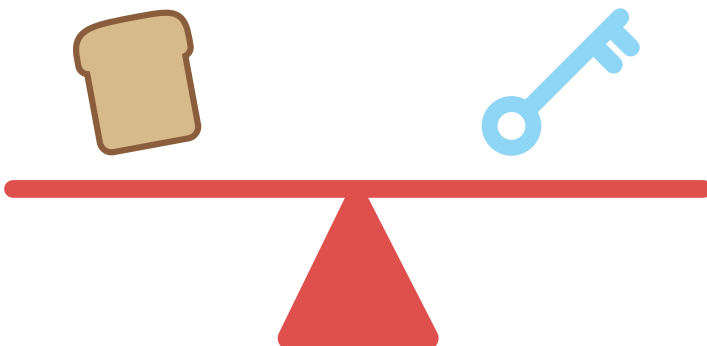
|  Carbohydrate |  Insulin |
|--|--|
|  | Needs  |
|  | Needs  |
|  | Needs  |

Balancing Insulin

What will happen to the blood glucose level?

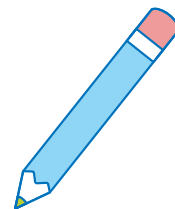


Watch me:
matching insulin to carbohydrate



What do you normally eat?

Please fill out your usual daily food intake. Each meal time has two to three spaces where you can write your most popular choices at that time. The more detail you can include, such as portion sizes, the better. If you do not eat at that time leave it blank.



Breakfast:

- 1.
- 2.
- 3.

Mid-morning

- 1.
- 2.

Lunch

- 1.
- 2.
- 3.

Mid-afternoon

- 1.
- 2.

Evening meal

- 1.
- 2.
- 3.

Supper

- 1.
- 2.

Drinks:

Write down all the drinks you usually have.

This table shows which foods contain carbohydrate that need counting, and those that do not

| Food Group | Contain carbohydrate | Do not contain carbohydrate, or minimal amounts |
|---|--|---|
| Starchy carbohydrates | Bread Breakfast cereal Rice Pasta, noodles Crackers Potatoes Chapatti, Naan, Flours, grains, oats | |
| Fruit (fructose is a natural sugar) and vegetables | All fruit (this includes tinned and dried fruit) All fruit juices Peas & sweetcorn Sweet potato, parsnips, butternut squash | Most other vegetables contain too little to count. |
| Milk and dairy (lactose is a natural sugar) | Milk – All types Yoghurts Fromage-frais | Cheese |
| Protein | Sausage rolls (the pastry) Meat pies (the pastry and crust) Battered Fish (the batter) Baked Beans Kidney beans Lentils | Meat, chicken, fish, eggs, Tofu, Nuts and seeds |
| Fat and added sugar products (Sucrose) | Biscuits & Crisps Sugary drinks (Coke, Lemonade, Powerade) Jam and marmalade, Sugar, Honey, Sweets (Starburst, Skittles) Ice-cream, Chocolate Cakes, Custard Sauces | Butter Margarine Oils Cream Salad Cream Mayonnaise |

How much carbohydrate do I need?

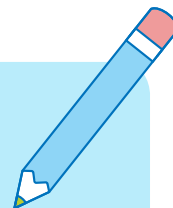
Everybody needs carbohydrate for energy and the government recommendations are for you have 40% to 55% of energy from carbohydrate.

| Age (years) | Average daily carbohydrate requirement in grams | |
|-------------|---|------------|
| | Boys | Girls |
| 1 - 3 | 70 – 145g | 70 – 130g |
| 4 – 6 | 140 – 195g | 130 – 185g |
| 7 – 10 | 165 – 250g | 150 – 240g |
| 11 – 14 | 215 – 330g | 200 – 290g |
| 15 – 18 | 280 – 400g | 240 – 310g |

To provide your body with a consistent supply of energy it's best to spread carbohydrate as equally as possible throughout the day. This is not possible every day but, a structure to your normal eating pattern would help your energy levels and blood glucose control.

Watch me: How much carbohydrate

Your average daily carbohydrate requirement calculated with your Dietitian is:



Daily carbohydrate: g to g

Main meals carbohydrate: g to g

What do you need to count carbohydrate?

To count carbohydrate accurately you will need:

- A set of scales that weigh in grams
- A calculator
- Food labels
- Carbs and Cals Book and/or APP
- Household measures such as a tablespoon, cup, favourite bowl, glass

Carbohydrate counting methods

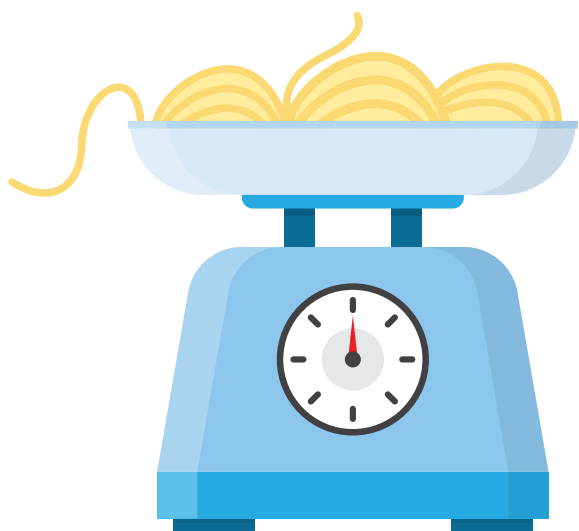
There are lots of resources, techniques, tips and tricks for carbohydrate counting, all with advantages and disadvantages. The most accurate methods involve weighing foods. Sometimes this is not possible and you will need to use different techniques according to the situation. Listed below are the different methods.

1. Carbs & Cals Book and APP:

Weighing is the most accurate

2. Food labels:

Carbohydrate information – weighing and working out your portion sizes or using the typical portion on the label



**“The more you weigh
the better the day”**

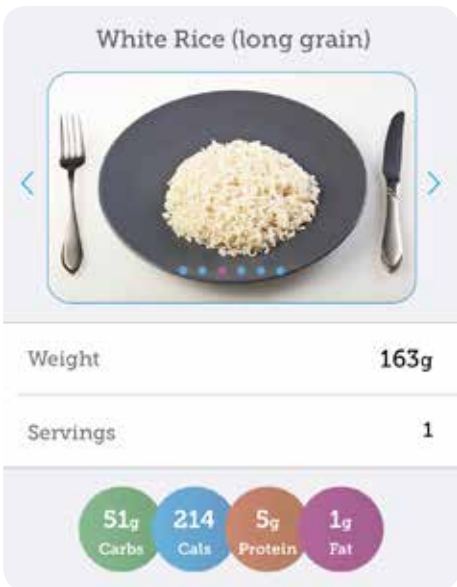
Watch me: What do I need to count carbohydrate?

Carbs & Cals Book and APP:

a. Weighing: If your portion of rice weighs 200g on the scales:

$$\frac{\text{Carbohydrate (green label) (g)}}{\text{Weight (White label below food) (g)}} \times \text{your portion (g)} = \text{Carb in your portion (g)}$$

Example: $51 \div 163 \times 200 = 62.5\text{g}$ carbs



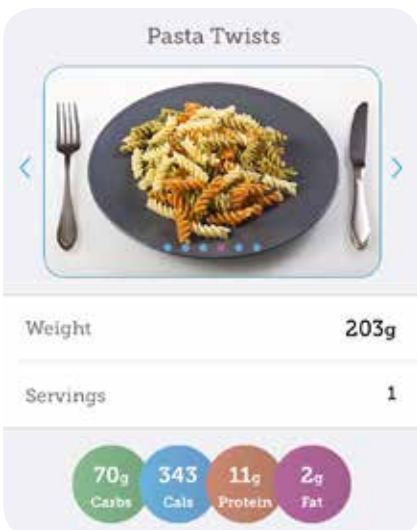
b. Weighing: getting your rice portion to the same weight as the picture:

Weigh your rice portion and add or take off rice until it weighs exactly 163g. Then your portion will have 51g carbohydrate.

Watch me: Breakfast using Carbs & Cals book

Watch me: Lunch using Carbs & Cals book

Work out this example if your pasta weight on the scales is 160g:



$$\frac{\text{g}}{\text{g}} \times \text{g} = \text{g}$$

Watch me: Breakfast using iPhone APP

Watch me: Evening meal using iPhone APP

Food labels: carbohydrate information

- When you are counting carbohydrate it is very important to count all of the carbohydrate (starch and sugar) not just the sugars.
- When counting carbohydrate from food labels uses the **“Total carbohydrate”** and **NOT** the **“of which is sugars”**.
- Food labels by law have to tell you the **“Total carbohydrate per 100g”** and often they have **per portion**.
- If the portion size is exactly what you are going to eat then use **per portion**.

Crisps

| | Per 100g | Per 40g bag |
|---|-----------------|-----------------|
| Energy | 483 kcal | 193 kcal |
| Protein | 6.5 g | 2.6 g |
| Total carbohydrates of which sugars | 58.0 g 1.0 g | 23.2 g 0.4 g |
| Fat | 25.0 g | 10.0 g |
| Fibre | 3.9 g | 1.6 g |

For foods that give the portion size of an individual item in the packet, you can use the Total carbohydrate per item and add up how many you are having.

Whole-wheat Digestive Biscuits

| | Per 100g | Per biscuit |
|---|------------------|----------------|
| Energy | 306 kcal | 37 kcal |
| Protein | 6.2 g | 0.7 g |
| Total carbohydrates of which sugars | 66.8 g 18.4 g | 8.0 g 2.2 g |
| Fat | 18.4 g | 2.2 g |
| Fibre | 5.8 g | 0.7 g |

How many grams of carbohydrates in three biscuit?



If the label does not give the total carbohydrate per portion size or the portion size you are going to have is more or less than the suggested portion size, you will need to weigh the food and use the carbohydrate **per 100g**.

The method below allows you to work out the carbohydrate for your portion size:

Total carbohydrate per 100g

$$\frac{\div}{100}$$

$$\times \text{ your portion (g) } = \text{ Carbohydrates (g) }$$

Cheese and Tomato Pizza

Using the pizza food label you can work out the total carbohydrate from a pizza slice that weighs 250g on the scales.

| | Per 100g |
|---|------------------------|
| Energy | 238 kcal |
| Protein | 9.3 g |
| Total carbohydrates of which sugars | 28.7 g 2.7 g |
| Fat | 9.6 g |
| Fibre | 2.3 g |

28.7g

$$\frac{\div}{100}$$

100

$$\times 250g$$

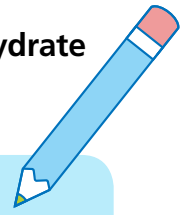
$$= 72g$$

Watch me: Breakfast using food labels

Watch me: Lunch using food labels

Now it's your turn!

Using the equation above and the food label below work out the **total carbohydrate** for a bowl of fruit and fibre that weighs 65g on the scales:



$$\text{g} \div 100 \times \text{g} = \text{g}$$

Fruit and Fibre

| | 30g cereal with 125ml semi-skimmed milk | Per 100g |
|---|---|------------------|
| Energy | 180 kcal | 380 kcal |
| Protein | 6.0 g | 8.0 g |
| Total carbohydrates of which sugars | 30.0 g 9.6 g | 69.9 g 26.0 g |
| Fat | 4.0 g | 6.0 g |
| Fibre | 2.6 g | 9.0 g |

Important things when using labels

Be careful of food labels with suggested serving sizes that include small portion suggestions or two foods. For example:

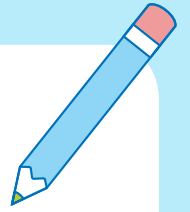
- Breakfast cereal suggested serving sizes is 30g cereal with 125ml semi-skimmed milk (see Fruit and Fibre label above). Therefore to get the carbohydrate count right you will have to have exactly 30g Fruit & Fibre and 125ml semi-skimmed milk.
- Young children's cereal portion sizes can be much less than the suggested serving size, whereas teenage boys' portions are much larger.

Carbohydrate calculator for common food

| Carbohydrate per 100g | Named examples | Weight of food portion in grams | | | | | | | | | | | | | | | | | | | |
|-----------------------|---|---------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
| 5 | | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 |
| 10 | | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 |
| 15 | Uncooked and boiled potatoes | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 14 | 14 | 15 | 15 |
| 20 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 25 | | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | 18 | 19 | 20 | 21 | 23 | 24 | 25 |
| 30 | Cooked rice, cooked pasta, chips, jacket potato | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 15 | 17 | 18 | 20 | 21 | 23 | 24 | 26 | 27 | 29 | 30 |
| 35 | | 2 | 4 | 5 | 7 | 9 | 11 | 12 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 26 | 28 | 30 | 32 | 33 | 35 |
| 40 | | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |
| 45 | | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 18 | 20 | 23 | 25 | 27 | 29 | 32 | 34 | 36 | 38 | 41 | 43 | 45 |
| 50 | Bread | 3 | 5 | 8 | 10 | 13 | 15 | 18 | 20 | 23 | 25 | 28 | 30 | 33 | 35 | 38 | 40 | 43 | 45 | 48 | 50 |
| 55 | | 3 | 6 | 8 | 11 | 14 | 17 | 19 | 22 | 25 | 28 | 30 | 33 | 36 | 39 | 41 | 44 | 47 | 50 | 52 | 55 |
| 60 | | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 | 57 | 60 |
| 65 | | 3 | 7 | 10 | 13 | 16 | 20 | 23 | 26 | 29 | 33 | 36 | 39 | 42 | 46 | 49 | 52 | 55 | 59 | 62 | 65 |
| 70 | Cereals | 4 | 7 | 11 | 14 | 18 | 21 | 25 | 28 | 32 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 60 | 63 | 67 | 70 |
| 75 | Dry pasta | 4 | 8 | 11 | 15 | 19 | 23 | 26 | 30 | 34 | 38 | 41 | 45 | 49 | 53 | 56 | 60 | 64 | 68 | 71 | 75 |
| 80 | | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 68 | 72 | 76 | 80 |
| 85 | Dry rice | 4 | 9 | 13 | 17 | 21 | 26 | 30 | 34 | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 72 | 77 | 81 | 85 |
| 90 | | 5 | 9 | 14 | 18 | 23 | 27 | 32 | 36 | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 77 | 81 | 86 | 90 |
| 95 | | 5 | 10 | 14 | 19 | 24 | 29 | 33 | 38 | 43 | 48 | 52 | 57 | 62 | 67 | 71 | 76 | 81 | 86 | 90 | 95 |
| 100 | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |

| Carbohydrate per 100g | Named examples | Weight of food portion in grams | | | | | | | | | | | | | | | | | | | | |
|-----------------------|---|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | |
| 5 | | 6 | 6 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 10 | | 11 | 12 | 13 | 14 | 15 | 16 | 16 | 17 | 18 | 19 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |
| 15 | Uncooked and boiled potatoes | 17 | 18 | 20 | 21 | 23 | 24 | 24 | 26 | 27 | 29 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 | 57 | 60 |
| 20 | | 22 | 24 | 26 | 28 | 30 | 32 | 32 | 34 | 36 | 38 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 68 | 72 | 76 | 80 |
| 25 | | 28 | 30 | 33 | 35 | 38 | 40 | 40 | 43 | 45 | 48 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
| 30 | Cooked rice, cooked pasta, chips, jacket potato | 33 | 36 | 39 | 42 | 45 | 48 | | 51 | 54 | 57 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 102 | 108 | 114 | 120 |
| 35 | | 39 | 42 | 46 | 49 | 53 | 56 | 56 | 60 | 63 | 67 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 119 | 126 | 133 | 140 |
| 40 | | 44 | 48 | 52 | 56 | 60 | 64 | 64 | 68 | 72 | 76 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 136 | 144 | 152 | 160 |
| 45 | | 50 | 54 | 59 | 63 | 68 | 72 | 72 | 77 | 81 | 86 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 153 | 162 | 171 | 180 |
| 50 | Bread | 55 | 60 | 65 | 70 | 75 | 80 | 80 | 85 | 90 | 95 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
| 55 | | 61 | 66 | 72 | 77 | 83 | 88 | 88 | 94 | 99 | 105 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 187 | 198 | 209 | 220 |
| 60 | | 66 | 72 | 78 | 84 | 90 | 96 | 96 | 102 | 108 | 114 | 120 | 132 | 144 | 156 | 168 | 180 | 192 | 204 | 216 | 228 | 240 |
| 65 | | 72 | 78 | 85 | 91 | 98 | 104 | 104 | 111 | 117 | 124 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 221 | 234 | 247 | 260 |
| 70 | Cereals | 77 | 84 | 91 | 98 | 105 | 112 | 112 | 119 | 126 | 133 | 140 | 154 | 168 | 182 | 196 | 210 | 224 | 238 | 252 | 266 | 280 |
| 75 | Dry pasta | 83 | 90 | 98 | 105 | 113 | 120 | 120 | 128 | 135 | 143 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 |
| 80 | | 88 | 96 | 104 | 112 | 120 | 128 | 128 | 136 | 144 | 152 | 160 | 176 | 192 | 208 | 224 | 240 | 256 | 272 | 288 | 304 | 320 |
| 85 | Dry rice | 94 | 102 | 111 | 119 | 128 | 136 | 136 | 145 | 153 | 162 | 170 | 187 | 204 | 221 | 238 | 255 | 272 | 289 | 306 | 323 | 340 |
| 90 | | 99 | 108 | 117 | 126 | 135 | 144 | 144 | 153 | 162 | 171 | 180 | 198 | 216 | 234 | 252 | 270 | 288 | 306 | 324 | 342 | 360 |
| 95 | | 105 | 114 | 124 | 133 | 143 | 152 | 152 | 162 | 171 | 181 | 190 | 209 | 228 | 247 | 266 | 285 | 304 | 323 | 342 | 361 | 380 |
| 100 | | 110 | 120 | 130 | 140 | 150 | 160 | 160 | 170 | 180 | 190 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 |

Using the carbohydrate calculator how many carbohydrates are there



In 30g of dry rice?

In 50g of cooked rice?

Plan for putting carb counting into daily life:

Who is responsible for carb counting and what resources to be used at:

Home:

School:

Relatives:

Friends:

Eating out:

Can you use handy measures?

.....

What barriers do you think there might be to accurate counting?

.....

How will you overcome those barriers? What support do you need?

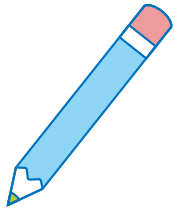
.....

What would help to involve and improve the carbohydrate counting skill of a person with diabetes?

.....

How balance are your meals?

Use the Eat Well Guide on the next page to divide your plates up by food group.



Breakfast



Mid-morning



Lunch



Mid-Afternoon



Evening meal



Supper



Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.



Water, lower fat milk, sugar-free drinks including tea and coffee all count.
Limit fruit juice and/or smoothies to a total of 150ml a day.

Choose wholegrain or higher-fibre versions with less added fat, salt and sugar
Potatoes, bread, rice, pasta and other starchy carbohydrates

Choose foods lower in fat, salt and sugars
Fruit and vegetables
Eat at least 5 portions of a variety of fruit and vegetables every day

Check the label on packaged foods

| | | | |
|-------------------|---------------|--------|------|
| Energy | Saturated Fat | Sugars | Salt |
| 1046kJ 250kcal | 1.3g | 34g | 0.9g |
| 13% | LOW | HIGH | MED |
| 4% | 7% | 38% | 15% |

Each serving (150g) contains
of an adult's reference intake
Typical values (as sold) per 100g: 697kJ / 167kcal

Choose foods lower in fat, salt and sugars

Beans, pulses, fish, eggs, meat and other proteins
Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat

Dairy and alternatives
Choose lower-fat and lower sugar options

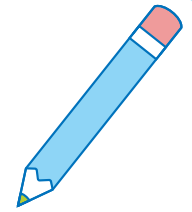
Oil & spreads
Choose unsaturated oils and use in small amounts



Eat less often and in small amounts

Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS

A healthy balance is achieved by eating the right proportions of foods in our diet.



Fruit and vegetables

- Eat a variety of fresh, frozen or tinned.
- Aim for at least _____ portions spread throughout the day. A portion is a handful or around 80g.
- Limit fruit juice to 1 glass a day.

Starchy carbohydrate foods:

Bread, pasta, rice, breakfast cereals

- Have foods from this group at each main meal
- Eat similar portion sizes of starchy carbohydrate foods at main meals. This will help to keep your blood glucose control consistent
- Try to use granary bread, basmati rice, pasta and high fibre breakfast cereals. These have a low glycaemic index and will keep you fuller for longer.

Protein foods:

Lean meat, poultry, fish, beans, eggs and alternatives

- Choose _____ portions a day
- A portion is about the size of your palm
- Eat oily fish twice a week, i.e. salmon, trout, mackerel, as these are rich in omega 3 and help to reduce risk of heart disease.

Milk and dairy:

Milk, yoghurt, cheese

- Aim for _____ to _____ portions a day.
- A portion is a pot of yoghurt, 150mls of milk or 30g cheese (matchbox)

Fat and sugary foods:

Crisps, chocolate, sweets, cakes, biscuits

- Keep these to a minimum as they contain very few vitamins and minerals
- Choose low fat options and have treats less often and in small amounts
- Choose unsaturated fat options

Drinks

Recommended:

- Limited that require insulin: Milk, fruit juice, hot chocolate
- Limited that do not require insulin: caffeinated drinks e.g. tea, coffee, diet fizzy drinks

Avoid:

The Eatwell Guide promotes a balanced and varied intake to improve health, and this will also improve your blood glucose control.

Some tips:

1. Eat three consistent meals that all have a similar mix of foods groups and portion sizes.

For example:

- Similar carbohydrate amounts
- Protein at main meals
- Including vegetables at each meal

2. Small fruit as a mid-morning snack that is no greater than 10g carbohydrate if having without insulin

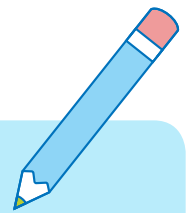
3. Having more whole foods and less processed foods

4. Having water or no added sugar drinks

5. Keeping high fat and sugary snack foods to a minimum

6. Avoid diabetic foods.

From the assessment with the dietitian of your usual meals compared with the Eatwell Guide. What do you think are the key changes that will improve your health and blood?



Your key changes

1

2

3

4

