Metabolic.ie

National Centre for Inherited Metabolic Disorders

Children's Health Ireland at Temple Street

Weaning Your Baby

on a PKU Diet

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Introduction

Weaning (complimentary feeding) is the process of gradually introducing solid food into your baby's diet. The overall aim is to have your baby join you at the table for family meal times.

Weaning is a time during which your baby will learn important skills. These include self feeding and development of muscles that are important for speech.

Weaning can be a busy time for parents. The time needed to feed a baby with PKU may be longer because of the different components to the diet. Our team of dietitians are here to support you along the way. This can be discussed on a weekly basis when calling for blood Phe levels.

When to Begin

The World Health Organisation (WHO) recommend starting to introduce weaning around the age of 6 months. However, weaning can begin as early as 17 weeks if your baby is showing appropriate signs of readiness to wean. If your baby is premature, please discuss weaning with your metabolic team.

Signs of readiness to wean

- Sitting with support and has good head control
- Coordination between eyes, hands and mouth-can look at food, pick it up and put it in their mouth
- Can swallow food instead of spitting it all back out

Signs often mistaken as readiness to wean

- Chewing fists
- Wakening for additional feeds at night-time
- Wanting extra milk feeds now and then

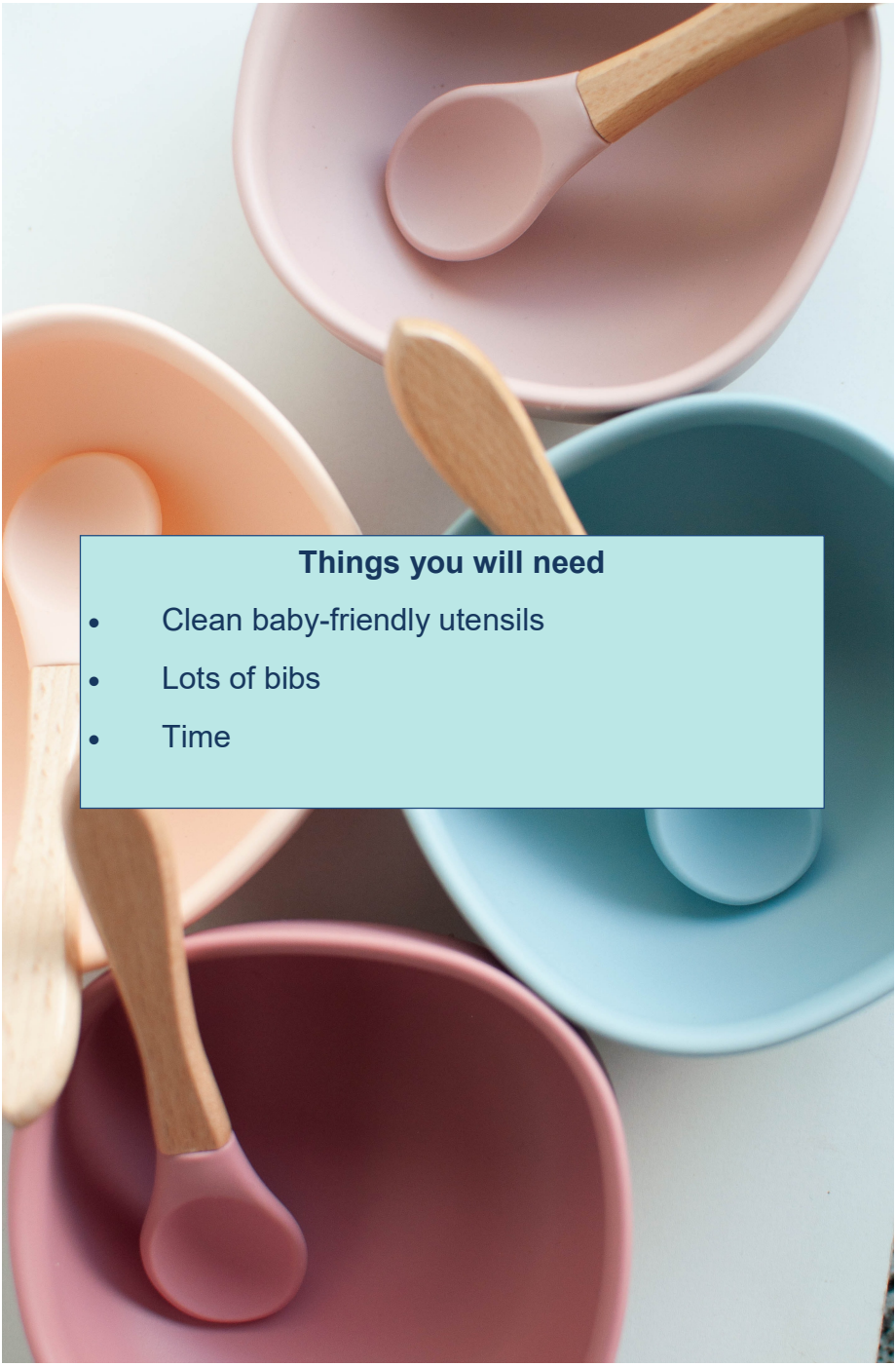
We do not recommend introducing solid food before 17 weeks, for nutritional and developmental reasons.

Reasons not to wean before 17 weeks
• Your baby's head control will not be ready for sucking and chewing food • Your baby's gut and kidneys will not be mature enough to cope with solid food • There is an increased risk that your baby will develop coeliac disease or type 1 diabetes later in life

Reasons not to delay weaning beyond 26 weeks (6 months)
• Your baby's increasing energy and nutrient needs will not be met by milk alone at 6 months • Delayed development of muscles for speech • Babies weaned later are less likely to eat a varied diet

Getting Started

- Choose a time to begin when both you and your baby are relaxed such as when older children are at school or at the weekend when you may have extra support
- Pick a time when your baby is hungry and alert, but not very hungry
- Ensure your baby is in a well supported seated position
- Choose a suitable food to begin with—see page 9
- Allow your baby to play with food and make a mess
- Your baby may only accept a small amount to begin with, you can gradually build up the amount from there. Go at your baby's pace, do not rush
- Avoid wiping your baby's mouth while they are eating
- If the food is rejected after a few attempts just try again at a different time of the day or the next day
- Always stay with your baby when they are eating to make sure they do not choke.



Things you will need

- Clean baby-friendly utensils
- Lots of bibs
- Time

What to Feed First

The first foods we advise to begin with are protein **free foods**. Most vegetables and fruit are naturally low in protein and will be an essential part of your child's diet. Remember, your child may like brussel sprouts even if you do not! Offer a wide variety of these foods.

Why not use the vegetables from your family meal? Just make sure there is no added salt

Babies have a natural desire for sweet tastes; it is better to introduce savoury food first.

Vegetables*

Carrots, sweet potatoes, swede/turnip, parsnips, butternut squash, cabbage, celery, cauliflower, courgette, cucumber, green beans, sugar snap peas, pumpkin, broccoli, aubergine, celeriac, peppers and beetroot. These can be introduced in whatever order you want

Fruit*

Apples, pears, peaches, strawberries, blueberries, tomatoes, olives, raspberries, nectarines, oranges, grapes, mangos, plums, banana and melon, dried fruit

*See page 10,11 and 21 on how to serve foods in a suitable way for babies

At first, offer one single vegetable or fruit at a time and then combine flavours when your baby is taking bigger quantities. You can offer these foods more than once a day to try and encourage acceptance of new foods.

Be led by your baby and feed to their appetite

For baby's who start weaning from 17 weeks

How to prepare vegetables & fruit

- Steam/boil vegetables or fruit until tender and soft*. Some ripe fruits do not need cooking
- Mash with a fork to remove large lumps and form a semi-smooth texture-cool boiled water or low protein milk can be added to achieve this.

* do not add salt (see page 34)

Home-prepared meals and snacks are a great way to start your baby's weaning journey. Use of shop-bought products can be a convenient option when on the go.

As your baby gets used to solid food, begin to add less liquid to the meals and mash to a lumpier consistency. Consider adding grated fruit or vegetables and giving soft finger foods from 6 months (see page 28).

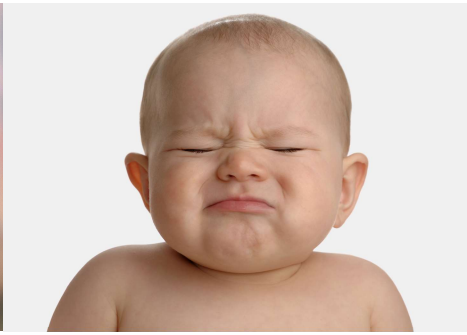
Baby-led weaning and PKU

Baby-led weaning means offering your baby only finger foods and allowing them feed themselves from the start. You can offer a range of small finger-sized pieces of food. This can be introduced from 6 months.

Some parents prefer baby-led weaning to spoon feeding while others combine both. There is no right or wrong way to introduce solid foods.
Discuss with your dietitian the best option for your baby.

What to expect

Your baby may make some odd facial expressions when trying a new taste. Don't be put off by this. This does not necessarily mean your baby doesn't like the food.



Did you know?

To help your baby to learn, keep offering new flavours over a few weeks. They may need to try a new food **10-15 times** before they accept it.

Parent Tip:

'The 3 day rule', if a food is refused offer it for 3 more days in a row. Usually by the third day they will eat it. If it is still refused the leave for a week then try again

Gagging verses choking

Gagging is a normal reflex which babies have as they learn to eat and swallow. This is a normal response that helps prevent choking.

If your baby gags, stay calm and tell them it's okay. Try not to panic. Gagging brings food forward into your babies mouth so that baby can chew it more, or try to swallow a smaller amount. Choking is where food obstructs the airway. Choking is silent where as gagging is not.

Please see https://www2.hse.ie/wellbeing/child-health/choking-strangulation-and-suffocation-in-babies-and-children/choking-in-babies-under-1-year.html and discuss with your public health nurse.

Messy food play

Messy food play is a really important part of your child's development and will help them accept new foods. This should be an enjoyable stage to share together.

Feeding Routine

There are several different elements to weaning on the PKU diet. Finding a routine which suits you and your baby is key. Here's a suggested feeding routine:

Breastfed baby

6am: Give a measured amount of PKU infant formula

7am: Then offer a **free** spoon feed, follow with breast milk to appetite

Bottlefed baby

6am: Give a measured amount of standard infant formula

7am: Offer a **free** spoon feed, follow with PKU infant formula to appetite

Introducing Protein

Once your baby is progressing well with eating and is managing to take around 10 baby spoons of free food/small baby bowl/ baby's fistful of suitable finger foods, your dietitian may recommend starting a protein containing food.

The protein in food is counted as ***exchanges***. An exchange is an amount of food which provides 1g of protein. You may prefer to give 1/2 an exchange to start and build this up over time.

1g protein = 1 exchange (1ex)

Once protein containing food has been started the amount of breast feeds/standard infant formula may change. We will discuss how to do this with you each week when discussing blood Phe levels.

Breastfed babies

The WHO recommend breastfeeding up to the age of 2 years. We will support you to continue breastfeeding for as long as you want, whilst introducing protein free and exchanges foods.

Suitable 1g protein exchange foods

- 2 level tbsp* Readybrek (8g uncooked)
- ½ Weetabix (10g dried)
- 1 heaped tbsp* porridge oats (10g uncooked)
- 1 small/‘egg-sized’ potato (80g cooked)
- ½ medium avocado (75g without stone)
- 1 tsp* dried red split lentils (4g uncooked)
- 1 tbsp* kidney beans (12 beans,15g cooked)
- 1 tbsp* chickpeas (15 chickpeas, 15g cooked)
- 1 tbsp* butter beans (17g cooked)
- 2 level tbsp* peas (frozen) (20g uncooked)
- 1 tbsp baked beans (20g uncooked)
- Unsalted plain rice/corn/oat cakes**
- Regular penne pasta (8g uncooked**)
- 1 blue scoop rice/couscous/quinoa (cooked)
- Measured amount of natural yoghurt or smooth nut butter or tahini** ensure to mix well before use

Note: the texture offered will depend on your babies stage of weaning-you may need to mash or chop. For example mash beans or chickpeas.

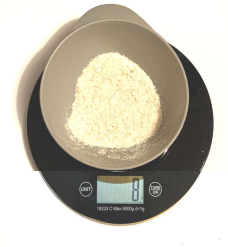
Speak to your Dietitian about our available recipe book ‘Love Real Food’

* Tbsp=tablespoon/ tsp=teaspoon

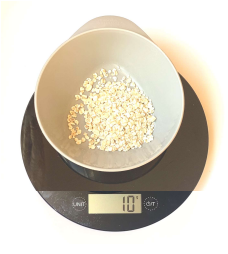
** Check the label

1/2 (10g) dried Weetabix

Weetabix with water or low protein milk



8g uncooked or 2 level tablespoons of Ready Brek



10g (uncooked) or 1 heaped tablespoon of porridge oats

75g or 1/2 avocado (no stone)

1 tablespoon or 15g cooked/tinned chickpeas

1 tablespoon or 15g cooked kidney beans

2 level tablespoons or 20g frozen peas

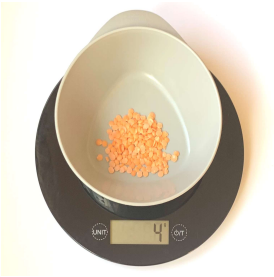
1 tablespoon or 20g baked beans

2 unsalted rice cakes (check label) OR 2 corn cakes (check label)

80g of cooked potato

1 blue scoop of cooked couscous

6 pieces 8g uncooked regular pasta (check label pasta may vary)



4g or 1 tsp of dried red split lentils

Example: batch cooking chickpeas to add into food later

- Take 10 tablespoons/ 150g of chickpeas and heat in a small quantity of water
- Mash/blend them to the right consistency for your child
- Divide into 10 equal portions (you could use ice cube trays) and freeze them. Each portion = 1 exchange

Example: batch cooking stew with red split lentils

Ingredients	**Method**	**Dividing into exchanges**
55g Leek 75g Carrot 95g Sweet Potato 80g Potato **(1ex)** 28g Red Split Lentils **(7ex)** 30g Turnip/Swede 10g Tomato Puree Small piece garlic **Total weight of ingredients 375g/ 8ex**	Place all the ingredients in a pan, just cover with water and bring to the boil. Simmer until all the vegetables are fully cooked.	The total cooked content weighed 504g Divide the total weight (cooked) by the number of exchanges in the pan (8 ex) 504 ÷8 =63 **63g cooked food = 1ex**

Cooked ingredients

Mashed with a fork

Blended with a stick blender

1ex/63g weighed out

Top tips for food preparation :

- Consider using ice cube trays or zip lock bags for batch cooking
- To add grip to finger foods, leave skins on such as banana cone and avocado

- If re-heating frozen batch cooked foods, make sure it is fully defrosted and heated thoroughly—watch out for hot spots if microwaving

Moving On

Your baby will move through the stages of weaning naturally at their own pace. You can encourage and guide them by:

- Offering new foods and flavours regularly - adding mild spices and herbs for flavour
- Progressing to lumpier textures and harder finger foods as they can manage
- Allowing your baby to self-feed
- Trying to eat together as a family
- Aiming to adapt family meals from about 9 months of age, e.g. spaghetti bolognaise using low protein pasta with tomato based sauce and mixed vegetables
- Introducing more exchanges as food following the advice of your dietitian

Progressing with Textures

Once your baby can manage smooth textures, the introduction of mashed/lumpier texture foods is advised.

- Avoid large chunks of food such as raw carrot sticks, apple chunks, whole beans, dried fruits, whole nuts, whole grapes, cherry tomatoes.
- Make the finger foods slightly bigger than the baby's hand to help with grip.

Food preparation tips to reduce choking risk:

Soft/mashable foods

Vegetables—cooked and mashed with a fork

e.g. carrots, parsnip, courgette, butternut squash, cauliflower, green beans, broccoli, pepper, swede, potato*, butterbeans*, chickpeas*, kidney beans*, sweetcorn*

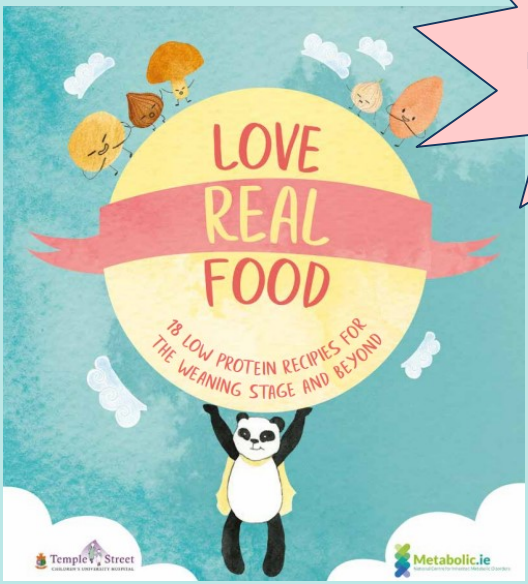
Fruit—raw and mashed with a fork

e.g. avocado*, melon, mango, kiwi, banana, peach, pear, raspberries

Yoghurt -plant or animal based (check label for exchanges)

* contain exchanges

Check out our recipe book 'Love Real Food'



Finger foods/chopped foods

- Prepared foods; grated low protein cheese, grated soft fruit (apple, pear) or vegetables (carrots)
- Cooked regular or low protein pasta chopped up
- Avocado slices
- Soft batons of vegetables e.g. carrots, parsnips, asparagus,
- Fingers of boiled potatoes/sweet potato
- Lower protein vegan cheese pieces
- Bread sticks or crispbread (gluten-free or low protein)
- Low protein bread toasted
- Mini rice cakes
- Yoghurt bread*
- Potato bread*
- Low protein omelette pieces* or egg muffin*
- Chickpea fingers or fritters*
- Low protein pancakes *
- Banana or Broccoli bites*
- 'Flippin' fantastic savoury pancakes*/low protein pancake/ regular pancake (check label for exchanges) Cous cous cakes*

*Recipes in Love Real Food recipe book **https://metabolic.ie/wp-content/uploads/2019/10/Love-Real-Food-Recipe-Book.pdf**

Food refusal

Food refusal is a normal part of the weaning process. We understand this can be difficult especially when you are trying to count protein exchanges and keep blood Phe levels in range. It can be helpful to divide the exchange foods when eating into portions on the plate e.g. 1 exchange of potato divided in two. This will help estimating how much has been eaten. When self feeding do your best to estimate food consumed and count as exchanges but don't worry if this is not exact. as this is not always possible. This can be stressful but remember it is just a phase.

What about Allergens?

Common foods associated with childhood allergies include:

- Milk
- Gluten *(from wheat, barley, rye, oats)*
- Peanuts *(whole or chopped nuts should not be given to children under 5)*
- Egg
- Fish

Check out our recipe book 'Love Real Food'

It is advised that these foods are introduced at around 6 months of age, as delaying the introduction could increase the risk of developing an allergy to that food. These foods are high in protein so speak to your dietitian about suitable recipes to help you to include small amounts in your baby's weaning diet.

Once successfully introduced try to include in your child's diet once a week.

How to introduce these foods :

- One at a time, with a suggested three day gap between each new food– if an immediate or delayed type allergic reaction happens it will be easier to identify the suspected food
- First thing in the morning and when your baby is well
- For peanut choose a suitable texture such as smooth nut butters-sugar and salt free

If your baby has a family history of food allergies please speak to your dietitian.

Vitamin D

If your baby is breastfed and taking less than 300ml of PKU infant formula, they should take 5 micrograms (5ug) of Vitamin D3 every day. This will need to continue throughout the weaning process and until they are 1 year old. Your dietitian or pharmacist can help you with finding a suitable vitamin D supplement for your baby's needs.

If your baby is fully bottle fed and is taking more than 300ml/day of regular and PKU infant formula combined then they will not need to be given a Vitamin D3 supplement.

Introducing a Second Synthetic Protein

- From the age of 6-9 months a second synthetic protein will be introduced. Try to offer it at the same time each day.
- It has a similar taste to PKU infant formula and can be given off a spoon. This allows your baby to fully taste their synthetic protein and take less of their PKU infant formula which allows room for food
- Do not add the second stage protein to food as you may put your baby off foods they usually like
- We still encourage your baby to remain on some PKU infant formula in conjunction with the spoonable options below

There are three options:

- PKU Anamix First Spoon
- PKU Squeezie
- PKU Explore 5

Parent Tip:

If your child is refusing their second stage protein leave the bowl and spoon with them and allow for some messy play. They will lick some off their hands/lips and build up a taste for it.

Introducing the Beaker

It is a good idea to introduce a beaker/cup when you begin weaning. Offer sips of cool boiled water or PKU infant formula with meals. By 1 year of age, it is recommended all drinks are taken from a beaker.

Why move on from a bottle to a beaker?

- It makes the change to the next stage synthetic protein easier
- It is better for your baby's teeth
- Using a beaker without a valve will help your baby learn to sip and strengthen muscles they need for eating and speaking

What should you put in the beaker:

- PKU infant formula
- Cool boiled water
- Low protein milk

Avoid giving juice of any type to your baby. Drinking water will get them into good habits for life and keep teeth healthy.

Parent Tip:

Use different beakers for your baby's water and their PKU infant formula.

What to look for in a beaker?

- A free flowing spout
- Handle on both sides
- For example: Tommee Tippee Free Flow Trainer Cup, Ikea Borja Training Cup

At first your baby will find it difficult to drink from a beaker. With some practice at every meal they will quickly learn to drink from it.

Open cup (from 6 mths)	Free flowing beaker / sippy-cup (from 6 mths)	Pop up straw bottle-free flow (from 9 mths)

Bottled water is not recommended as it can contain too much sodium. If using, look for water with a low sodium content i.e. less than 2mg per 100ml. Brands such as Evian and Volvic are suitable. Please check all bottled water before using. Please see guidance from the FSAI on recommendations for bottled water for babies.

Sample meal options:

Breakfast

- Porridge
- Ready brek
- Weetabix
- Low protein omelette slice
- Yoghurt (plant or animal based)

PKU Infant formula/water from a beaker

Mid-morning

PKU Anamix first spoon /PKU Squeezie/ PKU Explore

Finger food/snacks

- Banana cone
- Mango or soft pear slices
- Kiwi
- Low protein toast slices / crackers

Lunch

- Low protein or gluten free crispbread with hummus/cream cheese (vegan or regular)
- Red split lentils /mashed chickpeas /butter beans + mixed vegetables
- Mashed potato and vegetables
- Chopped up low pasta and a tomato-based sauce
- Creamy spiced sweet potato* with broccoli & peas*,
- Lentil pate*
- Curried chickpea fritter* with quartered cherry tomatoes
- Bangin' broccoli ball* served with relish
- Potato bread* (served with roasted courgette and peppers
- Homemade 'free' vegetable soup
- Low protein pancakes and grated vegan cheese

*check label to calculate quantity permitted (see page to 36 for this calculation)

PKU Infant formula/water from a beaker

Mid-afternoon

PKU Anamix first spoon /PKU Squeezie/ PKU Explore

Teatime

- See lunch options

PKU Infant formula/water from a beaker

Foods to avoid	Reason why
Salt and high salt foods Do not add salt to your baby's food or cooking water. This includes not using stock cubes, gravy, packets/jars of sauce or soup, or crisps.	Salt can be damaging to your babies kidneys.
Sugars and high sugar/fat foods Avoid sugar and high sugar/fat foods such as jams, jelly, fruit juice and dilutable squash, biscuits, chocolate, ice-cream, fizzy drinks, sweets and sugar sweetened breakfast cereal and sugar sweetened yoghurt	Foods high in suagr and fat are not recommended even as exchange foods. These foods will either overwhelm your babies appetite for nutricious foods or provide too many calories which may lead to overweight and obesity. High sugar foods will cause dental decay.

Foods high in salt , fat and sugar should be avoided

Foods to avoid	Reason why
Honey (in babies less than a year)	Honey can contain bacteria that can produce toxins in a baby's intestines, leading to infant botulism, which is a very serious illness.
Rice Milk is unsuitable for children for under 5 years	Arsenic is found naturally in the environment and can find its way into our food and water. Rice tends to take up more arsenic than other grains, but this does not mean that you or your baby cannot eat rice.

Honey must be avoided by babies under 1 year

Reading Food Labels

Are there exchange foods in the ingredients list?

(Such as milk, baby rice, wheat, potato, flour, rice, egg, pasta, peas)

Yes

Use the guide over the page to work out how many exchanges in the food

Example: 'Baby Food' Apple & Blueberry Dessert (125g jar).
Ingredients: Apples, Blueberries, Ground Rice.
The nutritional information states that there is 0.6g protein per 125g jar. Rice is an exchange food so this item needs to be counted according to the protein content on the nutritional label.

No

This is considered a protein free food

Example: 'Baby Food' Mango, Apple & Peach 100% Fruit Pouch.
Ingredients : Mango, Apple, Peach.
The nutritional information states that there is 0.5g protein per 100g pouch. However, this item should be classified as free because it is made entirely of permitted protein free food.

How to work out the number of exchanges per portion

If a food contains protein you will need to work out how many exchanges are in a portion. Use the guide below to help you.

Protein content (grams) per portion	Number of exchanges
0 -0.3g	Free
0.4g -0.7g	½
0.8g -1.2g	1
1.3g -1.7g	1 ½
1.8g -2.2g	2

If the protein content per portion is not listed you can calculate this yourself using the information provided on the nutrition label. To do this you will need to know two things:

- The weight/amount of the food to be eaten (grams)
- The protein content per 100g of the food (grams)

This is how it is done:

$$\frac{\textit{Weight of food to be eaten (g)} \times \textit{protein content (g) per 100g}}{100}$$

The next few pages contain examples of how to read nutritional labels.

Remember to look out for **ASPARTAME (E951 or E962)** it is not permitted because it contains a source of Phenylalanine**.**

Example 1: ‘Baby food’ carrot and parsnip

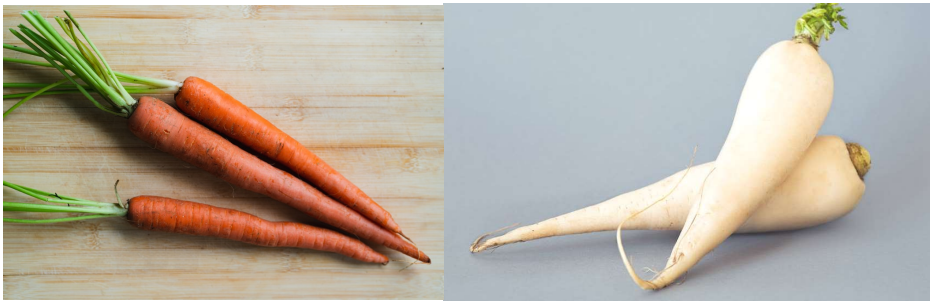
Ingredients: Carrots, parsnips

120 g jar

Nutritional Information	Per 100 g	Per Jar
Energy (kcal)	48kcal	58kcal
Carbohydrate	10.1g	12.1g
(of which sugars)	9.2g	11.0g
Fibre	1.4g	1.7g
Protein	0.5g	0.6g

Step 1: Look at the ingredients. Carrots and parsnips are both ‘free’ foods. These are the only ingredients so this baby food is a ‘free’ food and you do not need to use the nutritional label to check the protein content.

Both carrots and parsnips are ‘free’ foods



Example 2: ‘Baby food’ broccoli, pea and pear

Ingredients: Broccoli, peas, pears

120 g pouch

Nutritional Information	Per 100 g	Per Pack
Energy (kcal)	52kcal	62kcal
Carbohydrate	10.1g	12.1g
(of which sugars)	7.9g	9.5g
Fibre	2.8g	3.4g
Protein	1.0g	1.2g

Step 1: Look at the ingredients. Broccoli and pears are both ‘free’ foods. However, peas are an exchange food. Therefore, you need to use the nutritional label to work out the protein content.

Step 2: Looking at the nutritional label.

1 pack = 1.2 g protein. Therefore, 1 pack = 1 exchange

Peas contain exchanges so use the protein content on the label

Example 3: ‘Baby food’ carrot and potato

Ingredients: Carrots, potatoes, ground rice

125g jar

Nutritional Information	Per 100 g
Energy (kcal)	51kcal
Carbohydrate	7.4g
(of which sugars)	2.8g
Fibre	2.3g
Protein	1.1g

Step 1: Look at the ingredients. Carrots are a ‘free’ food. Potatoes and rice are both exchange foods. Therefore, you need to use the nutritional label to work out the protein content.

Step 2: Look at the nutritional label.

Protein per 100 g = 1.1 g protein. However, the jar is 125 g.

Step 3: Use the formula to work out how many exchanges are in the full jar

$$\frac{\text{Protein content per 100 g (1.1 g) x weight of product to be eaten (125 g)}}{100}$$

1 jar = 1.3 g protein. Therefore, 1 jar = 1 ½ exchanges

Example 4: ‘Baby food’ apple rice cakes

Ingredients: Wholegrain rice, apple juice, cinnamon

Nutritional Information	Per 100 g	6 g (Per 3 cakes)
Energy (kcal)	393kcal	24kcal
Carbohydrate	83.2g	5.0g
(of which sugars)	14.1g	0.8g
Fibre	3.1g	0.2g
Protein	7.5g	0.5g

Step 1: Look at the ingredients. Rice is an exchange food. Therefore, you need to use the nutritional label to work out the protein content.

Step 2: Looking at the nutritional label.

3 cakes = 0.5 g protein = ½ exchange

Which means we can work out that:

1 cake =0.16g protein = free

2 cakes = 0.3g protein = free

6 cakes = 1g protein = 1 exchange

Rice contains exchanges so use the protein content on the label

Additional information on reading labels

Some foods that are not on our exchange lists, you might need to work out the amount of food that is 1 exchange such as cereal or baby rice.

Weight of product that is 1 exchange:

$$\frac{1 \times 100}{\text{Protein content per 100 g}}$$

Weight of product for your required number of exchanges:

$$\frac{\text{No. of exchanges} \times 100}{\text{Protein content per 100 g}}$$

The following example shows you how to use this information.

Example 5: ‘Baby Food’ rice

Ingredients: Organic rice

Nutritional information	**Per 100 g Dry weight**
Energy (kcal)	387Kcal
Carbohydrate	86.7g
(of which sugars)	Trace
Fibre	1.8g
Protein	6.9g

Step 1: Look at the ingredients. Rice is an exchange food. Therefore, you need to use the nutritional label to work out the protein content.

Step 2: Looking at the nutritional label. Protein per 100 g = 6.9 g protein.

Step 3: Use the formula to work out how many grams of this baby rice is 1 exchange.

$$\frac{1 \times 100}{6.9}$$

= 14 g of this baby rice for 1 exchange

$$\frac{2 \times 100}{6.9}$$

= 29 g of this baby rice for 2 exchanges

Now its your turn...

Ingredients:

Container size:

Nutritional information	**Per 100 g**
Energy (kcal)	
Carbohydrate	
(of which sugars)	
Fibre	
Protein	

Step 1: Look at the ingredients.

Step 2: Look at the nutritional label.

Step 3: Use suitable formula

Notes:

Notes:

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