CAMBRIDGE
International Education

Cambridge IGCSE™

FOOD AND NUTRITION **0648/12**

Paper 1 Theory **May/June 2025**

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	<u>'List rule' guidance</u> For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standard isation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	Correct point or mark awarded
	Incorrect point or mark not awarded
	Benefit of the doubt given
Highlighted text	Highlighting areas of text
On-page comment box	Allows comments to be entered on the page
Off-page comment box	Allows comments to be entered at the bottom of the marking window and then displayed when the associated question item is navigated to
	Benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied
	Information missing or insufficient for credit
	Repetition in response

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Annotation	Meaning
I	Incorrect or insufficient point ignored while marking the rest of the response
R	Incorrect point or mark not awarded
CON	Contradiction in response, mark not awarded
SEEN	Point has been noted, but no credit has been given or blank page seen
	Key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen

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Question	Answer	Marks
1	*term used to describe the food that is normally eaten every day* diet;	**1**

Question	Answer	Marks
2(a)	*why some proteins have a higher biological value than others* biological value depends upon the number of amino acids in the protein; some/8/10 amino acids are called essential / indispensable amino acids (EAA/IAA); EAA/IAA cannot be made / made fast enough by the body and need to be provided by food; not all protein foods contain <u>all</u> EAA/IAA; protein foods that contain <u>all</u> the EAA/IAA have high biological value (HBV) / are complete proteins; protein foods that have one or more EAA/IAA missing have low biological value (LBV) / are incomplete proteins;	**3**
2(b)(i)	*animal foods that are a source of HBV protein* dairy foods or named example e.g. cheese, milk, yoghurt etc.; eggs; fish / seafood or named example; meat / poultry or named example; offal or named example;	**2**
2(b)(ii)	*plant foods that are a source of HBV protein* amaranth; buckwheat; chia; hempseed; quinoa; Quorn; soya or named soya product e.g. milk, cheese, yogurt, tofu, tempeh, edamame; spelt; teff;	**3**
2(c)	*reason why young children require a good supply of protein* growth – children are going through rapid growth (of bones, muscles, cells, tissues) / growth spurt / growing a lot / still growing; repair – due to small children falling over;	**2**

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Question	Answer	Marks
3(a)	*monosaccharide that should be eaten to give an immediate release of energy* glucose;	1
3(b)	*enzymes involved in the digestion of carbohydrates* lactase; maltase; pancreatic amylase; salivary amylase/ptyalin; sucrase/invertase;	2

Question	Answer	Marks
4(a)	*groups of fats and oils* monounsaturated; polyunsaturated;	2
4(b)	*health issues that could result from a diet high in saturated fat* breathing / respiratory problems; artery walls blocked/narrowed/clogged / CHD / heart disease; excess fat / adipose tissue stored under skin / around internal organs causing weight gain / overweight / obesity; high blood pressure / strokes; IBS; psychological problems / low self-esteem; problems with the knees / hips / spine / arthritis caused by obesity; obesity increases the risk of complications during surgery / pregnancy / childbirth;	4

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Question	Answer	Marks
5(a)	*name for vitamin B_{12}* cobalamin;	1
5(b)	*functions of vitamin B_{12} in the body* aids metabolism / use of/release of energy (from amino acids / carbohydrate / fat); formation of red blood cells; growth; health/function/maintenance of nervous system; prevents (megaloblastic) pernicious anaemia; production DNA/RNA / works with folic acid;	3
5(c)	*why some vegans may suffer from a deficiency of vitamin B_{12}* natural food sources of vitamin B_{12} are generally found in animal foods/products; vegans consume no animal foods/products; B_{12} is not found in many plant food; vegans need to purchase plant food that has been fortified with B_{12} (cereals, some plant milks, some soy products and some breakfast cereals); some vegans may be averse to taking / do not know about available supplements;	2

Question	Answer	Marks
6(a)	*reasons to include calcium in the diet* helps increase bone density which increases bone mass; helps prevent rickets / osteoporosis/brittle bones / osteomalacia/adult rickets / osteopenia / tooth decay / tetany; involved in blood clotting; needed for building and maintaining healthy/strong bones/teeth/nails; needed for growth/contraction/development/repair/movement of muscles; needed for nerve function; needed for the maintenance of a regular heart beat;	4
6(b)(i)	*deficiency disease caused by poor supply of iron* anaemia;	1
6(b)(ii)	*deficiency disease caused by a poor supply of iodide* goitre;	1

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Question	Answer	Marks
6(c)	*sources of phosphorus* dairy products e.g. milk, cheese, yogurt; eggs; fish / seafood or named example; legumes / pulses or named example e.g. beans, lentils; meat / poultry or named example; nuts or named example; offal or named example; Quorn; seeds e.g. amaranth, quinoa, sunflower, pumpkin; wholegrain cereals and products;	**4**
6(d)	*why people who have a high-sodium, low-potassium diet have a high risk of hypertension* high sodium intake raises blood pressure / risk of heart disease / stroke; when sodium levels are excessive kidneys cannot excrete enough sodium; sodium builds up in the blood; sodium attracts and holds water leading to increased blood volume / causes water (bodily fluid) imbalance / water retention; potassium helps sodium to be excreted through urine / helps regulate water (bodily fluid) balance so if low intake this function not performed and leads to build up of fluid / oedema / high blood pressure; potassium counteracts the effects of a high sodium intake by relaxing blood vessels so if low intake this function not performed leading to constricted blood vessels / high blood pressure; potassium lowers blood pressure so if low intake this function not performed leading to high blood pressure;	**4**

Question	Answer	Marks
7(a)(i)	*gas produced when using bicarbonate of soda* carbon dioxide / CO_2;	**1**
7(a)(ii)	*guidelines for storing bicarbonate of soda in the home* store in a cool place (such as a cupboard) / away from sunlight; keep away from moisture / keep dry / avoid humid conditions / do not store in fridge; keep in an airtight container; keep the container lid closed/covered/sealed; use stock rotation / use oldest first / do not mix old and new stock;	**3**

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Question	Answer	Marks
7(b)	*how to make the gingerbread using the melting method* sieve dry ingredients (flour, soda and ginger) into mixing bowl; make a well in centre of dry ingredients; melt/warm fat, sugar and syrup until the sugar is dissolved and stir with wooden spoon/spatula; whisk/beat (with a fork) egg and milk; cool the melted mixture; pour cooled melted mixture into dry ingredients; use a wooden spoon/spatula to mix; add egg and milk mixture to bowl; mix all ingredients to a smooth batter;	**5**
7(c)(i)	*reasons why there are little air holes on the surface of the baked cake* the mixture was not placed in the oven quickly enough after making / batter was left to stand before baking; the oven temperature was too low; the raising agent was not evenly mixed through the batter / dry ingredients not sieved together;	**2**
7(c)(ii)	*reasons why the cake has sunk in the middle* too much raising agent; too much syrup; oven door opened too soon/before the cake was set; too hot an oven; cake removed from the oven too soon and is under-baked/under-cooked;	**2**

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Question	Answer	Marks
8(a)	*oil suitable to use for deep frying* avocado oil; canola oil / rapeseed oil; coconut oil; corn oil / maize oil; cotton seed oil; palm oil; peanut oil / groundnut oil; safflower oil; soya oil; sunflower oil; vegetable oil;	**2**
8(b)	*effects of deep frying on the nutritional value of potatoes* fat/energy/calorie content increased; loss of water-soluble vitamins / vitamin B destroyed / vitamin C destroyed; fat-soluble vitamins increased / vitamin A/D/E/K content increased;	**2**
8(c)	*words to describe texture of deep-fried potatoes* crisp; crunchy; fluffy; greasy/oily; moist; soft; tender;	**3**

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Question	Answer	Marks
9(a)	*names of dairy foods* butter / ghee; buttermilk; cream (double/single/sour/clotted); crème fraîche; fromage frais; ice cream; kefir fermented milk drink; yogurt;	**3**
9(b)	*why some types of cheese are not suitable for lacto-vegetarians* cheese may not contain vegetable rennet/enzyme / cheese contains animal rennet/enzyme;	**1**
9(c)	*foods that mould commonly grows on* bread; cakes; fruit or one named example; jam / marmalade; milk; open canned or bottled foods e.g. sauces, beans, ketchup, puree; vegetables or one named example; yogurt;	**2**
9(d)	*how cheese should be stored in the home to minimise food spoilage* reseal the packet; cover/seal/wrap in plastic bag / foil / waxed paper / greaseproof paper / parchment paper/cling film / cheese paper; store in an air tight box / cheese dish; store in a cool place / refrigerator (0 – 8 °C);	**3**
9(e)	*why a person who is lactose intolerant should not eat a cheese sandwich* cheese is made from milk; milk/cheese contains (disaccharide) lactose/milk sugar; during digestion the enzyme lactase breaks down lactose (into glucose and galactose); person with intolerance to lactose has a shortage of the enzyme lactase; person who is lactose intolerant would be unable to digest lactose;	**3**

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Question	Answer	Marks
10(a)	*reasons for protecting food with packaging* physically protect food (such as soft fruits /eggs from damage/bruising/breakage) / to keep it in good condition during transport/storage; protection from deterioration due to environmental damage / atmospheric changes / temperature change / light penetration / humidity differences / oxidation / dust / entry of liquid; protection from microorganisms; protection from vermin / insects / rodents; protection from cross-contamination from people handling (contact with infected food); protection from tampering of the food;	**4**
10(b)	*disadvantages of using metal as a packaging material* contributes to landfill if not recycled; emissions produced from recycling process adding to global warming / pollution issues; high fuel energy costs incurred during recycling process add to cost to manufacturer for packaging outcome; metal cannot be used in a microwave as it reflect the microwaves instead of absorbing them and this damages the magnetron / will cause arcing; metal is a heavy material and adds weight to the product and this makes it heavier to carry for the consumer and adds to transportation costs; metal is an expensive material to produce due to many stages of manufacture (from mining through to final product assembly); metal is mined from a non-sustainable source so depleting resources for future generations; metal packaging is not transparent so it is not possible to see the food; metals are easily damaged/dented which can lead to food poisoning issues; metals are not compostable / biodegradable / are difficult to dispose of; metals endanger wildlife e.g. animals with cans on their snouts; most metals are not re-useable and must be disposed of thoughtfully / recycled; once opened cannot be closed/resealed so leftover product must be transferred to alternative storage container; ring cans / cans can be difficult to open; some metals, such as steel, are corrosive and unless food products are stored in dry conditions the quality of the food can be affected as the can rusts; there is a risk of injury from sharp edges after opening cans;	**4**

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Question	Answer	Marks
11	*advantages of using paint as a wall covering in a kitchen* available in a wide range of colours / can add colour to the kitchen; can have anti-mould properties/additives; can have specialist kitchen paints that are able to withstand high levels of moisture / condensation / steam / are resistant to water; durable / hard-wearing / long lasting so no need to frequently re-decorate; easy to change to help coordination of colour palette and style; easy to clean and maintain so should not allow growth of bacteria and mould; generally resistant to grease / hot oil splashes; not as expensive a method of wall covering compared to tiling;	**5**

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Question	Answer	Marks
12	*Obesity is a common health issue often caused by an incorrect diet. Discuss ways to prevent obesity when planning family meals.* change cooking methods grill / bake / steam food to avoid adding extra calories in the form of fat; choose fish / white meat more often than red meat as it has less energy providing fat; cook meals from scratch to ensure extra calories are not being consumed through use of high fat/sugar ingredients; eat breakfast to stimulate metabolism and help prevent snacking/grazing; encourage eating of appropriate portion sizes for age/lifestyle so extra energy is not consumed; encourage eating regular meals / avoid skipping meals as this results in hunger so leading to overeating/binge eating of energy rich foods; encourage good eating habits in childhood so good ground rules are laid down early; ensure individual intake of dietary energy is equal to expenditure / input equals output so excess energy is not stored in the body as fat; increase intake of fruits as they are less energy dense and provide satiety from NSP; increase intake of vegetables as they are less energy dense and provide satiety from NSP; increase intake of wholegrains / starchy foods as they are low in energy density and provide satiety from NSP; limit amount of fried foods eaten as they provide the body with extra calories; limit amount of processed meats / sausages / burgers eaten as they are high in fat which contributes to energy intake; limit consumption of foods high in sugar / cakes / biscuits / chocolate / sweets as they provide the body with extra calories/energy which if not used will lead to obesity; limit consumption of foods such as ready meals / pre-prepared convenience foods / fast foods / takeaway meals as these tend to be high in fat and provide the body with extra calories/energy; limit consumption of sugary drinks / sweetened beverages / replace with water to avoid extra calorie intake contributing to obesity; limit intake of protein rich foods as they can turn to glycogen if not used for primary function and then stored as fat / adipose tissue; refer to nutritional tools/websites/apps to gain knowledge of suggested guidelines on how to plan balanced meals / use for calorie counting; replace sugar in beverages / cakes / desserts etc. with sweetener to limit intake of energy/calories which may not be expended and lead to obesity; select dairy foods that are low in fat such as milk / spreads / cheese / yoghurt to reduce intake of unwanted calories; substitute oils/butter for herbs/spices when seasoning to limit addition of fat/calories/energy which may not be expended and lead to obesity; substitute pulses / legumes as proteins as they contribute less fat into the diet than meat; when choosing meat select leaner cuts / lower fat % content and remove any visible fat/skin; when shopping read labels to avoid foods high in fat and sugar which contribute to extra consumption of energy;	**15**

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Question	Answer	Marks
13	*Use your knowledge of nutrition and meal planning to discuss the vitamin requirements of a pregnant lacto-vegetarian and her developing baby.* *vitamin requirements [max 12 marks]* vitamin A/retinol is an antioxidant to help maintain a healthy immune system / reducing the risk of infection during pregnancy / required to produce visual purple/rhodopsin for developing baby and keeps the mucous membranes in the throat / digestive / bronchial / excretory systems moist and free from infection / promotes healthy skin; sources of vitamin A: animal sources as retinol: milk, cheese, butter, egg, yogurt; plant sources as beta-carotene which can be converted into vitamin A in the body apricots, carrot, green leafy vegetables (or named e.g. spinach/watercress/parsley/cabbage/broccoli), mango, orange, red pepper, tomatoes; vitamins in B group release energy from protein / fats / carbohydrates, energy is needed to support the growth of the developing baby / health and maintenance of the body's nervous system; sources of thiamine/B1, riboflavin/B2, niacin/B3: nuts, wholegrain cereal, fortified cereal products, wholemeal bread, potatoes, milk and dairy products, eggs, yeast and yeast extracts, Quorn, Nori seaweed, seeds, green vegetables, mushrooms; vitamin B9 / folate / folic acid (synthetic form of folate) essential for normal growth of developing baby, reduces risk of neural tube defects, e.g. spina bifida, cleft lip/palate in the developing baby, formation of red blood cells, production of nucleic acids DNA and RNA, lowers risk of premature birth; sources of vitamin B9: asparagus, bananas, cheese, fortified cereals, grapefruit, green leafy vegetables, milk, nuts, okra, oranges, potatoes, pulses, seeds, whole wheat / wholegrain cereals, yeast extract, yoghurt; vitamin B12/cobalamin reduces the risk of megaloblastic anaemia in woman / reduces the risk of the baby being born with neural tube defects e.g. spina bifida, cleft lip/palate / necessary for the formation of nucleic acids DNA and RNA / formation of red blood cells / important for the formation of the myelin / sheath surrounding each nerve fibre; sources of vitamin B12: eggs, cheese, yeast extract, fortified cereal products, B12-fortified dairy-free alternatives such as soya, oat and almond and dairy-free alternative drinks or spreads; vitamin C/ascorbic acid to enhance absorption of iron / prevent anaemia / help form connective tissues in developing baby / antioxidant to help maintain a healthy immune system therefore reducing the risk of infection during pregnancy / helps heal wounds / building and maintenance of skin and linings of the digestive system, source of NSP; sources of vitamin C: citrus fruit, rose hips, kiwi fruit, strawberries, mango, green peppers, new potatoes, tomatoes, green vegetables;	**15**

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Question	Answer	Marks
13	vitamin D/cholecalciferol to absorb calcium / prevent tetany / low birth weight / osteomalacia/osteoporosis in mother / lack of vitamin D during pregnancy can adversely affect foetal bone development; sources of vitamin D: butter, cheese, cream, eggs, fortified fat spreads, fortified breakfast cereals, margarine, milk, yoghurt, mushrooms; vitamin E/tocopherol has antioxidant properties to help maintain a healthy immune system therefore reducing the risk of infection during pregnancy / reduces scar tissue formation both internally and externally so good for mother; sources of vitamin E: soya bean, olives, nuts, seeds, whole-grains, wheatgerm, milk, margarine, butter, egg, grasses, avocado, tomato, mango, kiwi, green leafy vegetables / broccoli, quinoa; vitamin K assists in the promotion of coagulation factors in the blood to enable it to clot properly / prevents haemorrhaging in first month after birth / aids the absorption of calcium in bone / helps protect against osteomalacia / osteoporosis; sources of vitamin K: green leafy vegetables, milk / dairy foods, cereals, kelp, alfalfa, egg yolks, black strap molasses, polyunsaturated oil / vegetable oil; *specialised knowledge [max 3 marks]* vitamin A can be toxic in large quantities especially for the developing baby causing liver damage / birth defects / skin disorders / bone damage / nervous system problems / eye problems / spina bifida / cleft palate; pregnant women should avoid foods very high in vitamin A / select plant sources which contain around one sixth of animal source value as vitamin A can be toxic in large quantities, especially for the developing baby, causing liver damage / birth defects / skin disorders / bone damage / nervous system problems / eye problems / spina bifida / cleft palate; in order to retain vitamin B, which is water-soluble, consider methods of cooking and preparation e.g. cook in a small amount of boiling water, keep lid on pan, do not overcook, use cooking liquid in sauces, do not add bicarbonate of soda to cooking water, instead of boiling steam, stir-fry, microwave, wash before cutting, tear instead of cutting, do not shred too thinly, use a sharp knife, prepare just before cooking, do not soak; in order to retain vitamin C, which is water-soluble, consider methods of cooking and preparation e.g. cook in a small amount of boiling water, keep lid on pan, do not overcook, use cooking liquid in sauces, do not add bicarbonate of soda to cooking water, instead of boiling steam, stir-fry, microwave, wash before cutting, tear instead of cutting, do not shred too thinly, use a sharp knife, prepare just before cooking, do not soak; wash all fruit and vegetables before eating to avoid toxoplasmosis which can affect the unborn baby; wash all pre-packaged salads due to listeria;	

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