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C3 Food matters – Foundation Workbook answers

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	b	<p>For example:</p> <ul style="list-style-type: none"> • 1 ploughing land and adding manure or fertilizer: leaching of fertilizers from soils, causing water pollution • 3 protecting the growing crop from pests and diseases: pesticide residues in flour; also environmental impact on wildlife in the field of killing pests • 5 milling the grain to make flour: separation of valuable nutrients from flours that are not wholemeal • 6 mixing the flour with other ingredients, then letting it rise: use of additives such as enhancers and preservatives • 7 baking the dough to make bread: formation of toxic chemicals such as acrylamide during baking • 9 storing bread at home: deterioration of bread in storage – bread going stale or mouldy so it becomes inedible

Further guidance

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3	a	Missing words: (left) roots, proteins, (top right) nitrogen, (bottom right) rot, nitrogen compounds, soil																								
	b	Nutrients from the soil are removed with the harvested crop so they are not recycled. Fertilizers or manures are needed to replace the lost chemicals.																								
	c	<ul style="list-style-type: none"> Year 1: Wheat needs plenty of nitrogen in the soil to grow well. The wheat is harvested and sold. Year 2: Barley is harvested and sold. Year 3: Root crops are fed to animals. Year 4: Clover roots add nitrogen to the soil. Animals graze on clover. Manure from the animals is used as a fertilizer. 																								

Further guidance

4		<ul style="list-style-type: none"> • What are pesticides? → They are chemicals used to kill or control pests that harm our food, health, or environment. → They are used because pests can have devastating effects on the quantity and quality of crops. • What are pesticide residues? → They are the very small amounts of pesticides that can remain in a crop after harvesting or storage. → Pesticide residues may need to stay on the crop to do their job. For example, to protect it from pests during storage. • Do pesticide residues harm people's health? → Eating foods containing pesticide residues at levels below the safety limits should not harm people's health. → Not eating any fruit and vegetables would be a much bigger risk to someone's health than eating foods containing low levels of pesticide residues. • Do I need to wash and peel fruit and vegetables to remove pesticide residues? → You don't need to wash or peel fruit and vegetables in the UK because of pesticide residues. But it's a good idea to wash them to ensure that they are clean. → Washing and peeling may help remove residues of certain pesticides. But some pesticides are found within the fruit or vegetable. • Does cooking reduce pesticide residues? → Cooking generally reduces the level of pesticides in food. → This is because processing can break down the pesticides, or remove the part of the plant that carries the residue. • How are pesticides approved and regulated? → A company wanting to get a pesticide approved must ask permission and give information on possible risks to health and the environment. → Scientists do research and assess risks to make sure that any pesticide residues will not be harmful to people.
5		<ul style="list-style-type: none"> • Preservatives • Antioxidants • Emulsifiers • Stabilizers • Flavourings • Colours • Sweeteners
6		<ul style="list-style-type: none"> • Mould grows on bread in a warm, damp place. • Smoking, salt, and vinegar are used to preserve foods. • Making jam helps to preserve fruit because it contains lots of sugar. • Sulfur dioxide is a chemical used to preserve lemon juice and wine. • Microorganisms can cause food poisoning if they grow in food.
7	a	They stop oxygen reacting with chemicals in food.
	b	<ul style="list-style-type: none"> • Vitamin C • BHA or BHT
	c	Oxygen in the air makes slices of apple turn brown. Lemon juice contains the antioxidant vitamin C.
	d	People throw away food if it looks nasty or tastes bad.
	e	Some people are worried that antioxidants such as BHA and BHT may be harmful to health.

Further guidance

8	a	At first the oil breaks up into drops in the water. On standing, the drops quickly join up and the mixture separates into two layers.
	b	For example: salad cream/dressing, ice cream, low-fat spreads, cakes, chocolate
	c	Lecithin is a chemical found naturally in some food ingredients.
9		<ul style="list-style-type: none"> • An additive is given an E number to... show that it has passed safety tests and been approved for use in the European Union. • EU legislation requires food labels to... give the names or E numbers of additives used. • Looking at food labels allows customers to... avoid eating additives that they do not want to eat. • The Food Standards Agency checks up on additives to ... make sure that food manufacturers using additives do not use too much or chemicals that are illegal.
10		<p>Missing words:</p> <ul style="list-style-type: none"> • (Left) carbohydrate, cellulose, sugar, polymer, glucose, carbon, hydrogen • (Right) polymers, amino acids, proteins, nitrogen, oxygen
11	a	Large polymer molecules cannot pass through the gut wall. Digestion produces small molecules that can cross the gut wall into the bloodstream.
	b	The chemicals from digestion are taken up by cells in the body and used for respiration and growth.
12		Missing words clockwise from top right label: skin, haemoglobin, bone, enzymes, protein, tendons, muscle, hair
13		Missing words: liver, kidneys
14	a	Missing words: (left box) diet, (right box) ordinary
	b	Aspartame and acesulfame K are artificial sweeteners used in diet drinks. Diet drinks do not contain sugar.
	c	Some people prefer the taste of ordinary cola and want to avoid artificial sweeteners.
	d	Some people want to avoid too much sugar in their diet to avoid getting fat.
15	a	The sugar level rises for a time and then starts to fall. The rate of rise depends on the meal.
	b	There may be some sugar in the food. More sugar is produced by digestion of starch. Sugar starts to move from the gut to the blood. Cells in the body take up some of the sugar. The sugar level falls when this happens faster than sugar is entering the blood from the gut.
	c	A
	d	Foods with carbohydrates that take longer to digest, such as wholemeal bread, pasta, rice, and potatoes.

Further guidance

16		<p>Statements mainly about Type 1 diabetes:</p> <ul style="list-style-type: none"> • This type of diabetes usually appears before the age of 40. • The body is unable to produce any insulin. • The condition develops quickly and the symptoms are obvious. • Diabetes in some people can only be treated by insulin injections. <p>Statements mainly about Type 2 diabetes:</p> <ul style="list-style-type: none"> • The body can still make some insulin, but not enough. • With some people this can be treated by changes to lifestyle such as a healthier diet, weight loss and more exercise. • Tablets and/or insulin may be needed for normal blood glucose levels. • The insulin that is produced does not work properly. • This disease mainly affects older people. • The symptoms develop slowly and may not be noticed for quite a while. • Most people affected in this way are overweight. <p>Statements which are true for both kinds of diabetes:</p> <ul style="list-style-type: none"> • Glucose comes from sugar and other sweet foods. • The level of glucose (sugar) in the blood is too high if people who have diabetes are not treated. • The aim of treatment is to keep blood glucose levels as near to normal as possible. • Insulin is a hormone produced by the pancreas. • Glucose comes from the digestion of starchy foods.
17	a	False: Diabetes is not an infectious disease – it can't be caught like a cold or 'flu.
	b	False: Not directly. However, eating a diet with lots of sugary food can help to make you fat. Being overweight does increase the risk of developing diabetes.
	c	False: All diabetes is equally serious, and if not properly controlled can lead to serious complications.
	d	False: People with diabetes are encouraged to exercise as part of a healthy lifestyle. Keeping active can help to avoid complications.
	e	False: People with diabetes can eat sweets as part of a healthy diet, or with exercise.

Further guidance

18

Stage in the food chain	Risks to health from chemicals or other sources	Ways that government and regulators try to protect the public
Natural chemicals in growing crops	Fungi growing on wheat can produce toxic chemicals	Require farmers to have their crops inspected and tested
Cultivating and harvesting crops	Spraying crops with pesticides	Controlling the pesticides which farmers are allowed to use, the number of times they can spray, and the amounts used
Transporting and storing crops	Contamination by mistake, or by insect or animal pests	Set up an inspectorate to check on the work of the food industry
Preserving and processing food	Use of harmful additives	Test additives and ensure that only those which are safe can be used legally
Cooking and serving food	Bacteria can grow on warm food – this can lead to food poisoning	Train caterers about safe practice in cooking and serving food
Allergies that can affect some people	e.g. Some people are allergic to peanuts	Insisting that health warnings are included on food labels
Eating an unhealthy diet	Overeating and eating an unbalanced diet can increase the risk of heart disease, diabetes, or cancer	Education, controls on advertising, health campaigns

C3 Food matters – Higher Workbook answers

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	b	<p>For example:</p> <ul style="list-style-type: none">• 1 ploughing land and adding manure or fertilizer: leaching of fertilizers from soils, causing water pollution• 3 protecting the growing crop from pests and diseases: pesticide residues in flour; also environmental impact on wildlife of killing pests in the field• 5 milling the grain to make flour: separation of valuable nutrients from flours that are not wholemeal• 6 mixing the flour with other ingredients, then letting it rise: use of additives such as enhancers and preservatives• 7 baking the dough to make bread: formation of toxic chemicals such as acrylamide during baking• 9 storing bread at home: deterioration of bread in storage – bread going stale or mouldy so it becomes inedible

Further guidance

2

Aspect of farming	Intensive farming	Organic farming
Yield of crops from the land	as high as possible	lower yields
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Sustainability	high energy inputs to manufacture fertilizers, wastes that can be hard to dispose of, monocultures inhibit diversity, use of pesticides can harm the environment	lower energy inputs, recycling of wastes, variety of crops and animals encourages biodiversity

3

a

Flow diagram labels anticlockwise from the top: (centre - sky) reactions in thunderstorms, (top left - sky) reactions in thunderstorms, (left - factory) manufacture of fertilizers, (left - topsoil) bacteria in the roots of some plants, (centre - under cow) animal wastes, dead organisms, (below topsoil) protein in plants, (bottom centre) nitrates in the soil, (bottom right) to ground water, (right - topsoil) bacteria in the soil that turn nitrates into nitrogen, (right - above soil) protein in plants, (centre - cow) protein in animals

b

- Harvesting crops takes away protein and other nitrogen compounds, and so these chemicals are not recycled to the soil.
- If not all the nitrogen compounds from fertilizer are held in the soil or taken up by plants, then the excess can leach into the groundwater where the chemicals can cause pollution.

Further guidance

4		<ul style="list-style-type: none"> • What are pesticides? → They are chemicals used to kill or control pests that harm our food, health, or environment. → They are used because pests can have devastating effects on the quantity and quality of crops. Pests include rodents, insects, fungi and plants. • What are pesticide residues? → They are the very small amounts of pesticides that can remain in a crop after harvesting or storage and make their way into the food chain. → Residues also include any breakdown products from the pesticide. Pesticide residues may need to stay on the crop to do their job. For example, they may need to be on the surface of a fruit or vegetable to protect it from pests during storage. • Do pesticide residues harm people's health? → Expert committees set safety limits for all approved pesticides, based on scientific evidence. Eating foods containing pesticide residues at levels below the safety limits should not harm people's health. → Not eating any fruit and vegetables would be a much bigger risk to someone's health than eating foods containing low levels of pesticide residues. • Do I need to wash and peel fruit and vegetables to remove pesticide residues? → You don't need to wash or peel fruit and vegetables in the UK because of pesticide residues. But it's a good idea to wash them to ensure that they are clean, and that bacteria that might be on the outside are removed. → Washing and peeling may help remove residues of certain pesticides. But some pesticides are systemic, which means they are found within the fruit or vegetable. • Does cooking reduce pesticide residues? → Processing, including cooking, generally reduces the level of pesticides in food. → This is because processing can break down the pesticides, or remove the part of the plant that carries the residue. • How are pesticides approved and regulated? → Any company wanting to get a pesticide approved must submit an application containing information on any potential health and environmental risks. This always includes data on the potential of the pesticide to cause cancer and damage human reproduction. → Rigorous safety assessments are undertaken to make sure that any pesticide residues remaining in the crop will not be harmful to people.
5		<ul style="list-style-type: none"> • Preservatives • Antioxidants • Emulsifiers • Stabilizers • Flavourings • Colours • Sweeteners
6		<ul style="list-style-type: none"> • Bread goes mouldy. Butter turns rancid. Fruit and vegetables rot. • Smoking is used to preserve fish (e.g. kippers) and meat (e.g. bacon). Salt can also be used to preserve fish and meat. Vinegar is used in pickles. • The acetic acid in vinegar preserves pickles and chutneys. Sugar in jam preserves fruit. • Nitrites are used to preserve bacon and ham. Sulfur dioxide is used in lemon juice, wine and sausages. • Moulds growing on nuts and dried fruit can produce carcinogens such as aflatoxins.
7	a	<p>Oxygen in the air reacts with some chemicals in the food so that it looks bad and taste nasty. Antioxidants slow down or stop these reactions.</p>
	b	<ul style="list-style-type: none"> • Vitamin C or E • BHA or BHT

Further guidance

	c	It is possible that some antioxidants may be harmful to health. Setting ADIs based on scientific evidence is a guide to the food industry which helps to limit any risk to the public.
	d	The effects of antioxidants are studied by tests on animals.
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Further guidance

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- Diabetes in some people can only be treated by insulin injections.

Statements mainly about Type 2 diabetes:

- The body can still make some insulin, but not enough.
- With some people this can be treated by changes to lifestyle such as a healthier diet, weight loss and more exercise.
- Tablets and/or insulin may be needed for normal blood glucose levels.
- The insulin that is produced does not work properly.
- This disease mainly affects older people.
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- Most people affected in this way are overweight.

Statements which are true for both kinds of diabetes:

- Glucose comes from sugar and other sweet foods.
- The level of glucose (sugar) in the blood is too high if people who have diabetes are not treated.
- The aim of treatment is to keep blood glucose levels as near to normal as possible.
- Insulin is a hormone produced by the pancreas.
- Glucose comes from the digestion of starchy foods.

Further guidance

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		Eating an unhealthy diet	Overeating and eating an unbalanced diet can increase the risk of heart disease, diabetes, or cancer	Education, controls on advertising, health campaigns
18	a	To check the original findings. New experimental results from one group of scientists are often checked by other scientists.		
	b	Try out the ways of reducing acrylamide levels to see if they can be made to work for the food industry and/or at home. Carry out more health studies into the effects of typical levels of acrylamide in food.		
	c	Cooking at a lower temperature might not kill all the bacteria. The food might not keep so well, or taste as good.		
	d	Avoid as far as possible all foods cooked at the high temperatures used to bake bread or fry crisps.		