Continue

Addiodine solutionto the food sample.Positive result:Turnsblue-blackif starch is present.Benedicts Test (for Reducing Sugars like Glucose) AddBenedicts solutionto the food sample. Heat in awater bath (75C) for 5 minutes.Positive result:Turns fromblue green yellow brick red(depending on sugar concentration).Important:This test requiresheatto work!Biuret Test (for Proteins) AddBiuret solution(a mix of sodium hydroxide and copper sulfate).Positive result:Turnspurple/lilacif protein is present.Important:This test doesnotrequire heating.Emulsion Test (for Lipids) Addethanolto the food sample and shake. Pour intowaterand mix.Positive result:Acloudy white layerforms if lipids are present.Why? Lipids dissolve in ethanol butnot in water, forming an emulsion. 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To include: Benedicts test for sugars, Iodine test for starch, the emulsion test for lipids and the Biuret reagent for proteinYou will:Use qualitative reagents to test for the presence of key biological molecules in a range of foodsSafely use appropriate heating devices and techniques including the use of a Bunsen burden and a water bathA qualitative food test indicates if a substance is present or absent in a sample (although it doesnt tell you how much is present)Observations are essential in this practical; you are looking for colour changes in particular which can indicate if a substance is present or absent:Food test colour changes tableUse this imagePreparing a sampleBefore you can carry out any of the food tests described below, you may need to prepare a food sample first (especially for solid foods to be tested)To do this:Break up the food using a pestle and mortarTransfer to a test tube and add distilled waterMix the food with the water by stirring with a glass rodFilter the mixture using a funnel and filter paper, collecting the solutionProceed with the food testsUse this imageUse this imageUse this imageUse this imageIt is important that you carry out the tests methodically, recording your observations carefullyImportant hazardsWhilst carrying out this practical you should try to identify the main hazards and be thinking of ways to reduce harm:Biuret solution contains copper (II) sulfate which is dangerous particularly if it gets in the eyes, so always wear gogglesIodine is also an irritant to eyes (wear goggles)Sodium hydroxide in biuret solution is corrosive, if any chemicals get onto your skin wash hands immediatelyEthanol is highly flammable; keep it away from the Bunsen burner used in the Benedicts test (you should turn the Bunsen off completely)And of course, the Bunsen itself is a hazard!Use this imageBe prepared to explain what molecules are or are not present in a food sample make sure you know the positive and negative results for each testPage 2The purpose of digestion is to break down large, insoluble molecules into smaller, soluble molecules that can be absorbed into the bloodstreamLarge insoluble molecules, such as starch and proteins, are made from chains of smaller molecules which are held together by chemical bonds. These bonds need to be brokenEnzymes are biological catalysts they speed up chemical reactions without themselves being used up or changed in the reactionThere are three main types of digestive enzymes carbohydrases, proteases and lipasesCarbohydrases break down carbohydrates to simple sugars. Amylase is a carbohydrase which breaks down starch into maltose, which is then broken down into glucose by the enzyme maltaseAmylase is made in the salivary glands, the pancreas and the small intestineDiagram showing the digestion of starchProteasesProteases are a group of enzymes that break down proteins into amino acids in the stomach and small intestineProtein digestion takes place in the stomach and small intestine, with proteases made in the stomach (pepsin), pancreas and small intestineDiagram showing the digestion of proteinsLipasesLipases break down lipids (fats) to glycerol and fatty acids.Lipase enzymes are produced in the pancreas and secreted into the duodenumDiagram showing the digestion of lipidsThe pancreas is an accessory organ in the digestive system. Food does not pass directly through it, but it has a key role in producing digestive enzymes as well as the hormones that regulate blood sugar (insulin and glucagon).Did this video help you?Cells in the liver produce bile which is then stored in the gallbladderBile production and secretionBile has two main roles:It is alkaline to neutralise hydrochloric acid from the stomach. The enzymes in the small intestine have a higher (more alkaline) optimum pH than those in the stomachIt breaks down large drops of fat into smaller ones, increasing surface area. This is known as emulsification.The alkaline conditions and larger surface area allows lipase to chemically break down fat (lipids) into glycerol and fatty acids faster (the rate of fat breakdown by lipase is increased)Emulsification is the equivalent of tearing a large piece of paper into smaller pieces of paper.The products of digestion are used to build new carbohydrates, lipids and proteins required by all cells to function properly and growSome glucose released from carbohydrate breakdown is used in respiration to release energy to fuel all the activities of the cellAmino acids are used to build proteins like enzymes and antibodiesThe products of lipid digestion can be used to build new cell membranes and hormonesDid this page help you?To help you plan your year 8 science lesson on: Food tests: practical, download all teaching resources for free and adapt to suit your pupils' needs.The starter quiz will activate and check your pupils' prior knowledge, with versions available both with and without answers in PDF format.We use learning cycles to break down learning into key concepts or ideas linked to the learning outcome. Each learning cycle features explanations with checks for understanding and practice tasks with feedback. All of this is found in our slide decks, ready for you to download and edit. The practice tasks are also available as printable worksheets and some lessons have additional materials with extra material you might need for teaching the lesson.The assessment exit quiz will test your pupils' understanding of the key learning points.Our video is a tool for planning, showing how other teachers might teach the lesson, offering helpful tips, modelled explanations and inspiration for your own delivery in the classroom. Plus, you can set it as homework or revision for pupils and keep their learning on track by sharing an online pupil version of this lesson.Explore more key stage 3 science lessons from the Human digestive system unit, dive into the full secondary science curriculum, or learn more about lesson planning.Aim: To use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedicts test for sugars, Iodine test for starch, the emulsion test for lipids and the Biuret reagent for proteinYou will:Use qualitative reagents to test for the presence of key biological molecules in a range of foodsSafely use appropriate heating devices and techniques including the use of a Bunsen burden and a water bathA qualitative food test indicates if a substance is present or absent in a sample (although it doesnt tell you how much is present)Observations are essential in this practical; you are looking for colour changes in particular which can indicate if a substance is present or absent:Food test colour changes tableUse this imagePreparing a sampleBefore you can carry out any of the food tests described below, you may need to prepare a food sample first (especially for solid foods to be tested)To do this:Break up the food using a pestle and mortarTransfer to a test tube and add distilled waterMix the food with the water by stirring with a glass rodFilter the mixture using a funnel and filter paper, collecting the solutionProceed with the food testsUse this imageUse this imageUse this imageUse this imageIt is important that you carry out the tests methodically, recording your observations carefullyImportant hazardsWhilst carrying out this practical you should try to identify the main hazards and be thinking of ways to reduce harm:Biuret solution contains copper (II) sulfate which is dangerous particularly if it gets in the eyes, so always wear gogglesIodine is also an irritant to eyes (wear goggles)Sodium hydroxide in biuret solution is corrosive, if any chemicals get onto your skin wash hands immediatelyEthanol is highly flammable; keep it away from the Bunsen burner used in the Benedicts test (you should turn the Bunsen off completely)And of course, the Bunsen itself is a hazard!Use this imageBe prepared to explain what molecules are or are not present in a food sample make sure you know the positive and negative results for each testPage 2The purpose of digestion is to break down large, insoluble molecules into smaller, soluble molecules that can be absorbed into the bloodstreamLarge insoluble molecules, such as starch and proteins, are made from chains of smaller molecules which are held together by chemical bonds. 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This is known as emulsification.The alkaline conditions and larger surface area allows lipase to chemically break down fat (lipids) into glycerol and fatty acids faster (the rate of fat breakdown by lipase is increased)Emulsification is the equivalent of tearing a large piece of paper into smaller pieces of paper.The products of digestion are used to build new carbohydrates, lipids and proteins required by all cells to function properly and growSome glucose released from carbohydrate breakdown is used in respiration to release energy to fuel all the activities of the cellAmino acids are used to build proteins like enzymes and antibodiesThe products of lipid digestion can be used to build new cell membranes and hormonesDid this page help you? Back to B2 HomeB2 F) Food Tests We can undertake a few different tests to see whether a food sample contains certain substance. All of the tests start with the same general process, which is:Get a sample of the food and break it up using a pestle and mortar.Put the ground up food in a beaker and add some distilled water (pure water).Mix the distilledwater and ground up food to create a solution.Filter the solution to get rid of any solid bits of food. We filter the solution by pouring the solution through a funnel that is lined with filter paper. The water and dissolved food substances will pass through the filter paper, and the solid bits of food will be stuck ontop of the filter paper. We now have our sample with the dissolved food substances to test. The tests for carbohydrates (sugars and starch), proteins and lipids are explained below CarbohydratesCarbohydrates are the bodys main source of energy.They make up about 5% of the bodys mass.Carbohydrates come in the form of sugars or starch.SugarsSugars are soluble in water and they taste sweet. Glucose is an example of a sugar. Many naturally sweet tasting foods contain sugars. For example, most fruits contain fructose and milk contains lactose. Sugar that we add to hot drinks or sprinkle on top of cereal is known as sucrose (e.g. caster or granulated sugar).There are two different types of sugars reducing and non-reducing sugars. We can test for reducing sugars by using Benedicts test. To test for reducing sugars we:Add 5 cubic centimetresof our food sample to a test tube.Use a water bath to heat the test tube up to 75C.Add about 10 drops of Benedicts solution so that the solution becomes blue.Leave the test tube in the water bath for around 5 minutes. Make sure that the test tube is facing away from you when it is left in the water bath (for safety reasons). After 5 minutes, we look at the colour of the mixture in the test tube. If no reducing sugars are present, the mixture in the test tube will remain blue. If reducing sugars are present, the colour of the mixture will change. The extent of the change depends on the quantity of reducing sugars that are present.Here are what the different colour outcomes mean:Blue no reducing sugarsGreen a trace of reducing sugarsYellow low levels of reducing sugarsOrange moderate levels of reducing sugarsRed high levels of reducing sugars StarchThe second type of carbohydrates are starch. Foods that are high in starch are pastas, potatoes and rice. We can test for the presence of starch by using iodine solution. We carry out the test by transferring around 5 cm3 of our food sample into a test tube. We then add a few drops of iodine solution and gently shake the test tube. Iodine is a brown-orange colour. If starch is present, the starch will react with the iodine, which results in the solution changing from brown-orange to black-blue. If no starch is present, the mixture will remain brown-orange. Proteins Proteins make up around 18% of the bodys mass. Proteins are polymers that are made from amino acids. Amino acids are used to build thousands of different proteins, such as enzymes, haemoglobin (in red blood cells) and many more. Meats, fish and cheeses are foods that are high in protein. We test for proteins by using the biuret test. We transfer a small sample of the food (around 2 cm3) to a test tube. We then add 2 cm3 of Biuret solution and shake the test tube. Biuret solution is a blue solution. If proteins are present in our sample, the solution will change from blue to pink or purple. If no proteins are present in our sample, the solution will remain blue. Lipids Lipids make up around 10% of our bodys mass. They are used as long-term energy stores. They are stored under skin, and they act as an insulator preventing heat loss. They are also stored around the kidneys and the heart for protection. Lipids are made from fatty acids and glycerol. A lipid is a molecule of glycerol joined to three fatty acid molecules (see diagram below). We can test whether a food contains lipids by using the Sudan III test. We prepare the sample in pretty much the same way that was outlined at the start of this section, except we do not filter it. We then transfer about 5 cm3 of our sample into a test tube. The next step is to add a few drops of Sudan III into the test tube and gentle shake. If lipids are present in the mixture, a red layer will form on the top of the sample. If no lipids are present, no red layer will form on the top of the sample. End NoteThe names for the different food tests can be quite tricky to remember. Therefore, it is worth getting them down on a revision card. Here is a summary:Reducing Sugars Benedicts test: the mixture goes from blue to green, yellow, orange or red if reducing sugars are present. The mixture will stay blue if no reducing sugars are present.Starch iodine solution: the mixture goes from brown-orange to blue-black if starch is present. If starch is not present, the mixture will stay brown-orange.Proteins biuret test: the mixture goes from blue to pink or purple if proteins are present. The mixture will stay blue if no proteins are present.Lipids Sudan III: a red layer will form at the top of the mixture if lipids are present. If no lipids are present, no red layer will form.

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