WJEC level 3 Diploma in Food Science and Nutrition Summer Work 2024

Hello lovely Year 11s.
We are really pleased that you are going to study the Level 3 Diploma in Food Science and Nutrition course from September.

To help you get ready for the course and gain an understanding of the different areas we will be covering you need to complete the following tasks. I have split them into 3 tasks.

Good luck and we're looking forward to teaching you in the next academic year.

All work should be submitted to

isaacd@wallingfordschool.com

TASK 1 – NUTRITION

Nutrition is a key part of the course and you will need to have a clear understanding of nutrients and healthy eating.

1. Eatwell Guide

   Watch the video link to learn more about what is meant by a healthy diet. Explain what a healthy diet is and the key elements of the Eatwell Guide. This should be at least one side of A4 and included some of your own research.

https://www.youtube.com/watch?v=1tJYcNt6Bpk

2. Energy Needs
   Explore the concept of energy intake, expenditure and energy balance.

   https://www.youtube.com/watch?v=d-5w67NAOlo

Watch the podcast about energy and answer the questions below.
What is energy?
Why do we need to eat food?
How much energy do we need?
What are the factors that affect 'energy out'?
What is energy balance?

3. Vitamins

   Read and make notes on Vitamins (see below). Prepare a presentation on Vitamins to be submitted for marking and design a 3 course meal that is high in vitamins. You should identify the vitamins in your dishes and which ingredients they are contained in.

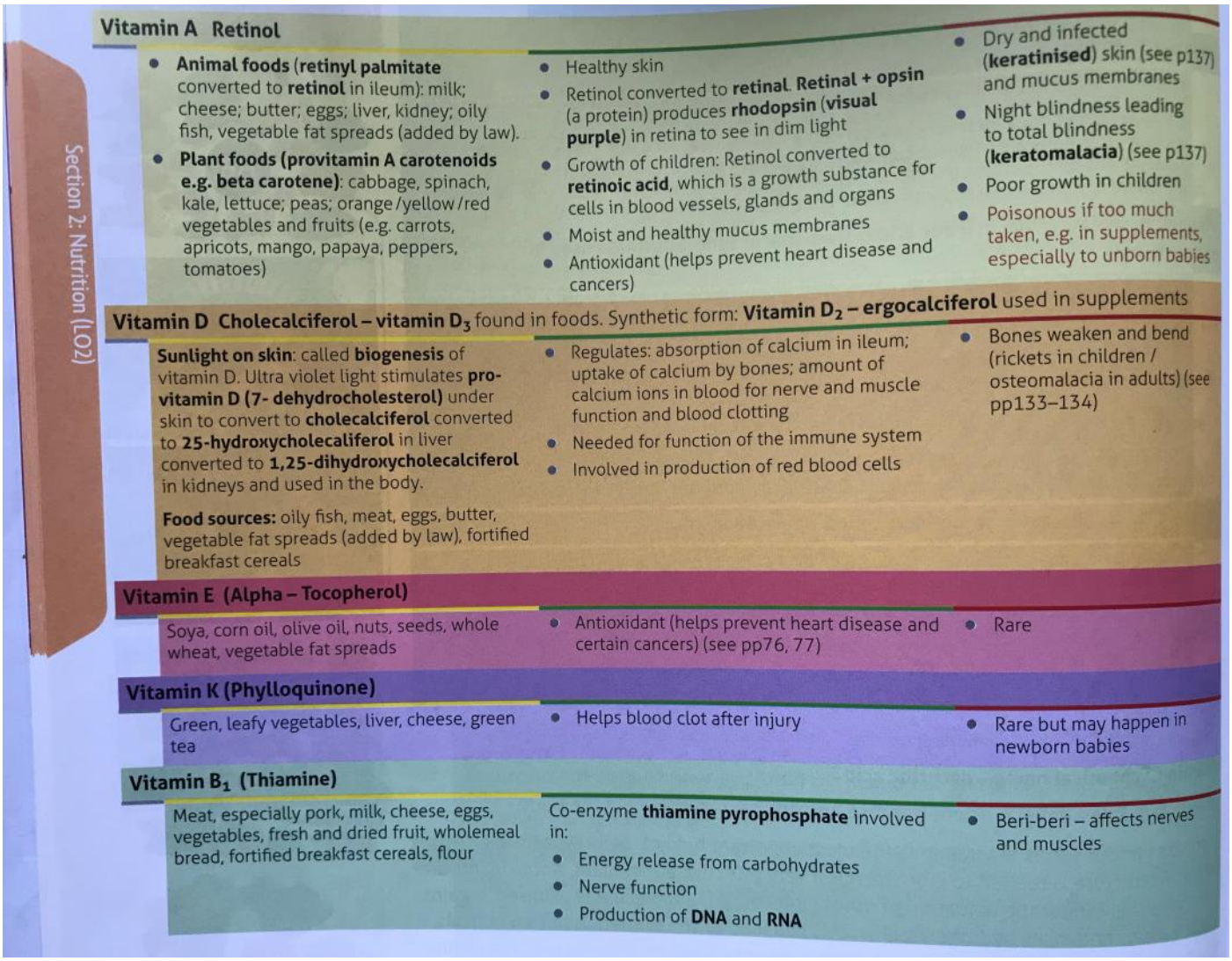
   Extension – cook your dishes and send me photos

   Marking criteria

   High – detailed explanation of vitamins and their role in the diet. Creative dishes using a wide range of ingredients and giving lots of different types (more than 6) of vitamins. Dishes all complement each other (no clash of flavours or repetition of ingredients unnecessarily). All 3 dishes show high skill levels eg deboning a chicken.

   Medium – Only 5 vitamins are included. Some detailed explanation of the role of the chosen vitamins. All 3 dishes do not show complex skills. Some clash of flavours.

   Low – Less than 4 vitamins are included. Explanation of the role of the vitamins is not very detailed and inaccurate in places. Dishes do not show a wide range of skills and are basic.



Section 2: Nutrition (LO2)

Vitamin A Retinol

- **Animal foods (retinyl palmitate** converted to **retinol** in ileum): milk; cheese; butter; eggs; liver, kidney; oily fish, vegetable fat spreads (added by law).
- **Plant foods (provitamin A carotenoids e.g. beta carotene)**: cabbage, spinach, kale, lettuce; peas; orange/yellow/red vegetables and fruits (e.g. carrots, apricots, mango, papaya, peppers, tomatoes)

- Healthy skin
- Retinol converted to **retinal**. **Retinal + opsin** (a protein) produces **rhodopsin (visual purple)** in retina to see in dim light
- Growth of children: Retinol converted to **retinoic acid**, which is a growth substance for cells in blood vessels, glands and organs
- Moist and healthy mucus membranes
- Antioxidant (helps prevent heart disease and cancers)

- Dry and infected **(keratinised)** skin (see p137) and mucus membranes
- Night blindness leading to total blindness **(keratomalacia)** (see p137)
- Poor growth in children
- Poisonous if too much taken, e.g. in supplements, especially to unborn babies

Vitamin D Cholecalciferol – vitamin D_3 found in foods. Synthetic form: **Vitamin D_2 – ergocalciferol** used in supplements

Sunlight on skin: called **biogenesis** of vitamin D. Ultra violet light stimulates **pro-vitamin D (7- dehydrocholesterol)** under skin to convert to **cholecalciferol** converted to **25-hydroxycholecaliferol** in liver converted to **1,25-dihydroxycholecalciferol** in kidneys and used in the body.

Food sources: oily fish, meat, eggs, butter, vegetable fat spreads (added by law), fortified breakfast cereals

- Regulates: absorption of calcium in ileum; uptake of calcium by bones; amount of calcium ions in blood for nerve and muscle function and blood clotting
- Needed for function of the immune system
- Involved in production of red blood cells

- Bones weaken and bend (rickets in children / osteomalacia in adults) (see pp133–134)

Vitamin E (Alpha – Tocopherol)

Soya, corn oil, olive oil, nuts, seeds, whole wheat, vegetable fat spreads

- Antioxidant (helps prevent heart disease and certain cancers) (see pp76, 77)

- Rare

Vitamin K (Phylloquinone)

Green, leafy vegetables, liver, cheese, green tea

- Helps blood clot after injury

- Rare but may happen in newborn babies

Vitamin B_1 (Thiamine)

Meat, especially pork, milk, cheese, eggs, vegetables, fresh and dried fruit, wholemeal bread, fortified breakfast cereals, flour

Co-enzyme **thiamine pyrophosphate** involved in:

- Energy release from carbohydrates
- Nerve function
- Production of **DNA** and **RNA**

- Beri-beri – affects nerves and muscles

Summary of vitamin functions, sources, deficiency and excess

Vitamin B_2 (Riboflavin)

Milk and milk products, eggs, fortified breakfast cereals, rice, mushrooms	Precursor in a range of enzyme reactions involved in: • Energy release from carbohydrates, fats and proteins • Converting retinol to retinoic acid • Converting tryptophan to niacin • Production of vitamin B_6	• Rare – sore corners of mouth

Niacin Group name for **Nicotinamide** and **nicotinic acid** (used to be called vitamin B_3)

Beef, pork, wheat flour, maize flour, eggs, milk	• Precursor in a range of enzyme reactions involved in many metabolic reactions, especially respiration (see p106)	• Pellagra – diarrhoea, dementia, dermatitis

Vitamin B_5 Pantothenic acid

Nuts, beans, liver, green leafy vegetables, milk, eggs, cereal grains, cauliflower	• Converted to **co-enzyme A** which is involved in metabolism of proteins, fats and carbohydrates during respiration	• Rare • Fatigue, insomnia, depression, stomach upsets, burning feet sensation

Vitamin B_6 Pyridoxine

Red meat, milk, bananas, green leafy vegetables, avocados, carrots, eggs, oily fish, nuts, corn, potatoes, beans	Co-enzyme involved in: • Metabolism of fatty acids, protein, glycogen • Synthesis of co-enzyme A • Incorporating iron into **haemoglobin** (see p106)	• Cracks at corners of mouth, dry, scaly lips • Swollen tongue • Depression, confusion • Weakened immune function

Vitamin B_7 Biotin

Milk, oily fish, eggs, cheese, beans, mushrooms, cauliflower, nuts, liver	• Co-enzyme involved in production of fatty acids • Needed for **gluconeogenesis** (see p77)	• Hair loss, scaly red rash on face • Depression, lethargy, hallucinations, numbness and tingling sensation in hands and feet

Vitamin B_9 (Folate)

Green leafy vegetables, yeast extract (e.g. Marmite); peas, chickpeas, asparagus; wholegrain rice; fruits; added to some breads and breakfast cereals	• Makes healthy red blood cells • Precursor for production, repairing and reprogramming of DNA • Cofactor in metabolic reactions especially in growth of embryo and foetus in pregnancy • Helps prevent spinal cord defects in unborn babies	• Megaloblastic anaemia • Possibly spina bifida in newborn babies

Vitamin B_{12} (Cobalamin: sometimes called cyanocobalamin)

Liver, meat, fish, cheese, fortified breakfast cereals, yeast	• Coenzyme in metabolism of proteins, lipids and carbohydrates • Production and control of DNA • Makes healthy red blood cells • Makes healthy nerve cells	• Pernicious anaemia

Vitamin C (L-Ascorbic acid)

Fruits and vegetables, especially citrus fruits (e.g. oranges, lemons, limes and grapefruit), blackcurrants, kiwifruit, guavas, Brussels sprouts, cabbage, broccoli, new potatoes, milk and liver	• Important for absorption of iron in ileum • Cofactor in enzymic reactions in the production of collagen in connective tissue, which binds body cells together • Antioxidant (helps prevent heart disease and cancers)	• Anaemia • Bleeding under skin • Loose teeth • Wounds do not heal • Scurvy

TASK 2 Food Presentation

It is important to understand how to layout food products in order to improve tier visual appearance. Use the following websites and videos to investigate what makes food look good. You are welcome to search for other tips and guidance on food presentation techniques. This is partially important, as you will be required to photograph the products you make.

Task: Write a list of tips and ideas for successful food presentation including photos/sketches to demonstrate your idea/tips.

http://www.howtocookgourmet.com/foodpresentationtips.html
http://www.cravemag.com/features/the-art-of-food-presentation/
https://www.youtube.com/watch?v=Udzs_MPNpMQ
https://www.youtube.com/watch?v=9YBnczqciHI

TASK 3 Food in the news: Create a "food in the news" media folder. Between now and the beginning of September collect any articles that you find referring to Food and Nutrition.

The Guardian and Observer newspapers, the BBC news and the BBC Good Food Magazine are good starting places. You could also look at the free papers and magazines available at food retailers and listen to podcasts eg the TASTE podcast. Just one thing – Dr Michael Mosley

Task: Select 2 articles that you think are important/news worthy. Summarise the key points and explain why you think that each article was published/written.