GCSE

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APPLIED SCIENCE (Double Award)

UNIT 2: Space, Health and Life

Pre-Release Article for use in the following examinations on FRIDAY, 7 JUNE 2019 – AFTERNOON:

GCSE Applied Science (D/A) Unit 2 Foundation Tier (3445U20-1)

GCSE Applied Science (D/A) Unit 2 Higher Tier (3445UB0-1)

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Factors affecting Human Health

Smoking, drinking alcohol and diet are lifestyle choices that affect health.

1. Smoking

Figure 1: What happens to the body in the time after smoking the last cigarette

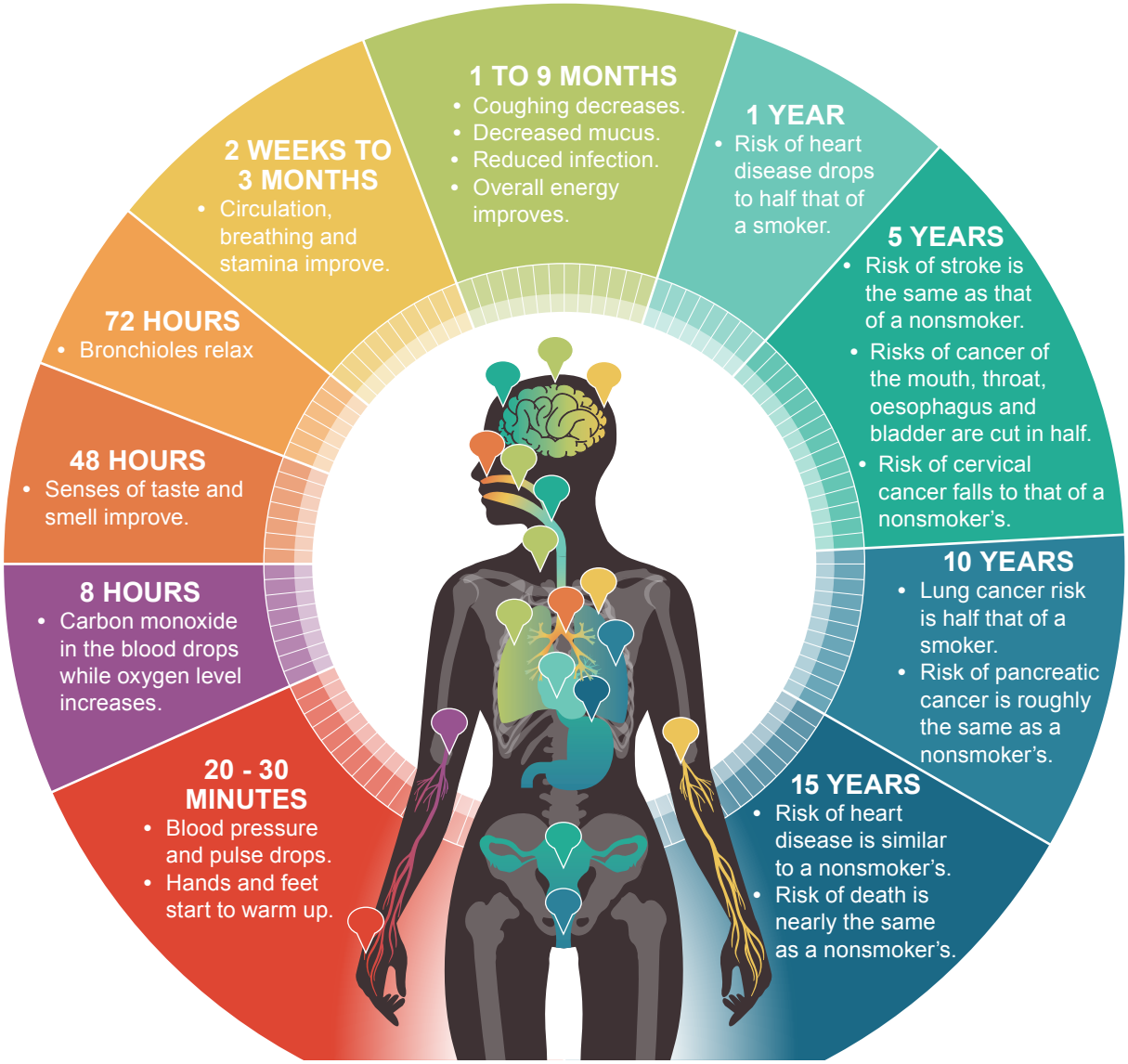

Figure 2: Percentage of the Welsh population who were current smokers and the percentage of smokers who have quit

Year	Percentage	
	Current smokers	Smokers who have quit
1974	45.6	26.7
1976	41.8	31.0
1982	35.3	38.8
1984	34.0	40.2
1986	32.7	42.7
1990	30.0	45.3
1992	28.4	47.7
1994	26.8	48.8
1996	28.0	47.2
2000	27.0	46.5
2002	25.9	48.1
2006	22.0	51.9
2008	21.6	54.7
2010	20.3	54.9
2012	20.4	50.2
2014	18.8	54.6
2016	17.8	56.7

Turn over.

2. Alcohol

The Chief Medical Officer's guideline for both men and women is not to drink more than 14 units a week on a regular basis.

Figure 3: Maximum recommended weekly intake of alcoholic drinks

The NHS defines binge drinking as "drinking lots of alcohol in a short space of time or drinking to get drunk". This amounts to drinking more than 6 units of alcohol in one session. The body can only process one unit of alcohol per hour.

3. Diet

A healthy diet should consider the guideline daily amounts (GDA) shown in the table below and balance this against personal energy requirements (PER).

Figure 4: Guideline daily amounts (GDA)

Guideline Daily Amount (GDA)			
Typical values	**Women**	**Men**	**Children (5-10 years)**
Calories	2000 kcal	2500 kcal	1800 kcal
Protein	45 g	55 g	24 g
Carbohydrate	230 g	300 g	220 g
Sugars	90 g	120 g	85 g
Fat	70 g	95 g	70 g
of which are saturates	20 g	30 g	20 g
Fibre	24 g	24 g	15 g
Salt	6 g	6 g	4 g

Figure 5: Example of a food label on a variety pack of cereals

Nutrition Facts	Wheat Squares Sweetened	Corn Flakes Not Sweetened	Mixed Grain Flakes Sweetened
1 serving per container **Serving size** **1 box**	(35 g)	(19 g)	(27 g)
Amount per serving **Calories**	**130 kcal**	**70 kcal**	**100 kcal**
Total Fat	0 g	0 g	0 g
of which are saturates	0 mg	0 mg	0 mg
Salt	0 mg	200 mg	120 mg
Total Carbohydrate	29 g	17 g	24 g
Dietary Fibre	3 g	1 g	1 g
Total Sugars	8 g	8 g	13 g
Protein	4 g	1 g	1 g
Vitamin D	0.002 mg	0.002 mg	0 mg
Calcium	0 mg	0 mg	0 mg
Iron	2 mg	1 mg	4 mg
Potassium	125 mg	25 mg	30 mg

People have different personal energy requirements (PER) as shown by the equation below.

$$\text{Personal Energy Requirement (PER)} = \text{Basic Energy Requirement (BER)} + \text{Extra Energy Requirement (EER)}$$

The BER is given by:

$$\text{BER} = 32 \times \text{body mass}$$

and the EER is given by:

$$\text{EER} = 8.5 \times \text{number of hours training} \times \text{body mass}$$

Poor diet can lead to obesity or malnutrition. This affects the Body Mass Index (BMI). BMI is calculated using the equation:

$$\text{BMI} = \frac{\text{mass}}{\text{height}^2}$$

The risk of developing health problems is related to BMI values as shown in **Figure 6**.

Figure 6

Classification	BMI Category (kg/m^2)	Risk of developing health problems
Underweight	< 18.5	Increased
Normal weight	18.5 – 24.9	Lowest
Overweight	25.0 – 29.9	Increased
Obese class I	30.0 – 34.9	High
Obese class II	35.0 – 39.9	Very high
Obese class III	> = 40.0	Extremely high

Figures 7 and **8** below give BMI values for people of different masses or heights.

Figure 7

Mass (kg)	Height (m)	Height^2 (m^2)	$\frac{1}{\text{height}^2}$ ($/m^2$)	BMI (kg/m^2)
40	1.7	2.9	0.35	14
50	1.7	2.9	0.35	17
60	1.7	2.9	0.35	21
70	1.7	2.9	0.35	24
80	1.7	2.9	0.35	28
90	1.7	2.9	0.35	31
100	1.7	2.9	0.35	35

Figure 8

Mass (kg)	Height (m)	Height^2 (m^2)	$\frac{1}{\text{height}^2}$ ($/m^2$)	BMI (kg/m^2)
65	1.2	1.4	0.69	45
65	1.3	1.7	0.59	38
65	1.4	2.0	0.51	33
65	1.5	2.3	0.44	29
65	1.6	2.6	0.39	25
65	1.7	2.9	0.35	22
65	1.8	3.2	0.31	20
65	1.9	3.6	0.28	18

Obesity in people with relatively large BMI values can cause the development of diabetes. However maturity onset diabetes of the young (MODY) is a rare form of diabetes which is different from both Type 1 and Type 2 diabetes, and runs in families. MODY is caused by a mutation in a single gene making it a dominant allele.