

Ark Pioneer learning at Home

Core Curriculum

Science



Work to be completed

- Day 1- Healthy diets
- Day 2- Energy requirement analysis
- Day 3- Nutrients questions
- Day 4- Exercise
- Day 5- News Article

Resources / links to help with work:

<https://www.arksportsdaychallenge.com/>

How will this work be checked?

Each week you will be given 'red pen work' to carry out corrections on the learning that you are doing at home. Please make sure this work is done and that you correct all work in your exercise book.

You must also complete the weekly quiz for your core curriculum subjects online and the link to those is on our school website in the 'quizzes' drop-down option from 'Home Learning'.

How much time should I be studying and what happens if I don't finish all my work?

For core curriculum subjects you are expected to do 30min each day as a minimum. Those subjects are English language, English literature, Maths, Science, History and Geography. These subjects all have a weekly quiz and will be checked in on by your form teacher when they call each week.

All other subjects are 'Extended Curriculum' and they should be done after you have finished the Core Curriculum tasks for the day. You should plan to do work in different subjects each day. We recommend that pupils do one hour per week in each of the 'extended curriculum' subjects.

We recognise that it is not possible for all pupils to complete all work given the exceptional circumstance. Please speak with your form tutor about the work if it is becoming unmanageable.



Aim high



Have integrity



Be kind



Model determination

This week's science booklet focuses on living a healthy lifestyle and the importance of a healthy diet and regular exercise on the body.

<p>Nutrients</p>	<p>Important substances that your body needs to survive and stay healthy. It is important that you eat a balanced diet with the correct proportion of each nutrient.</p>	
<p>Carbohydrates</p>	<p>The nutrient that is used as the body's store of energy. Foods rich in carbohydrates are: bread, pasta, rice, potatoes etc. Carbohydrates are also found in sugar and anything that contains sugar</p>	
<p>Proteins</p>	<p>The nutrient that is used for growth and repair of the body. Foods rich in protein are meat, fish, dairy, eggs, beans, lentils etc.</p>	
<p>Lipids (fats and oil)</p>	<p>This nutrient is essential for a healthy nervous system and is also a source of energy for the body. Foods rich in lipids are butter, fatty meat, nuts, oily fish, avocado, oils.</p>	
<p>Vitamins and minerals</p>	<p>Essential nutrients needed by the body in very small amounts to keep it healthy. Example: Vitamin C which is found in citrus fruits, calcium is found in dairy products.</p>	
<p>Fibre</p>	<p>Provides bulk to food to keep it moving through the gut, not a nutrient but important in a healthy diet.</p>	
<p>Deficiency</p>	<p>When a person does not eat enough of a certain nutrient which can lead to specific diseases, for example a Vitamin D deficiency can lead to a disease called Rickets.</p>	

Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

Check the label on packaged foods

Each serving (150g) contains

Energy	3.0g	Saturated fat	0.9g
Fat	1.3g	Sugar	3.4g
Carbohydrate	LOW	Na	10.5g
Fibre	4%	Iron	7%
Protein	13%	Calcium	38%
		Energy	15%

Typical values (per 100g) per 100g: 687kJ/167kcal

Choose foods lower in fat, salt and sugars



Water, lower fat milk, sugar-free drinks including tea and coffee all count.
Limit fruit juice and/or smoothies to a total of 150ml a day.



Eat less often and in small amounts

Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS

Day One

Answer the following questions in your workbook in full sentences.

1. Write down everything you ate for each meal yesterday.
2. Identify the nutrients present in each meal that you ate.

Example:

Breakfast

Cornflakes (carbohydrates)

Semi skimmed milk (Protein and a small amount of lipid)

Glass of orange juice (Vitamins and carbohydrates)

Lunch

Ham and cheese sandwich (ham and cheese - protein and lipids, bread – carbohydrates, butter- lipids)

Bag of crisps (Carbohydrates and lipids)

Apple (Carbohydrates and vitamins)

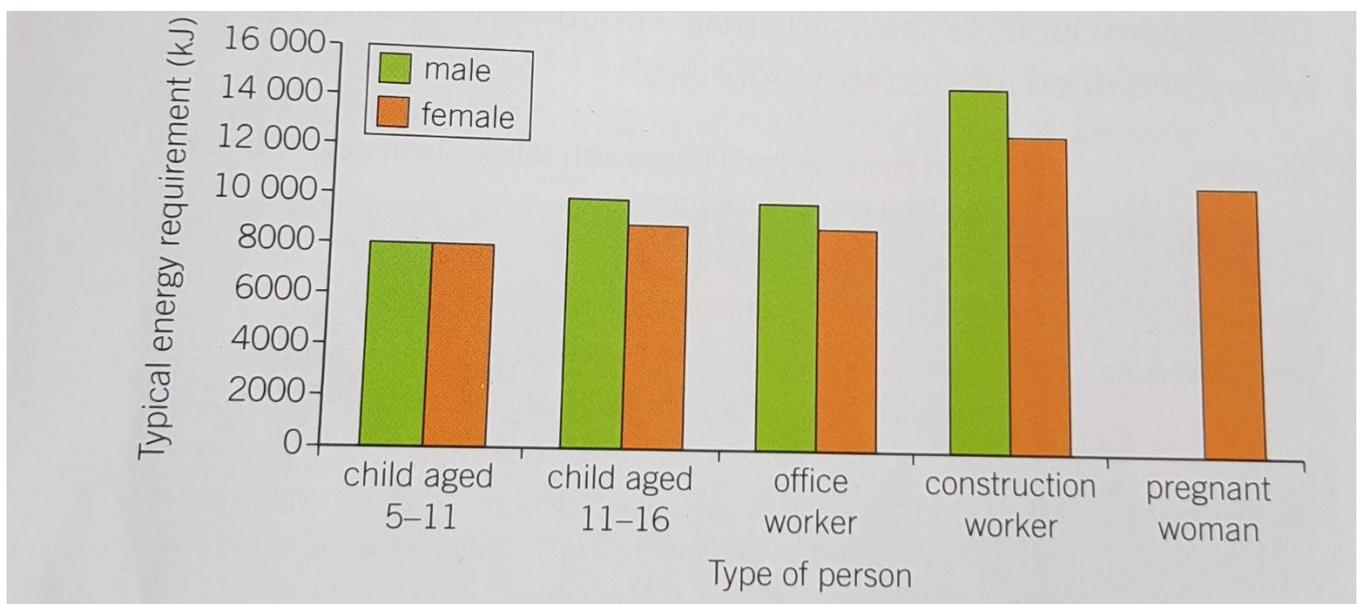
Water

3. For each meal use the Eatwell Guide above to decide whether you think it was a 'healthy balanced meal' or not and explain why.
4. Plan your meals for another day this week. Make sure each meal is balanced and contains all the nutrients your body needs in the right proportions. Explain how you know that each meal you have planned is healthy and balanced.

Day Two

Your body needs the correct amount of energy each day to function properly. The amount of energy you need from food varies depending on your size (height and weight), sex, age and the amount of movement you do each day.

Below is a bar graph showing the daily energy requirements for different people:



Use the bar graph to answer the following questions:

1. What type of person requires the most daily energy? Why do you think that is?
2. Why do you think a child needs less energy daily than an adult?
3. Approximately how much energy does a pregnant woman need each day? Why do you think that is?
4. How much more energy does a female need when she is 12 years old compared to when she is 8?
5. Use the graph to estimate how much energy a male sports person might need each day.
6. A male office worker starts a new job as a construction worker. Calculate the percentage increase in his daily energy needs.
7. Explain what would happen to the male office worker if he ate 12 000kJ worth of food every day for two years without increasing the amount of exercise he does.

Day Three

Answer the following questions in your workbook in full sentences.

Q1. Some people have unbalanced diets. This can give them problems with their health.

(a) Draw **one** line from each unbalanced diet to the health problem it can cause.

unbalanced diet	health problem
too much fat	not much energy
too much sugar	heart disease
not enough protein	tooth decay
not enough carbohydrate	poor growth

(b) Explain why eating a lot of chips every day is bad for your health.

.....

Q2. The following are important parts of a balanced diet.

carbohydrates

proteins

fats

vitamins

water

A pupil has a sweet, juicy orange to eat.

(a) Complete the following sentences using words from the list above.

(i) An orange is a good source of

..... and

(ii) An orange is a poor source of

..... and

(b) Give the names of **two** parts of a balanced diet which are **not** shown in the list above.

1.

2.

(c) In order to obtain the nutrients, food must be chewed Give **two** reasons why it is important to chew food.

1.

.....

2.

.....

Q3. The information below shows the recommended daily amounts of nutrients and energy for four different people.

person	protein	calcium	iron	energy
15-year-old girl	45 g	800 mg	15 mg	8 830 kJ
15-year-old boy	55 g	1000 mg	11 mg	11 510 kJ
computer operator	56 g	700 mg	9 mg	10 700 kJ
bricklayer	56 g	700 mg	9 mg	13 000 kJ

Information taken from Report 41 of the Department of Health - Dietary Reference Values for Food Energy and Nutrients for the United Kingdom 1991.

(a) Suggest **one** reason why the bricklayer needs a higher energy diet than the computer operator.

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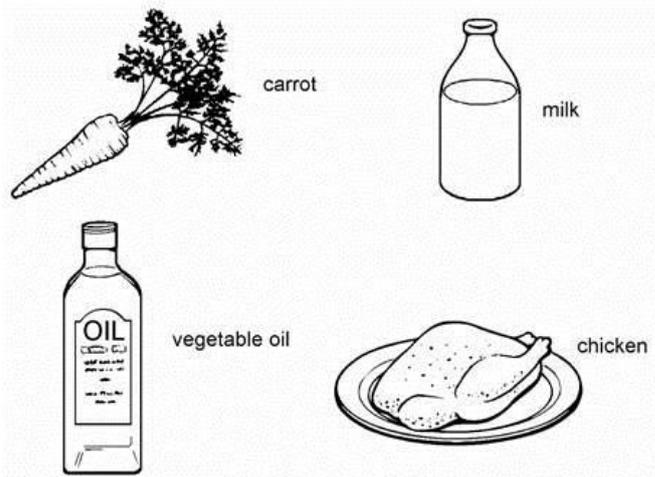
.....

(b) Explain why the 15-year-olds need more calcium than the adults.

.....
.....
.....

(c) A balanced diet contains a variety of foods which provide nutrients and energy.

The drawings show four different foods.
Choose from these to answer the questions which follow.



Which of these foods is the best source of:

fibre?

calcium?

protein?

Day Four

Exercise is **extremely important** to living a healthy lifestyle. Even if you eat a balanced diet without exercising regularly your body will not be in its best possible condition. Exercise can help you lungs and heart function better, improve your fitness-strength and endurance and exercise can help boost your mood.

For that reason **use your half and hour of science work time today to do 30 minutes of exercise.** This could be walking, running, cycling, dancing or anything else you can think of.

If you go on a walk, run or cycle make sure to record the distance that you do on the Ark sports day challenge website so the distance can count for your tutor group.

<https://www.arksportsdaychallenge.com/>



Day Five

Read the news article below, you can write down any thoughts you have on the topic of the news article in your book.

Your food choices affect Earth's climate

Eating meat can have twice the 'carbon footprint' of consuming fruits, veggies and grains

By Janet Raloff

July 11, 2014 at 8:01 am

Every action has a cost. That's as true for driving a car as it is for growing food and delivering it to your dinner plate. A team of researchers has just tallied the costs of producing meat versus other types of foods for human diners. They find that meat production — from farm to fork — releases more climate-warming pollution that does producing fruits, vegetables, nuts and grains. A lot more.



Their calculations suggest that people could do a lot to slow global warming if they limited how much meat they eat.

There are plenty of “costs” to producing any goods, including food. Sure, people pay money for the food as well as the fuel needed to get groceries to the store or restaurant. But those are just the most visible costs. Producing things also takes resources. For foods, this includes the water used to irrigate crop fields. It also includes the fertilizer and chemicals that boost plant growth and fight pests. And don't forget the gasoline and diesel that fuel ploughs and also those trucks that take crops to market.

Along with those resources are wastes: pollution. Manure is one obvious pollutant associated with meat production. But there are others, including the air pollutants spewed by tractors that plough fields and the trucks that move feed to the animals and animals to the slaughterhouse. Peter Scarborough at the University of Oxford in England, and his colleagues decided to tally some of the less-visible pollution created by food production.

They focused on greenhouse gases. In the atmosphere, these gases trap heat from sunlight. Lately they've been trapping too much, causing a sort of mild, global fever. Overall, food production accounts for one-fifth of this type of pollution.

One greenhouse gas emitted through the production of our food is carbon dioxide, or CO₂. It's released by the burning of fossil fuels, such as gasoline and natural gas. They are used to power farm machinery, to take foods to market (and home), to store foods awaiting processing and to cook foods. The researchers also tallied methane. Fermentation in the guts of ruminant livestock — mostly cows — releases this gas. And the scientists calculated the nitrous oxide released during the ploughing and fertilizing of crop fields.

All three gases are important. CO₂ is the greenhouse gas released in the highest volume. But methane and nitrous oxide stay in the atmosphere far longer than CO₂ does. As such, they are more potent, molecule for molecule, in warming Earth's atmosphere.

A computer converted the methane and nitrous-oxide emissions for each person's diet into its carbon-dioxide "equivalent." That's the amount of CO₂ needed to warm Earth's atmosphere by the same amount as the methane or nitrous oxide would.

Switching from meat-rich meals to vegetarian ones would reduce the average meat eater's CO₂ equivalents — also known as its *carbon footprint* — by 1,230 kilograms (about 1.4 U.S. tons) per year, the new study calculated. Scarborough's team presented its findings in the July issue of *Climatic Change*.

How they calculated food's 'carbon footprint'

In the 1990s, a survey asked 65,000 adults what they typically had eaten throughout the past year. Scarborough's team fed those data into a computer. The researchers also included the amount of greenhouse gases linked with producing nearly 100 common foods. Then the computer matched those greenhouse-gas amounts to the mix of foods each person had reported eating.

Some people had eaten lots of meat. Others hadn't. Some had been big fish eaters. Others weren't. All people ate some plant-based foods, such as salads, grains, bread, beans or fruit. Some reported being vegetarians. That means they downed only plant-based foods with the exceptions of possibly eggs, fish or milk. Others, vegans, reported eating no meat, poultry, fish or dairy foods (including cheese, butter and yogurt).

The diet of someone whose meals included an average of 50 to 99 grams (1.8 to 3.5 ounces) of meat each day would be responsible for the daily release of 5.6 kilograms (12.4 pounds) of CO₂ equivalents, according to the new analysis, would contribute only 2.9 kg (6.4 lbs) of

CO₂ equivalents, the researchers calculated. Indeed, those vegans had the lowest diet-linked greenhouse-gas emissions. Vegetarians had the next lowest emissions, followed by people who ate fish but no red meat or poultry.

Scientists don't expect many people will give up eating meat entirely. In fact, in England the trend has been in the opposite direction. The share of people there who consider themselves vegetarians or vegans fell from 5 percent in 2000 to just 2 percent by 2010. Over the same period, meat consumption climbed 7.8 percent — to 84.2 kg (186 lbs) per person.

U.S. data show that as of 2012, 4 percent of men and 7 percent of women considered themselves vegetarians. However, Americans continue to consume more meat

than people in the United Kingdom and Europe. Each year the average American adult downs about 120 kg (265.7 lbs) of meat.

Still, the new study "demonstrates that reducing the intake of meat and other animal-based products can make a valuable contribution to climate change mitigation," its authors conclude. And there's another advantage to reducing meat consumption, the researchers point out. Compared to meat, more plant-based food calories can be grown on a plot of land — and with less water and other resources. In places where many people are going hungry, as they are in large parts of the world, raising meat may make it harder to ensure that everyone gets enough to eat.



Beyond greenhouse gases

“I think it’s interesting,” Danielle Nierenberg said of the new study. She’s president of Food Tank, a food-policy organization based in Washington, D.C. Looking at greenhouse gases is important, she says. But, she adds, it’s just one of many environmental costs of foods.



“The more we think about what we’re eating, and food’s role in sustainability or in climate change, that’s a good thing,” she says. But, she adds, “more needs to be done to be sure that we’re capturing everything.” By that she means scientists want to be sure that they are not missing important environmental “costs” of producing food.

Those costs may have to do with the resources. Some crops are water hogs, which can be a problem in areas with little rain. Others may require a lot of processing — using water and plenty of expensive energy — to clean, cook-up, package or deliver foods to grocery shoppers.

And then there are a range of less visible environmental problems. Animals may harden the soils, making the land less likely to soak up water when it rains. Often farmers rely on weed killers and pest killers to improve the size of their crop harvests. Many of those chemicals can be toxic to wildlife and people. Some fertilizers can pollute groundwater. Ploughing fields can lead to erosion. That can diminish the fertility of soils.

Finally, Nierenberg notes, even for meat, “not all meat is created equal.” Some farmers pen cattle in feedlots to fatten them quickly. This requires feeding them an unnatural diet and releases a lot of animal wastes (poop and pee) into a small area. In contrast, some farmers graze their cattle on pastures. Allowing the animals to eat grass and over a broad expanse of land helps ensure that the soil is protected and that native plants are not trampled to death.

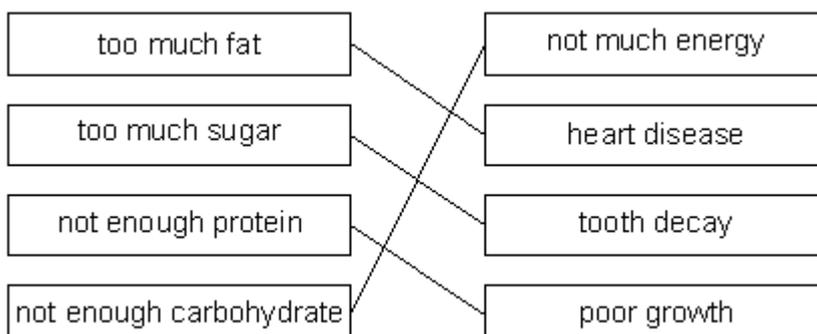
There can also be a similar range of environmental differences in the way plant-based foods are farmed. Some can be less wasteful and less polluting than others.

Scarborough’s team took a good first step in tallying costs, Nierenberg says. But, she argues, more details will be needed about how foods are grown to truly know which foods — or farm practices — take the biggest toll on Earth’s total environment.

Mark Schemes

Day Three

Q1.(a)



*if more than four lines are drawn deduct one mark for each
incorrectly drawn line
minimum mark zero*

4 (L3)

(b) they contain too much fat

*accept 'they contain fat' or 'they make you fat or overweight'
accept 'it is an unbalanced diet' or 'it could give you a
heart attack' or it causes heart disease'*

1 (L3)

[5]

Q2.

(a) (i) **Answers may be in either order**

vitamins

accept 'vitamin C'

1

water

accept 'carbohydrates'

do not accept 'sugar' or 'starch'

1

(ii) **Answers may be in either order**

fats

1

proteins

1

(b) **Answers may be in either order**

minerals

1

fibre

accept 'roughage'

1

(c) any **two** from

- increases the surface area of the food **or** orange

*accept 'increases the surface area'
or 'breaks it into smaller pieces'*

- breaks open cells

accept 'so you can get the nutrients out'

- mixes it with saliva for easy swallowing

accept 'for ease of swallowing' or 'to stop you choking'

- mixes with saliva to start digestion occurring

*accept 'to start digestion' or 'to mix enzymes with the food'
or 'to break it down'*

2

[8]

Q3.

- (a) **answers should show an understanding that the bricklayer does physical work**

more active

accept 'uses up more energy'

or 'lifts bricks all day' or 'does more work'

do not accept 'works harder' or 'has a tougher job'

or 'does hard work'

1 (L5)

- (b) **answers should refer to bones and their growth**

calcium is needed for bone

accept 'it is needed for teeth'

1 (L5)

the 15-year olds are still growing

accept 'the adults have stopped growing'

1 (L5)

- (c) carrot

1 (L5)

milk

1 (L5)

chicken

1 (L5)