

Equazen, science pioneers and creators of brain health supplements*, has teamed up with the ADHD Foundation to help explain the importance of good brain health, celebrate neurodiversity as well as being proud supporters of the Schools Neurodiversity week



Brain Matters and Fish: Brain Health Explored

Lesson Plan KS1 and KS2

These activities, suitable for 7-10-year olds, each take about 20 minutes and can be used separately or together, depending on the time you have.

CURRICULUM LINKS:

● **SCIENCE:**

○ **BIOLOGY:**

- the brain (how it works)
- healthy eating; food groups (fish); nutrition for the brain; ability to recognize types of fish

AIM:

- To understand the importance of Essential Fatty Acids (technically called Omega-3 and Omega-6) for a healthy diet, brain health, pupil development and behaviour, reading ability and memory
- To understand brain health in the context of neurodiversity and learning differences such as dyslexia, dyspraxia and the autistic spectrum

THEMES: nutrition and healthy eating, brain development, brain health, brain nutrition, omega fatty acids, respect and care for each other, learning differences, neurodiversity,

RESOURCES NEEDED:

- Interactive brain poster map/flyer
- A4 brain health information explainer (see schools pack)
- Celebration of Neurodiversity Week (see schools pack)
- Omega fats information sheet (provided leaflet)

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The beneficial effect is obtained with a daily intake of 250mg of DHA*

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ACTIVITY 1

What is the brain?

AIM TO CONSIDER WHY WE HAVE A BRAIN, ITS STRUCTURE, HOW IT WORKS AND TO EXPLORE THE IDEA OF BRAIN HEALTH

ASK pupils what they think of when they hear the word 'brain'. If you have the time you could split your class into smaller groups to come up with their own ideas of why we have a brain and what it does.

EXPLAIN (SEE A4 BRAIN HEALTH EXPLAINER) That the human brain is an amazing organ and a large mass of nerve tissue that is protected by the skull. It is very large compared with that of other animals, weighs about 1.5kg and is responsible for the senses (sight, hearing, smell, taste and touch), our memory and emotion. It also helps to send messages to our body HQ to help control our breathing, make sure blood is being pumped by our heart around the body and help special chemicals in our bodies called hormones. Hormones are created by the body and they help us do certain thinking like grow up.

A human brain contains approximately 86 billion nerve cells¹. Contrary to popular myths we use all of the nerve cells in our brains not just a small fraction of them. Each of these nerve cells communicates, through electrical signals, with thousands of other nerve cells to create countless circuits across 162,000 km of nerve fibres². These circuits are responsible for everything we think, say, do and feel, even when we are asleep.

The biggest part of the brain is called CEREBRUM. It is the CEREBRUM which is the thinking part of the brain and there are two halves to our brains too. Let's hear a bit more about what the two halves of our brains do.

DISPLAY THE INTERACTIVE BRAIN MAP POSTER

EXPLAIN that there is a left and right brain with different functions

ASK pupils to respond orally to the brain map by identifying the different functions of the left and right brain.

SUMMARISE what the pupils have said by re-listing the activities/functions of the left and right brain.

ASK pupils what they think it means to have a healthy brain.

EXPLAIN that a healthy brain is one that can perform things like the ability to learn new things, to remember things, learn, understand, help solve problems and interpret the use of language, read and concentrate.

¹ Devlin J. Equazen Presentation. On file

² Ibid

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ACTIVITY 2

What is healthy food and nutrition for the brain?

AIM TO CONSIDER THE IMPORTANCE OF FISH AND TYPES OF FISH IN THE DIET

ASK pupils what they think the brain needs to work or function well.

PLAY THIS TRUE OR FALSE QUIZ:

Brain health depends on good nutrition and healthy eating? *True*. Healthy eating and good nutrition are important for all parts of the body, including the brain

The main component of the brain is protein? *False*. It's fat. The brain is made up of 60% fat

We need a lot of fat in our diets for brain health? *False*. We don't need a lot of fat overall, but we need specific types of fat.

Fish is good for our brains? *True*. Oily fish such as sardines, pilchards, salmon, fresh tuna, herring and mackerel is good for our brains. Oily fish contains omega 3 essential fatty acids, especially DHA, which is important for brain health. Other white fish such as cod and haddock are good for us but they do not contain so much of the DHA which is good for our brains and its building blocks.

Could ask (if you have time after saying that the answer to the previous question is true) the pupils to come up with the names of fish, whether they like fish and which ones they like to eat. Fish fingers is an OK answer!

Exercise is good for our brains. *True*. Exercise has both physical and mental health benefit (see poster. Making Time for PE. The benefits of exercise and fish for the brain)

A human brain contains approximately 86 billion nerve cells

DID YOU KNOW?

Omega-3 fatty acids are known as "essential fatty acids" because they cannot be synthesized in the body and have to be obtained from our diet. Although we cannot synthesize these fatty acids ourselves, they play an important role in almost every cell.

EPA (known as eicosapentaenoic acid) - is one of the fatty acids that make up the group we know as omega 3 and is found in oily fish.

DHA (Aka docosahexaenoic acid) - another omega-3 marine fatty acid, provides the building blocks of the brain and eyes. It makes up 40% of the polyunsaturated fatty acids, or PUFAs, in the brain and 60% of those found in the retina.

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ACTIVITY 3

Why is eating fish important for the brain?

AIM TO CONSIDER THE IMPORTANCE OF OILY FISH, SPECIFIC TYPES OF OMEGA FATS, FOCUSING ON DHA FOR BRAIN STRUCTURE

EXPLAIN

- Fish, particularly oily fish, is important for brain health. It contains DHA a specific type of omega fat.
- Evolution of our large human brain depended on a plentiful source of DHA from oily fish and marine sources.³
- Of all the omega fats, omega-3s are the most abundant in the brain. DHA accounts for 97% of the omega-3 fatty acids in the brain.⁴
- Oily fish are the best sources – salmon, sardines, pilchards, fresh tuna herring, mackerel.
- DHA in particular is a building block within the brain and may be the most important ingredient for brain health throughout life.⁵
- DHA can be compared to the foundation when building a house. It is the most important building block. Without this DHA foundation, it is difficult to build a healthy brain.
- DHA is the preferred foundation for the building the brain cells.
- DHA is a major structural component of the cerebral cortex, the part of the brain responsible for memory, language, creativity, attention and emotion⁶. Show the brain poster map.
- DHA plays a major role in communication between brain cells.

³ <https://www.ncbi.nlm.nih.gov/pubmed/10419087>

⁴ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2621042/>

⁵ <https://www.ncbi.nlm.nih.gov/pubmed/20329590>

⁶ http://www.dartmouth.edu/~rswenson/NeuroSci/chapter_11.html

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ACTIVITY 4

How can omega fats help pupils achieve at school, home and in play?

AIM TO CONSIDER HOW OMEGA FATS CAN IMPROVE READING SKILL, CONCENTRATION AND MEMORY

EXPLAIN

ASK the pupils how much oily fish they think they should be eating and whether they think they eat that much. Fish fingers do not count.

EXPLAIN (SEE A4 BRAIN HEALTH EXPLAINER)

- Average intake of oily fish, our best dietary source of omega-3, is 54g per week, less than half the recommended 140g⁷. Children often have inadequate omega-3 status
- High intakes of DHA enhance learning⁸ and low intakes are linked to an increased risk of attention deficit hyperactivity disorder (ADHD) and behavioural change⁹.

ASK the pupils that given that intakes of oily fish and omega 3 fats are below recommended levels and maybe not all of us enjoy eating oily fish (this will depend on what the pupils said in response to the True/False question in Activity 3) could we think about other ways to boost DHA intake?

Pupils may suggest having oily fish on school lunches or bringing sardine sandwiches for school lunch (good if they do)

REFER again to the brain map showing brain activities in the left and right brain

⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/310995/NDNS_Y1_to_4_UK_report.pdf

⁸ <https://www.ncbi.nlm.nih.gov/pubmed/10479465>

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