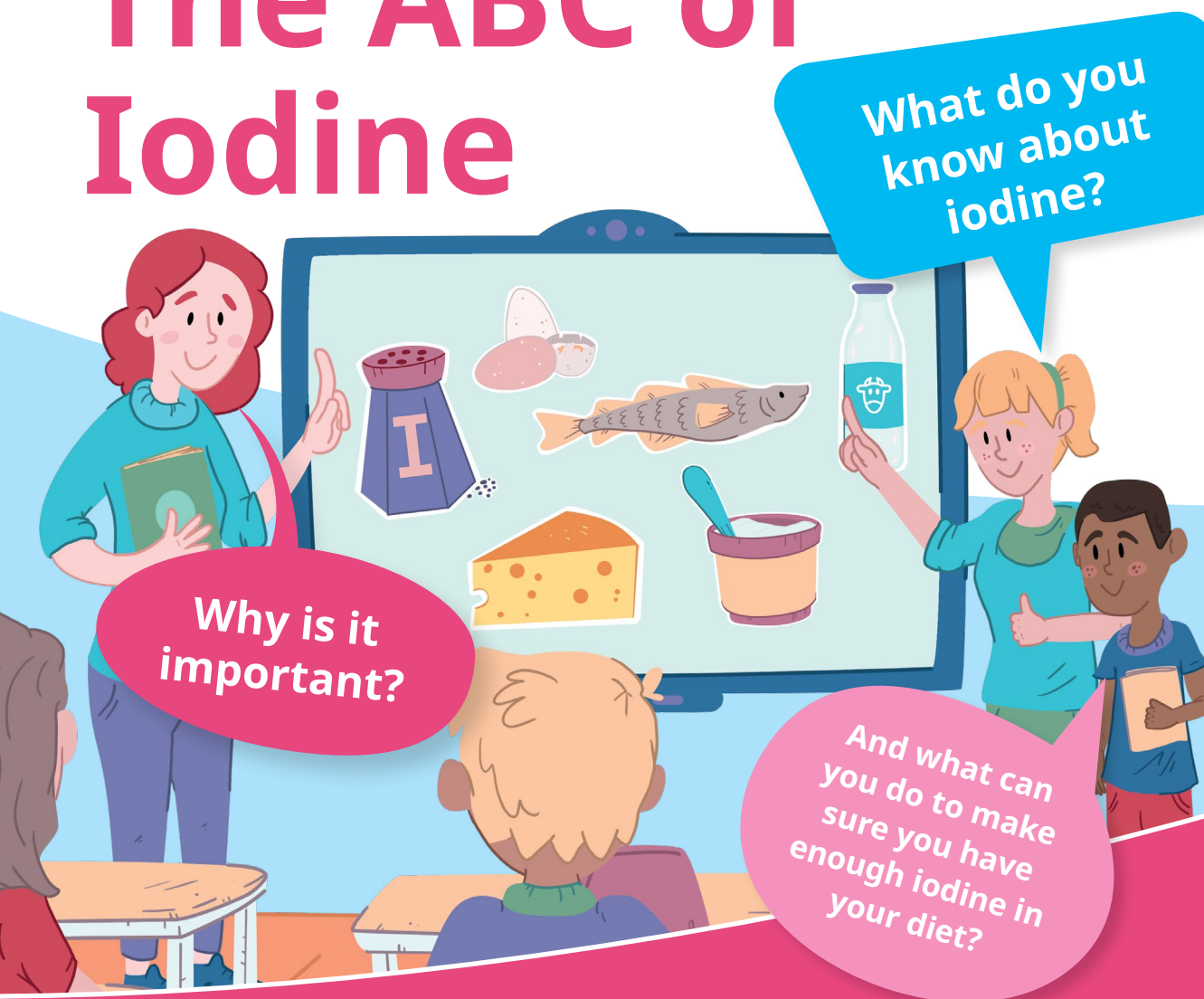


The ABC of Iodine



A discovery guide for students and teachers

Name:

Class:

The EUthyroid2 project is funded by Horizon Europe, aimed at finding ways to improve awareness of iodine deficiency, especially among adolescents and young women.



Co-funded by
the European Union



UK Research
and Innovation



EUthyroid2

The ABC of iodine has three modules where you can learn about the importance of iodine nutrition.

Mandatory

Module A

The mandatory Module A includes a lecture and related exercises.

Optional

Module B

The optional Module B offers group assignments for presentations.

Optional

Module C

The optional Module C involves group work to create an iodine poster.

Module A (Mandatory)

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Module A

Why is iodine important?

Iodine is an essential mineral that plays a key role in the body for a healthy life. You only need it in tiny amounts every day. It helps your thyroid gland, which controls how fast your body uses energy. It's crucial for growth and staying energised. Without enough iodine, your body might not work as it should, so make sure you get enough. The intake of iodine is important at all stages of life, but especially for children and women who plan to have a child.

You need iodine before you are born and very early in life to ensure you can grow and learn well. In the months after birth, your mother's breast milk or formula can provide the iodine you need. After that, you need to find it in your diet from different iodine-rich foods.

You need iodine:



Fact



Iodine is needed before you are born, throughout your childhood, and when you are planning to have a baby.

Glossary

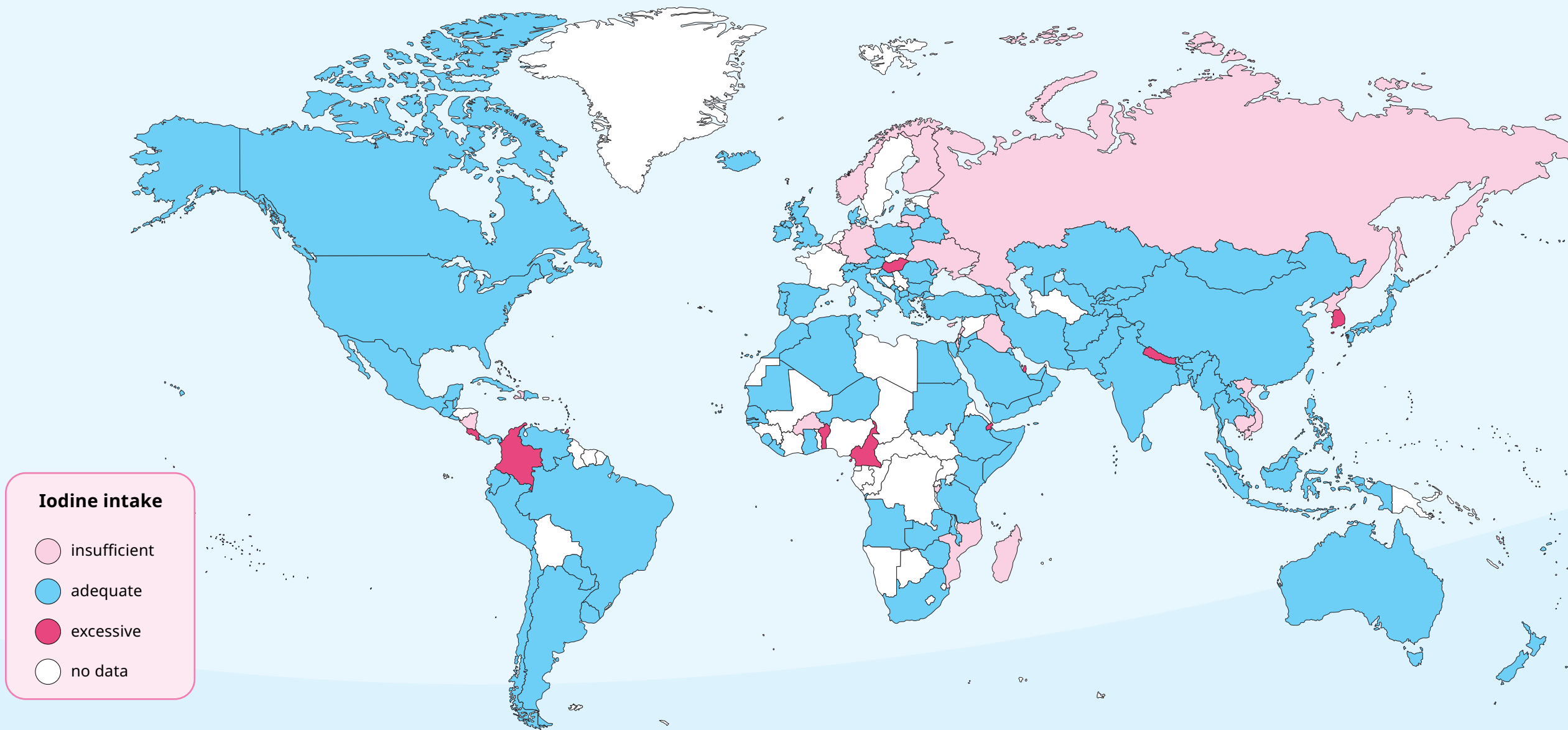


An **essential mineral** is when a mineral is needed but your body cannot produce it, you have to get it from your diet.

Does everyone in the world have access to iodine in their diet?

Most normal diets in many countries lack sufficient iodine. Because of a global campaign to add iodine to household salt, much of the world's population has access to the tiny amounts of iodine they need. However, in some countries, including the United Kingdom and the Republic of Cyprus, people do not have access to iodised salt.

Iodine status is monitored by governments by checking iodine content in urine during national or regional surveys. Though the national iodine intake might be adequate, certain groups in the population can have an insufficient iodine intake. Find your country on this map to see iodine status.



What is the history of iodine deficiency?



Iodine deficiency has a long history. In 326 BCE, Alexander the Great saw swollen necks in residents of the northern area of present-day Pakistan. This was goitre, a swelling of the thyroid gland in the neck due to iodine deficiency.

In 1880, the famous writer, Mark Twain, wrote about a fellow traveller who remarked: "Well, I am satisfied, I have seen the principal features of Swiss scenery – Mont Blanc and the goitre – and now for home!" Switzerland was the first country in the world to iodise salt (add iodine to salt) as a way of tackling the problem of iodine deficiency, and has been doing so for more than a hundred years. Before that, there were high rates of severe and permanent mental impairment, as well as goitre, especially in Alpine regions with low iodine levels in soil and plants.

The United States is also coming up to 100 years of salt iodisation. During World War I, 31% of military people were disqualified from service due to goitre because their necks were too large to fit in a uniform. Salt began to be iodised in 1924, and significantly improved iodine status.



About 30 years ago, international leaders, the salt industry and people all over the world came together in a campaign to iodise salt, called Universal Salt Iodisation. Thanks to this campaign, we no longer see the signs of severe iodine deficiency in most parts of the world. However, we still see moderate and mild deficiencies, mostly due to lack of attention to use of iodised salt and eating iodine-rich foods.

Glossary

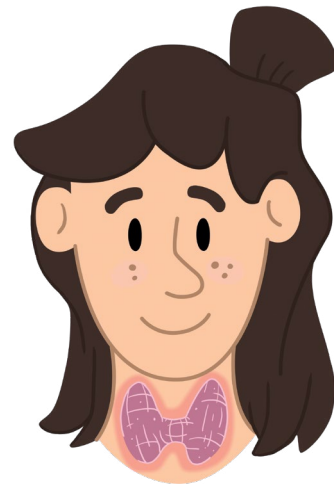


Mental impairment involves difficulties in cognitive functions such as learning, understanding, remembering, or problem-solving, which might affect an individual's ability to grasp information or interact with the world in typical ways.

Iodine deficiency or nutrient deficiency is when your body doesn't get enough of something it needs, such as important vitamins and minerals, like iodine.

Iodine: fuelling growth and energy

You need iodine to produce thyroid hormones, which are necessary for growth and metabolism. The thyroid gland is in front of your neck, below the Adam's apple. If it cannot produce the right amount of thyroid hormones, this may lead to negative health effects. Also, if the thyroid gland does not get enough iodine, it may lead to thyroid diseases (too little or too much of the thyroid hormone is produced). Since the thyroid hormones are important for metabolism, iodine deficiency may lead to problems regulating body temperature, fatigue, tiredness, and weight changes.



Fact

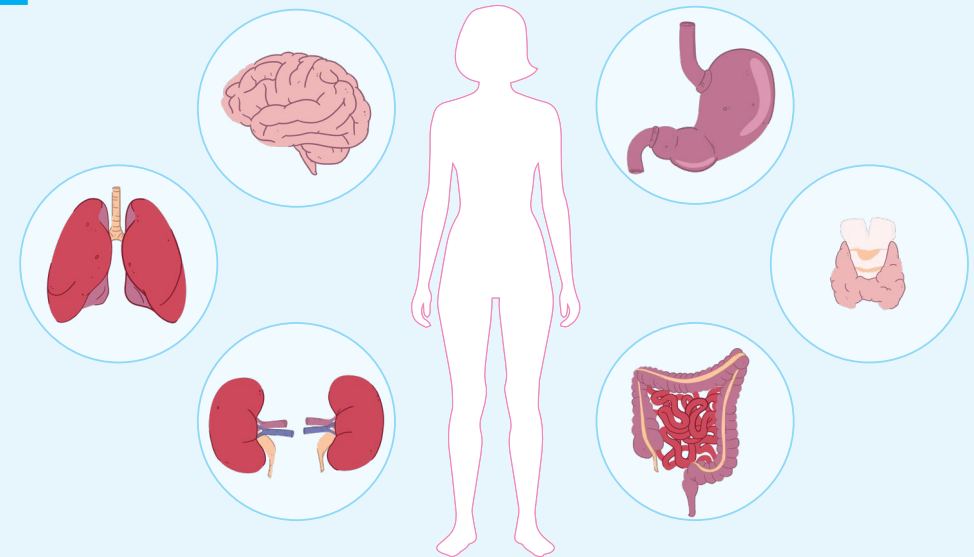


The thyroid gland is a small butterfly-shaped gland in the front of your neck, below the Adam's apple.

Extension task



Illustrate the location of the thyroid gland in relation to other organs in the human body and describe its location in one sentence.



» Iodine in pregnancy: growth and brain development of the baby

Iodine is crucial during pregnancy because it supports the production of thyroid hormones. These hormones are essential for the healthy development of the baby's brain and nervous system. Thus, iodine is important for the development of cognitive abilities, learning, and overall health as the baby grows.



Extension task



Create a comic strip or a diagram illustrating the journey of iodine in a pregnant woman's body and its role in the baby's brain development.

» Why should we care about iodine deficiency today?

While the signs of severe iodine deficiency are fading, moderate and mild iodine deficiency still exist. As it is no longer an obvious, visible issue, many people do not know about the importance of having enough iodine in their diets.

Iodine deficiency can impact the health of all population groups, and it is the largest preventable cause of mental impairment.

» Do you know anyone who is thinking about having a baby?

During pregnancy, your body needs more iodine, so it's important to have good iodine nutrition before becoming pregnant.

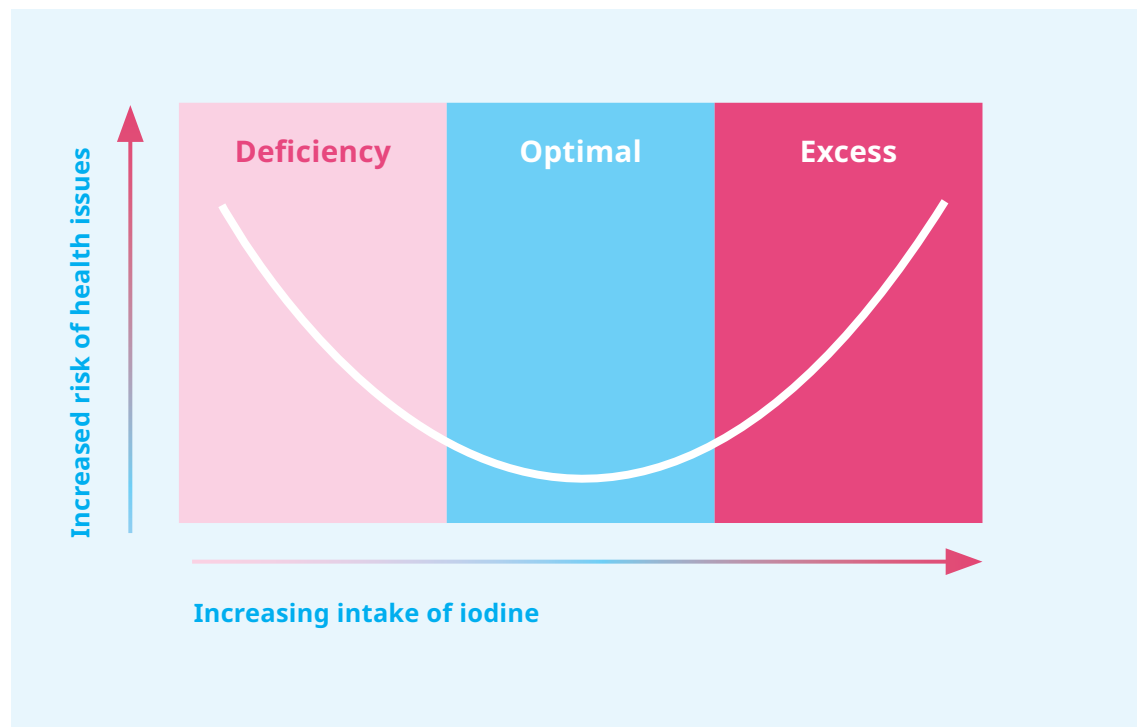
Extension task



Write a text message to a (perhaps imaginary) friend or a family member who is considering having children. Talk about the importance of iodine before and during pregnancy.

Getting the proper amount of iodine is important for good health

One might think that if a little iodine is good for human health, then consuming more iodine is even better. But like many nutrients, you can have too much of it. One example of this is seaweed. While it's a good source of iodine, brown seaweeds such as kelp have a very high iodine content, so it's important to understand how much to eat. Ensuring an adequate but not excessive iodine intake is essential for health.



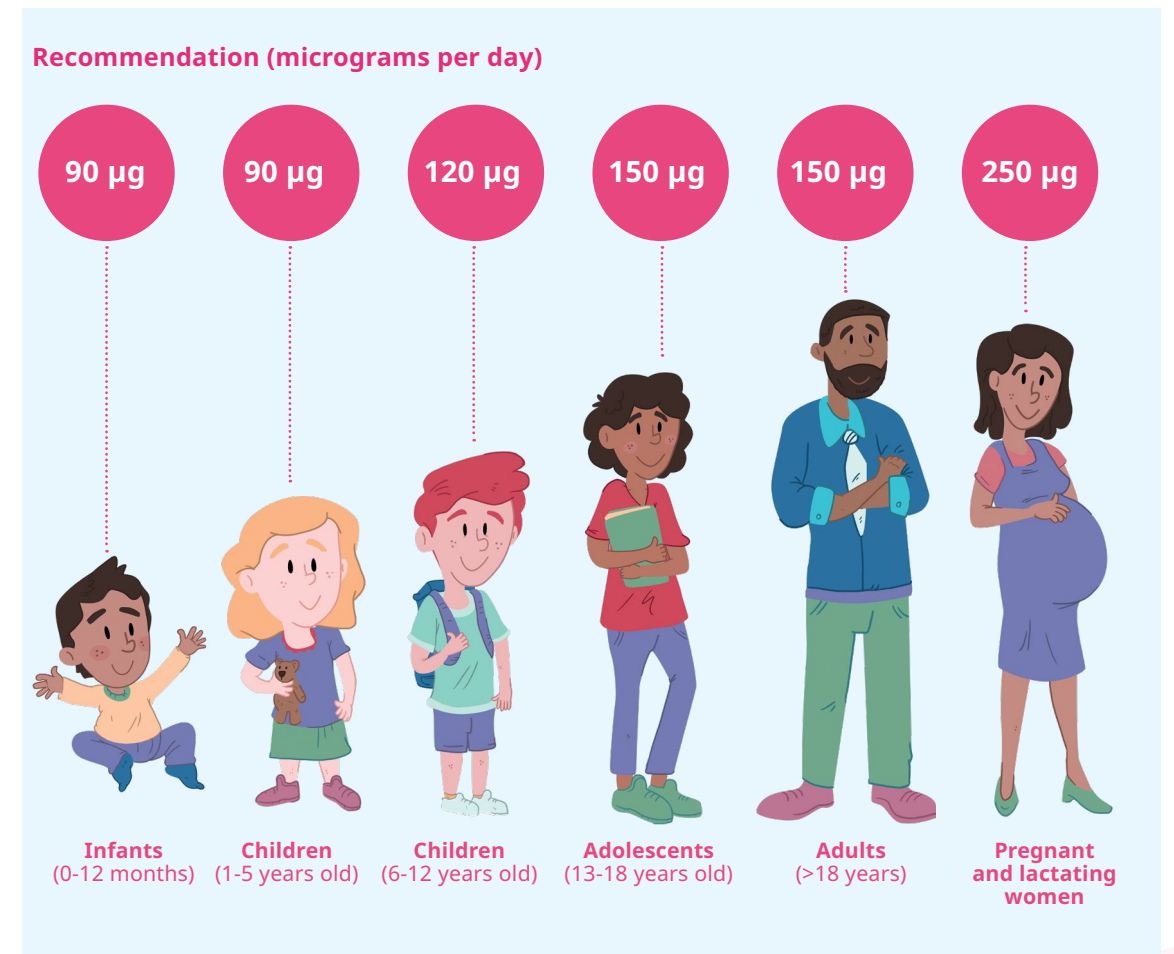
Glossary



Hypothyroidism: if the thyroid gland does not get enough iodine, it may start to produce too little thyroid hormone (hypothyroidism).

Recommended iodine intake – also for pregnancy and breastfeeding

The World Health Organization (WHO) recommends the following iodine intake per day (2007). These recommendations are based on the average daily intake of iodine necessary to maintain thyroid hormones and overall well-being for different age groups and life stages.



Fact

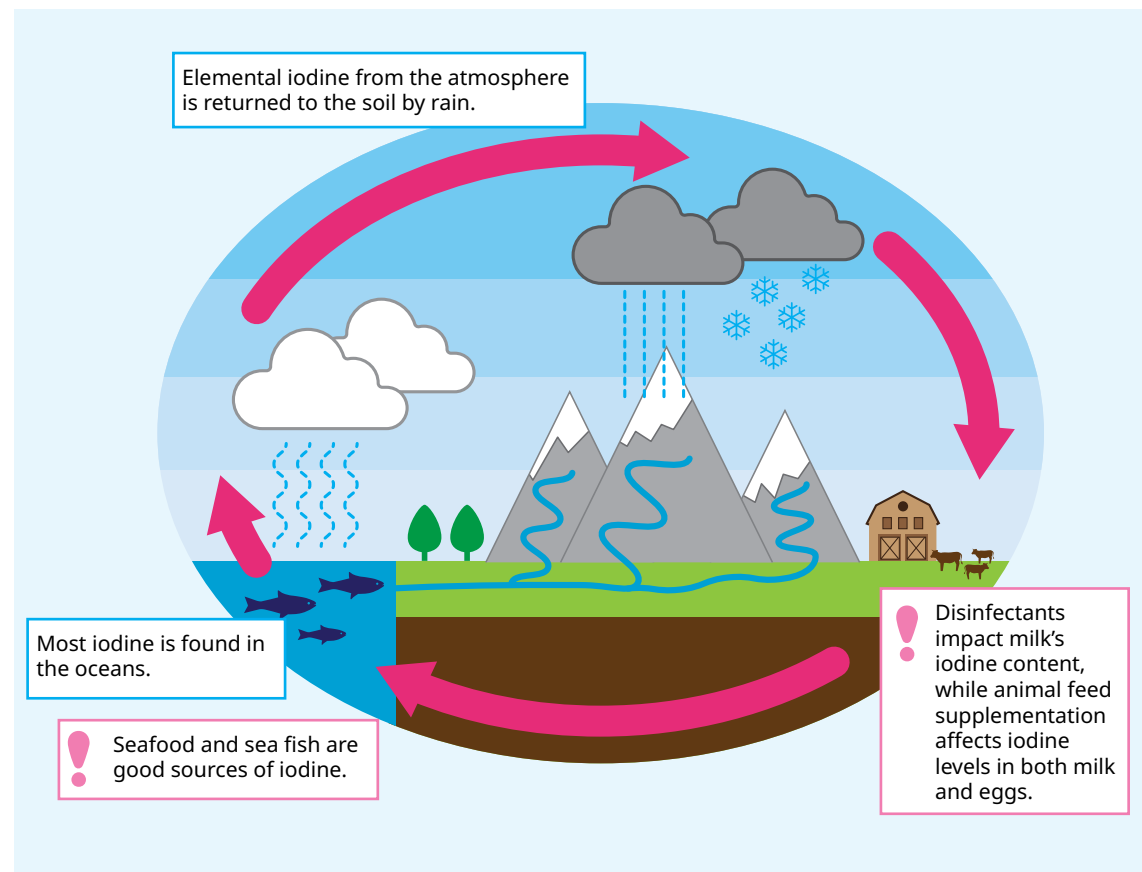


A µg (microgram) is such a small amount that it's hard to illustrate. The amount of iodine you need a day is so small that you will need less than a teaspoon of iodine your entire lifetime.

The iodine cycle

Iodine's journey starts in the ocean, where fish, shellfish and seaweed absorb it from sea water. From the ocean, iodine evaporates into the air in tiny droplets. These droplets fall on land when it rains, and the soil absorbs the iodine.

Furthermore, national regulations on iodine content in animal feed, food fortification, and salt iodisation programmes influence the level of iodine in foods. In some countries, iodine is also used as a disinfectant during milking and so milk and dairy products are also good sources of iodine in your diet. Hence, iodine enters the food chain in various ways.



Glossary

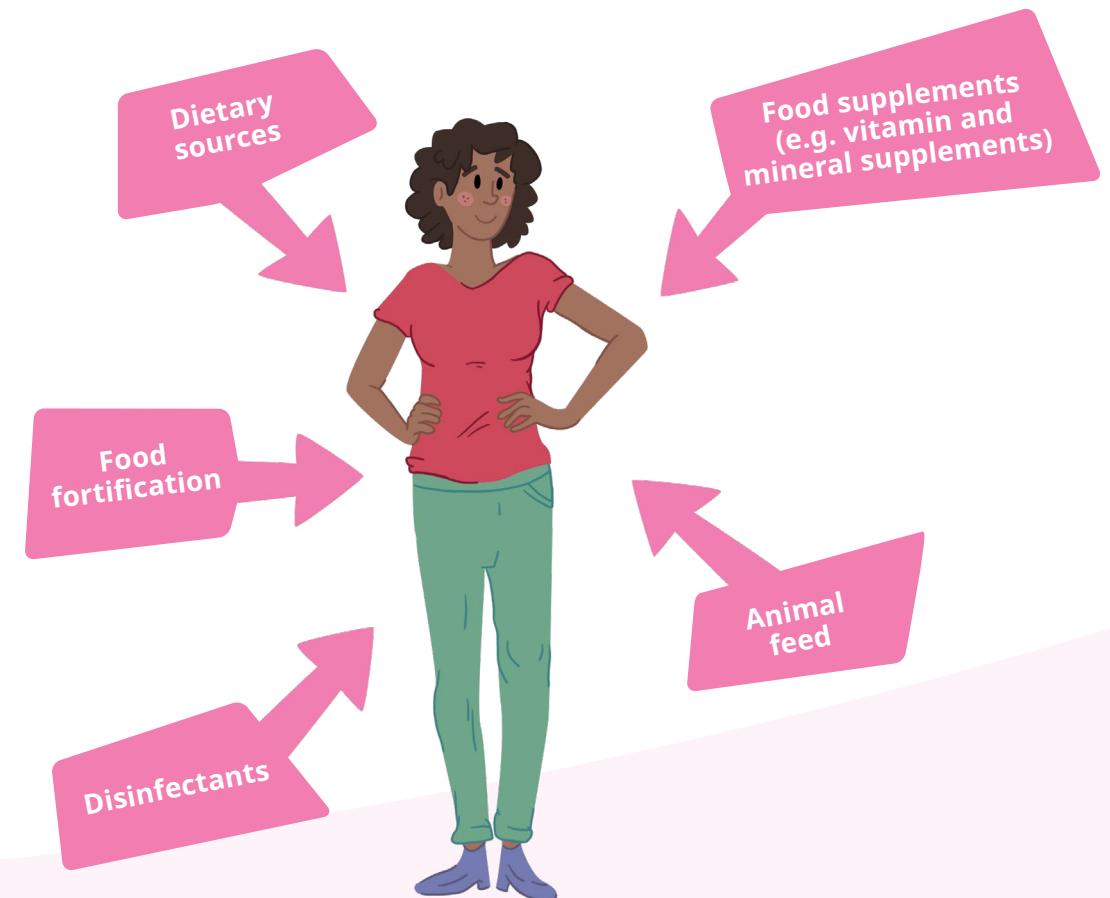


Fortification is when essential vitamins or minerals, like iodine, are added to certain foods such as salt, bread, cereals, or milk. The aim is to increase the amount of certain nutrients in particular foods and make sure that people get enough of the important vitamins and minerals.

How can countries ensure that people are getting enough iodine in their diets?

Countries may have different ways of ensuring that their population consumes enough iodine. Many countries have salt iodisation programmes, but they may differ in terms of how much iodine is added to salt (this depends on how much iodine people in a particular country need). In some countries, it is mandatory to use iodised salt (salt with added iodine) to produce bread and ready-made foods, whereas in others, it is voluntary. There are also other ways iodine is introduced into the food chain, including fortification of certain foods, animal feed and the use of disinfectants in food production. These affect how much iodine ends up in foods such as milk and eggs because of what the animals eat or how the foods are produced. Additionally, in some countries food supplements containing iodine are available.

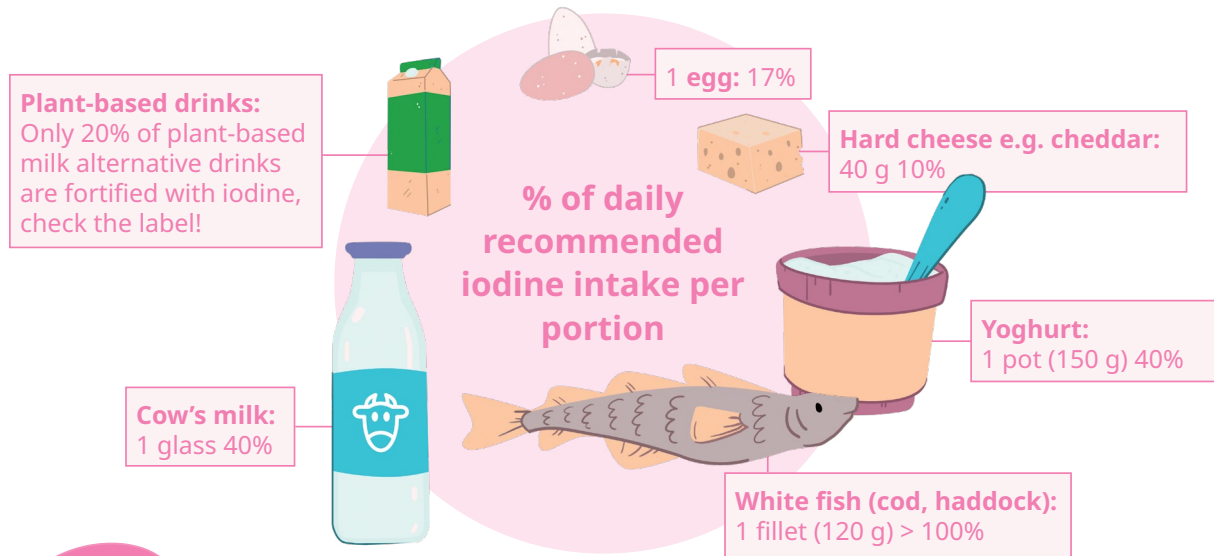
Legislation regarding iodised salt, food culture and geographical conditions may create significant differences in iodine intake between countries – even those that are geographically close to each other.



Iodine sources

Portion sizes to get the recommended daily amounts of iodine through diet

In the UK, cow's milk, yoghurt, cheese, eggs, white fish and oily fish are good iodine sources.



Important! Pregnant women need more iodine (250 µg daily).

If you follow a vegan diet, or you do not drink milk due to other reasons, make sure to get enough iodine.

Fact



Supplements provide extra vitamins or minerals. People can take them if they're not getting enough of these from their diet.

Isn't salt bad for us? WHO supports salt iodisation as the best strategy to ensure that people get enough iodine. But WHO is also concerned about how much salt people eat because it can cause other health problems, such as high blood pressure, heart disease, and stroke. What people really need to do is eat less salt, but make sure it's iodised.



Evaluation task (for all students)



In a small group of two, come up with a meal for lunch rich in iodine.

You can also choose to compose the three main meals for a pregnant/non-pregnant women, a vegetarian, or a vegan, ensuring their iodine needs are met.

Present your work to the others and discuss it with your classmates.

Extension task



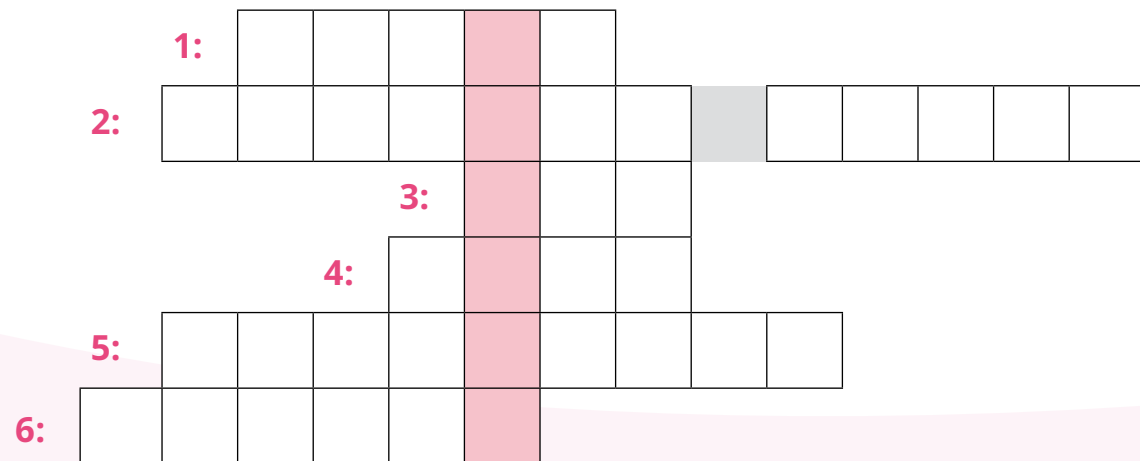
What kind of dairy products are there in your home? Have they been replaced by plant-based products such as oat or soy milk alternatives? If you have changed practices, do you think it has changed your iodine intake? Write five lines about this.

Things to remember



Crossword

- 1: Iodine is important for the development of the baby's _____.
- 2: Thyroid hormones are produced in the _____.
- 3: As an adolescent, you need 150 micrograms of iodine per _____.
- 4: _____ is a good marine source of iodine.
- 5: Women need a higher iodine intake per day during _____.
- 6: Iodine deficiency may lead to the enlargement of the thyroid, this is called _____.



Spot the errors

Adequate iodine intake is essential to prevent iron deficiency.

Correct sentence: _____

Having enough iodine in the diet is especially important during old age.

Correct sentence: _____

A global campaign 100 years ago to iodise salt helped reduce the incidence of deafness.

Correct sentence: _____

Apart from iodised salt, other important sources of iodine are chocolate and rice.

Correct sentence: _____

Extension task



Write a summary of the correct information as a tweet.

Module A exercises

A1: Which functions does iodine influence and regulate in your body?

(You can mark multiple choices.)

- Blood circulation
- Metabolism
- Brain development, especially during pregnancy and early childhood
- Reproductive functions and fertility
- Respiratory function
- Growth and development, particularly during childhood and adolescence

A2: Fill in the blanks

- Insufficient iodine in the diet might lead to a condition known as _____, characterised by an enlarged _____.
- The u-shaped curve illustrates that you can get both too _____ and too _____ iodine.
- When there is too little iodine during pregnancy, it may result in _____ and impaired _____ development.

A3: Which foods are good iodine sources? (You can choose more than one answer)

- Eggs
- Bread
- Cereals
- Milk and dairy products
- Fish and seafood
- Fruits and vegetables
- Potatoes
- Vegetable oils
- Iodised salt

A4: How much iodine does WHO advise adolescents to consume per day?

- 100 µg
- 150 µg
- 200 µg
- 250 µg
- 350 µg
- 600 µg
- 1000 µg

A5: How much iodine does WHO advise pregnant women to consume per day?

- 75 µg
- 100 µg
- 150 µg
- 175 µg
- 200 µg
- 250 µg
- 600 µg
- 1000 µg

A6: Why is iodine vital during pregnancy? (You can choose more than one answer)

- It is important for the development of the baby's bones and teeth
- It is important for the development of the baby's brain and nervous system
- It ensures the baby's overall growth
- It is important for the development of the baby's organs and skin

A7: How many or how much?

How many eggs should you eat a day to have enough iodine as an adolescent?

- 2 eggs
- 5 eggs
- 6 eggs
- 9 eggs

How many portions of white fish (120 g) should you eat a day to have enough iodine as an adolescent?

- 1 portion
- 2 portions
- 3 portions
- 4 portions

How many glasses of cow's milk should you drink a day to have enough iodine as an adolescent?

- 1 glass of milk
- 2-3 glasses of milk
- 5 glasses of milk
- 10 glasses of milk

Module B



Iodine awareness quest: crafting a community questionnaire

What about conducting your own mini study?
How about finding out what others know about iodine?

Assignment



Work with your classmates to create a questionnaire that asks family and friends or people in your community about iodine and how it affects their health.

How to make a questionnaire and how to do the study? See more here:



Iodine detective: exploring family food records

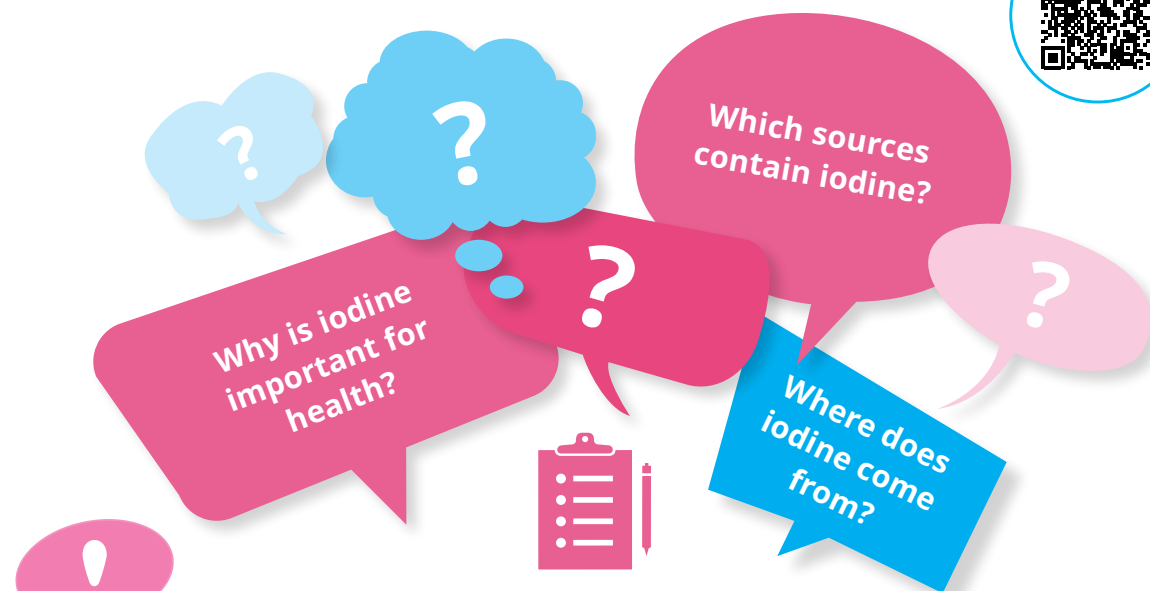
It's not just you who needs iodine, your family needs it too.

Assignment



Work together with your group to create iodine food records, focusing on where they get iodine in their diets. Use the iodine feedback tool.

How to make a food record? See more here:



It is fun to make a questionnaire, but you need to avoid **biased questions!** What is a biased question?

A biased question is a question that may influence people to answer in a specific way, for example: "Do you agree that pizza is the greatest food?"



Tracing iodine: mapping global fortification programmes

Countries around the world employ various strategies and methods to ensure that their populations have an adequate iodine intake.

Assignment



You and your group will study and compare iodine fortification programmes in different countries, including your own.

Learn more on fortification programmes here:



Iodine investigation: exploring local food sources

Assignment



Explore local stores and markets to uncover iodine-rich foods. Collaborate with your group to select stores, examine products, and document findings. Prepare a presentation for the class. Alternatively, conduct an online search.

Find guidelines for your investigation here:



Module C

Craft your iodine campaign poster!

Assignment



Design and create a campaign poster for an imagined national campaign for iodine awareness. This poster should educate others about what iodine is and why it is important for health.

A campaign aims to inform people about a topic and encourage them to act in a certain way. You will create a campaign for iodine awareness, targeting students of your age, explaining to them why iodine is important for health and guide them to pay attention to their daily iodine intake.



Step by step

Planning

What is your message, what facts should be on the poster, and how can you make your message stand out so that people remember it? Sketch a poster outline (how do you imagine your poster will look like?).

Production

Write the text you need (make sure all the facts are correct). Find the images and the information you need. You may want to take some of the pictures yourself to make them exactly as you want them.

Design and editing

Will you use a text and an image editing programme? Or will you create your own design - digitally or by hand? Maybe you have access to a programme through your school, or you can find one online. Editing programmes often have poster templates that are easy to use.

Does it work?

Show your poster to others without explaining anything first. Ask them:

- Do you like the poster, why?
- Have you learnt anything new that you didn't know before?
- What do you think, where would the poster be best to be displayed?

If you look at people's responses, have you succeeded in what you wanted? Does the feedback align with your purpose?

How to design a good poster? See more here:



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