

SARGSNAP!

Sargassum Lesson

Students Booklet





Learning Objectives

In this lesson, students will learn...

1. What sargassum is
2. How to identify different species of sargassum
3. The challenges and opportunities of sargassum

Activity 1: What do you think sargassum is?

Sargassum is...?

A plant

An animal

**Other type of
living thing**

Give a reason for your answer



West of Barbados, Caribbean Sea
March 2022



Tema, Ghana
June 2022

Sargassum 'floating' on the ocean surface

SARGSNAP!

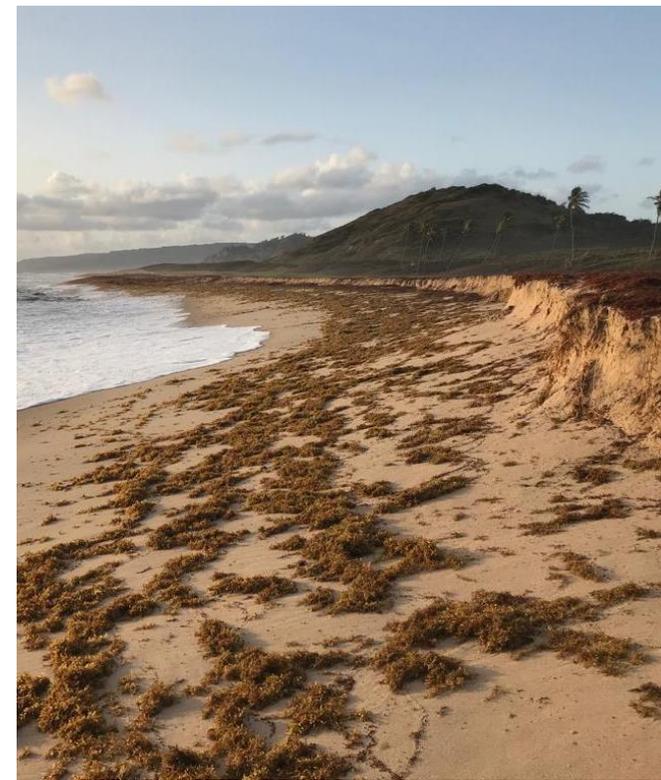




Esiama, Ghana
September 2021



Beyin, Ghana
September 2021

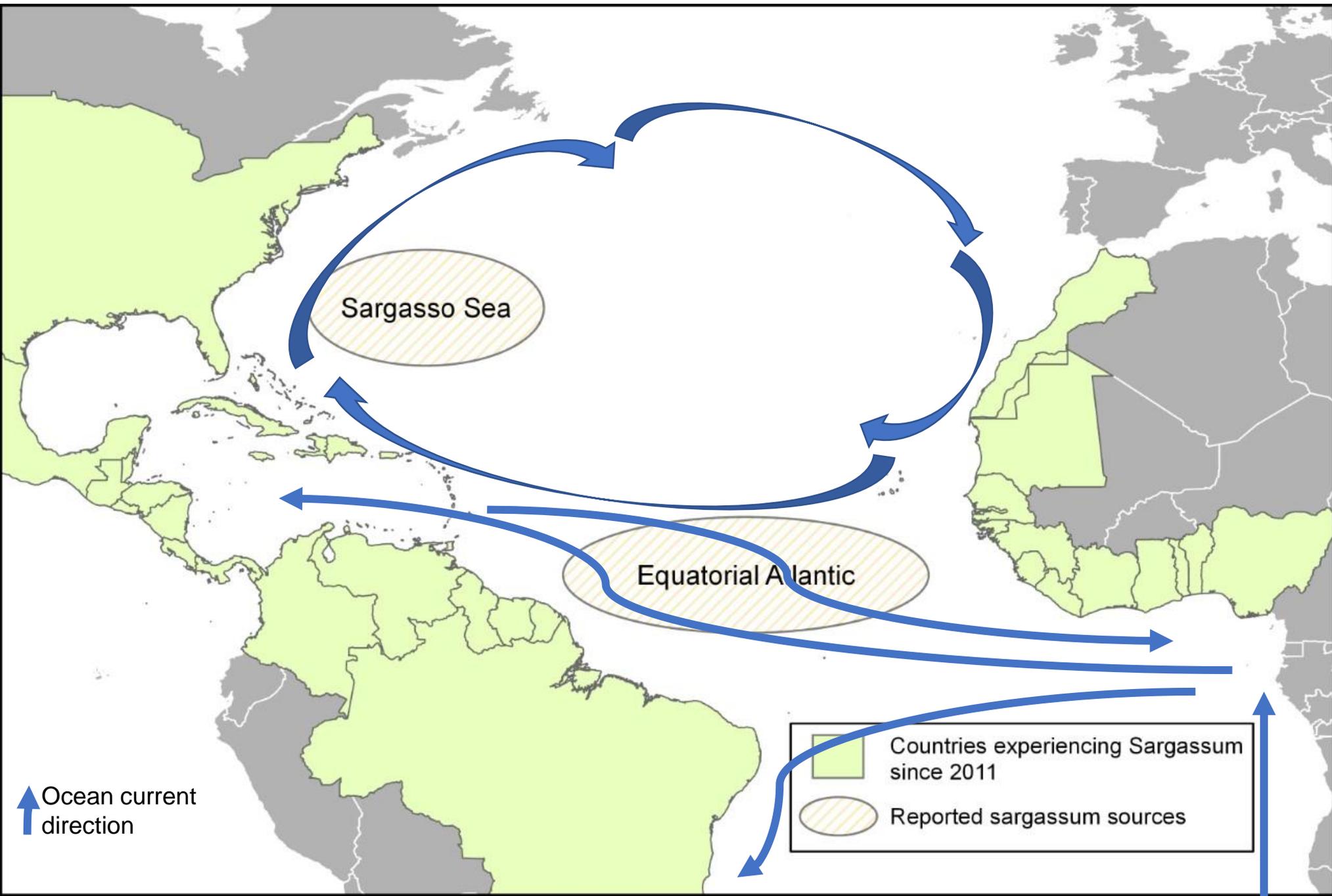


Barbados, Morgan Lewis
March 2022

Sargassum deposited on beaches.

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Activity 2: Sargassum Key Words

Can you match the pairs?

1. Seaweed

a. When the sea loses energy and it drops things it has been carrying

2. Benthic

b. The arrival of a large amount of something

3. Algae

c. Type of algae growing in the sea

4. Influx

d. Living at the bottom of the water

5. Deposit

e. Living organism without stems, roots and flowers

6. Holopelagic

f. rapid, massive and uncontrolled growth of algae

7. Natural Resource

g. A naturally occurring source of wealth or revenue

8. Bloom

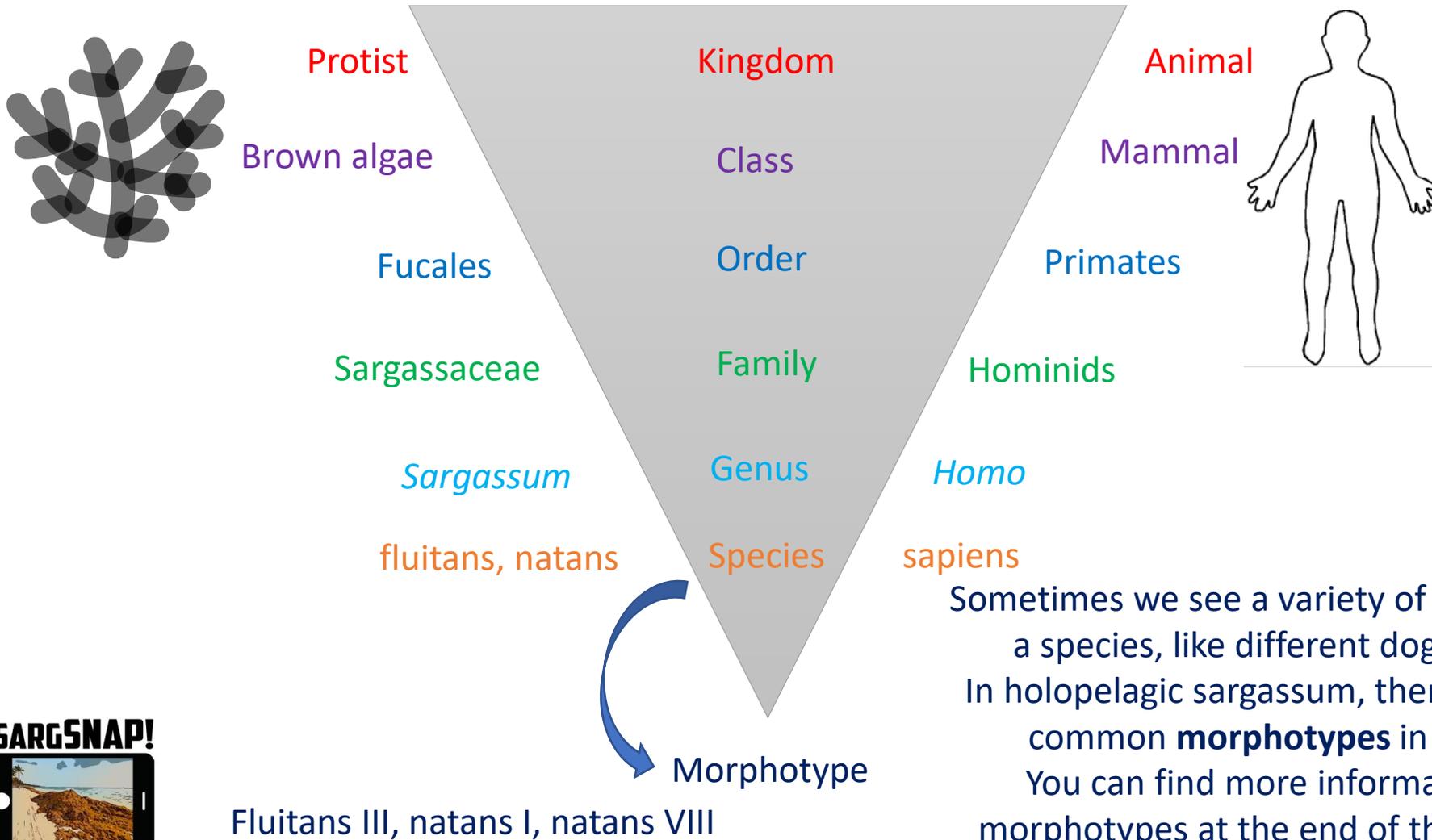
h. A body of water or air moving or flowing in a definite direction

9. Currents

i. Floats in the sea for a lifetime

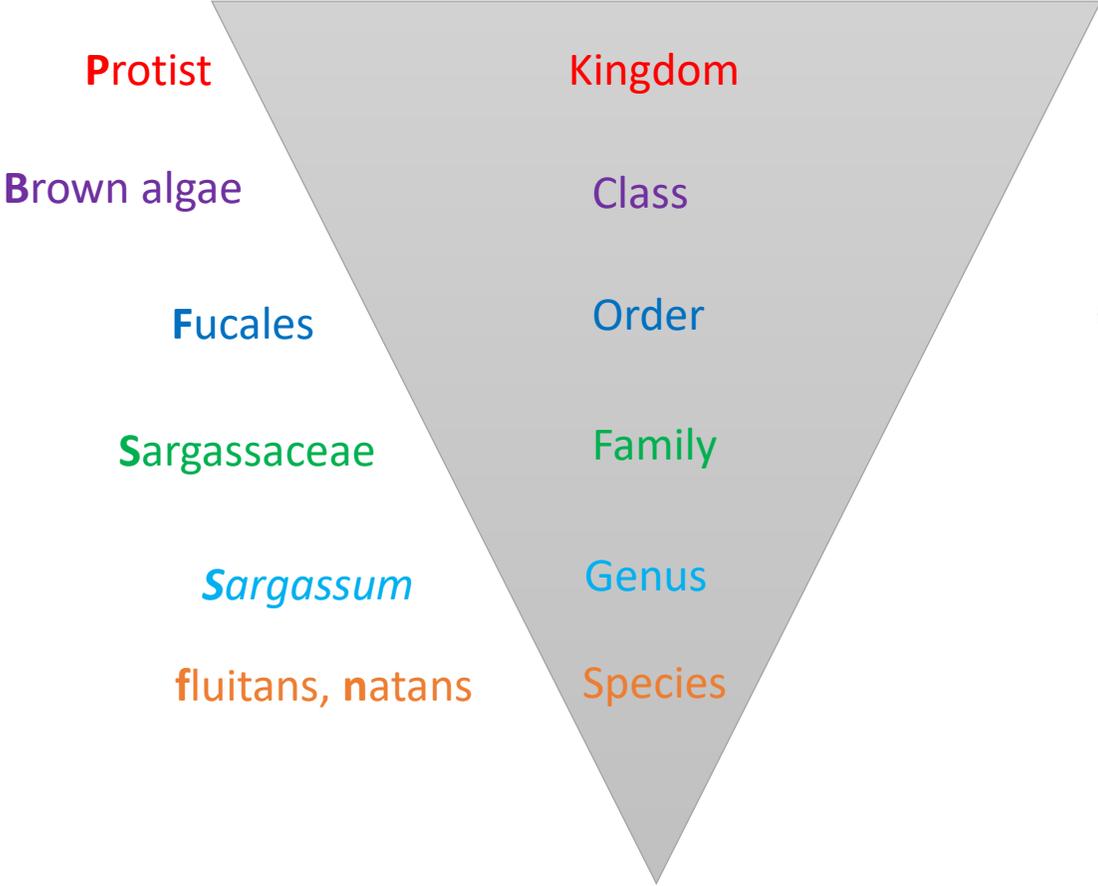
Classification of Sargassum

All fauna (animals) and flora (plants) have a taxonomic classification. See the diagram below showing the classification of *Homo sapiens* (humans) and *Sargassum fluitans* and *natans*.

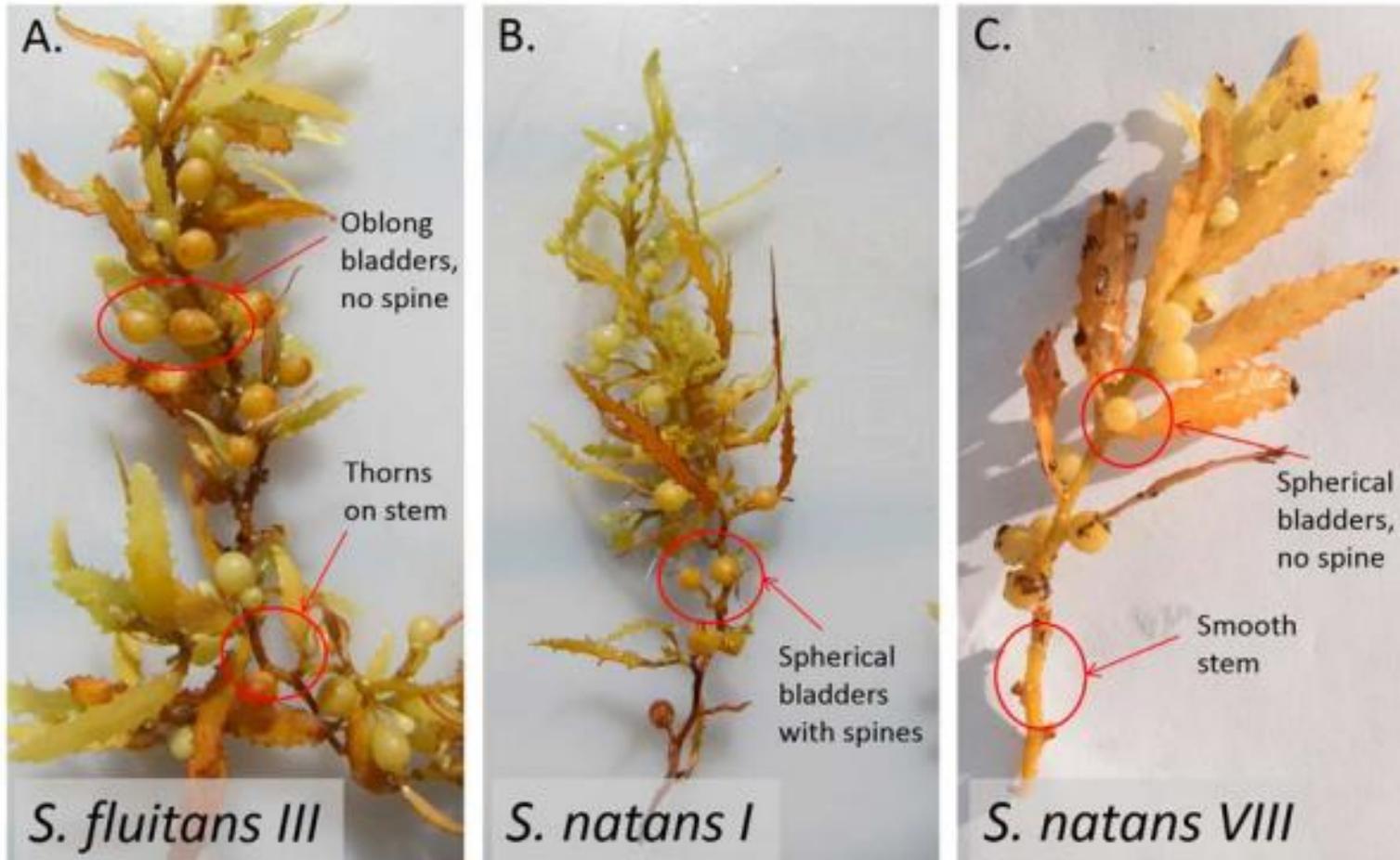




A mnemonic to help you remember



Please Bring Four Silly Shoes For Nana



Source: DOI: 10.7717/peerj.7814/fig-1

We can see differences in the three morphotypes.
Next time when you're at the beach see if you can identify the different morphotypes by their characteristics.

Spines are soft spikes attached to the stem or bladders of sargassum.

Simple guide to identifying sargassum morphotypes by bladders



Step 1: Does it have **spherical (football/soccer)** or **oblong (rugby/American football)** shape bladders?

Red arrow pointing to this box from the text above.

A red-bordered box containing a photograph of a sargassum branch with several spherical bladders circled in red. A red arrow points from the text 'Spherical bladders' to the bladders. To the right of the photo is a black and white soccer ball.

Blue arrow pointing to this box from the text above.

A blue-bordered box containing a photograph of a sargassum branch with several oblong bladders circled in red. A red arrow points from the text 'Oblong bladders, no spine' to the bladders. To the left of the photo is a brown and white rugby ball.

Step 2: Are the bladders **smooth** or do they have **spines**?

fluitans III

Purple arrow pointing to this box from the text above.

A purple-bordered box containing a photograph of sargassum bladders that are smooth and spherical. A purple-bordered box with the text 'natans VIII' is overlaid on the right side of the image.

Green arrow pointing to this box from the text above.

A green-bordered box containing a photograph of sargassum bladders that are smooth and oblong. A green-bordered box with the text 'natans I' is overlaid on the top center of the image.



Activity 3: Can you identify the species of morphotypes of sargassum?

A



Morphotype: _____



Activity 3: Can you identify the species of morphotypes of sargassum?

B



Morphotype: _____



Activity 3: Can you identify the species of morphotypes of sargassum?

C



Morphotype: _____

Activity 3: Can you identify the species of morphotypes of sargassum?

- D This one is extra tricky because there are epiphytes growing on it. Don't worry about the "epiphytes"!
Epiphytes: Plants that grow on other plants (see red circle).



Hint: Spherical bladders with no spines

Morphotype: _____

Activity 4: Challenges and opportunities keywords

Write a sentence to describe what you think each keyword means using the picture as a hint.



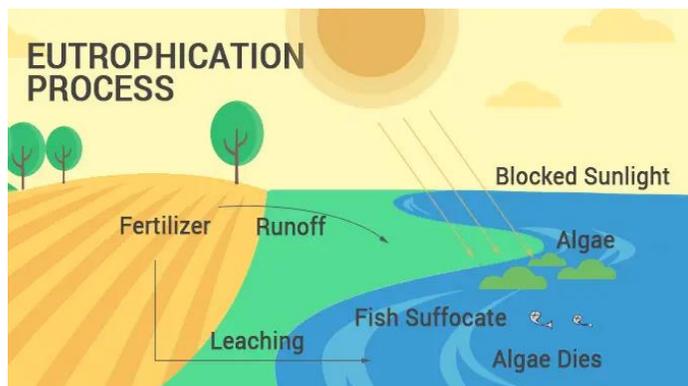
Biodiversity



Tourism



Fisheries



Eutrophication

Beach erosion



Types of Fisheries Commonly Used in Ghana

Industrial:
Large steel-hulled (usually imported from abroad) and stay at sea for long periods of time as they have freezers for the fish.



Fisheries

Lagoon:
This can include using cast nets, small canoes, line fishing and using traps.

Inshore / Semi-Industrial:
Planked wooden-hulled vessels with more powerful diesel engines, usual used for trawling to catch small fish.

Canoe:
Can be small (1-2 fishers) or mid-size (2-11 fishers) either propelled by sail/paddle or low horsepower outboards, they harvest a variety of fish including large and small.

Learning Objective 3

Activity 5: Do you think the following things are impacted by floating sargassum negatively, positively or have no impact? Put the words and a reason in the table where you think they go.

Biodiversity Tourism Fishing industry
Human health Local economy

	Negative	Positive	No impact
Floating in the ocean			



Learning Objective 3

Activity 5: Do you think the following things are impacted by sargassum deposited on the beach negatively, positively or have no impact? Put the words and a reason in the table where you think they go.

Biodiversity Tourism Fishing industry
Human health Local economy

	Negative	Positive	No impact
Deposited on the beach			





Sargassum mixed with soil for fertilising **non-food** plants for landscaping.



Sargassum mixed with sand for fertilising mangrove plants.

Uses of Sargassum
which can be done immediately after
harvesting





Sargassum construction blocks.



Cosmetics containing alginate, a chemical found in algae like sargassum.



Algas, a fertiliser made to increase crop growth. Made from sargassum.

Uses of Sargassum
which require treatment or processing





Activity 6:

Use the keywords you learnt to fill in the gaps

Sargassum is a s_____, which is type of brown a_____. It forms b_____ in the ocean, aggregating in large mats and is moved by w_____ and c_____. An i_____ of sargassum happens when lots of sargassum is deposited on beaches. Sargassum that is always floating is called h_____. There are three main species and m_____ of sargassum found in Ghana, these are *S. fluitans* III, *S. natans* I, *S. natans* VIII.

Sargassum is a potential threat to the e_____ as it can affect other animals and plants negatively. It also has e_____ impacts on industries such as fishing and tourism.

But, it is also a natural r_____ and there are many o_____ for using sargassum.

To be able to use sargassum we must first monitor and understand it.

Activity 7: What have you learned today?

- a. Name two things you have learnt.
- b. Has your opinion on sargassum being good or bad changed? Why?
- c. Do you feel confident to sort sargassum into the three morphotypes?
Give it a go:
Can you find the different species on the beach?
Can you draw the different species and their distinct characteristics?

You are now the local sargassum scientists in the Western
Region of Ghana!





Word Glossary

Here is a list of some words which may have come up in this lesson but haven't been explained yet.

You can find more words and definitions in the matching activity 2 and picture activity 4.

Word	Definition
Economic	Relating to trade, industry, or money.
Environmental	Relating to the air, water, and land in or on which people, animals, and plants live.
Opportunity	A circumstance that makes it possible to do something.
Epiphyte	A plant that grows on another plant.
Characteristics	A feature or quality belonging typically to a person, place, or thing and serving to identify them.

Further information on classification and taxonomy

- Sorting all living things similar groups (kingdoms of life)
- Done first by Carl Linnaeus (Swedish scientist). *Species plantarum* (1753) and *Systema naturae* (1758)
- Early books on taxonomy contained names for 12,000 species of plants and animals (there are now many more)
- Robert Whittaker (American scientist) identified 5 main kingdoms (in 1969): animals, plants, fungi, protista, prokaryotes.
- Here are some videos you can watch:

The 5 Kingdoms of Living Things Rap by Songs for Schools:

<https://www.youtube.com/watch?v=eo9HkVhb76w>

Kingdoms of Life Explained, Sort Of by Science Trek:

<https://www.youtube.com/watch?v=mnAnsRa7SI4>





More information on morphotypes

A morphotype is an infrasubspecific (*meaning a more specific classification than species*) group of animals or plants that can be distinguished by differing shapes, features and characteristics that show they are different but still belong to the same species.

For example a sheepdog and a spaniel, whilst both dogs are very different. They have different ears, snouts, sizes, colours and personalities. Sheepdogs are used on farms for herding cattle and spaniels are used as hunting companions, they are both still types of dog but can be considered to be morphotypes. The word 'morphotype' was first used to describe dog breeds by Brothwell et al. (1979).





Acknowledgements

Photos

Sargassum beach and floating images were taken by team members Philip-Neri Jayson Quashigah and Yanna Fidai.

Sargassum identification images (activity 3) were taken by Emma Tompkins, Amaral-Zettler et al., (2016) and Martine et al. (2021).

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Funding

SargSnap is a project organised by the University of Southampton and the University of Ghana and is funded by ESRC GCRF and ESRC IAA.

