Title of the Unit Unit 4.

Module name brachiopoda

Articulata and Inarticulata.

My name is Kimberly Fiona Afon-

So. In this particular module we will

outline the various characteristics,

morphology, habitats and geological

history along with their bio-

Stratigraphic significance of the

Phylum brachiopoda, as well as

to highlight the difference between

Articulata and inarticulate.

By the end of this module we will be

able to list the general characteristics,

morphology, habitats and

geological history of the phylum

brachiopoda ,so what are they.

Brachiopods are usually filter feeders.

Having a hard protective shell.

Some resemble the ancient Roman lamp.

Mostly sessile bottom dwelling animals,

not colonial.

Mostly prefer living in shallow waters.

A few deeper forms,

mostly live attached to the

rock or a firm substrate.

Some,

for example lingula live in vertical

burrows in sand and mud bottoms. They were

once the dominant phyla after

the Cambrian explosion.

This is an image showing Phylum Brachiopoda.

The soft part of the animals belonging

to the phylum are enclosed in a

shell which consists of two valves.

These valves are dorsal and

ventral in position.

The valves are inequivaled in

almost of the the brachiopods.

This is an image showing that these

shells are basically inequivalved.

As you can see to the image to my right,

the light grey resembles the dorsal wall

and the dark Gray is the ventral valve.

Based on how these two valves are joined

together and the morphology of the

interior and the outer surface of the shells,

these up subdivided into two:

The inarticulate are the ones where in

Two valves are held by means of muscles,

as there is no tooth socket and hinge,

whereas in articulate, the two valves

are joined together by means of a hinge.

So then let us take a look at

the class inarticulata.

Here the two valves are held

together by means of hinge.

Therefore the muscle system

is more complicated.

The opening and closing is done with

the help of the adductor muscles.

Shell is

interlayered with chitin and

calcium phosphate,

but in few forms it is calcareous in nature.

Lingula is a well known

inarticulate brachiopods.

This is an image of lingula showing that

this is an inarticulate brachiopod.

The articulate as the ones where

in two valves are joined together

by means of teeth and socket,

the teeth and socket together

form the hinge muscle system.

Therefore,

Muscle system is simple here, shell is calcareous.

A thin chitinous layer called as

periostracum overlies the shelly part.

They are generally biconvex in shape.

Some of the more common articulate

brachiopods include Atrypa.

, productus, and Spirifer.

This is a fossil of a **Syringothyris**,

which is an articulate **Brachiopoda**.

Instead of being horizontally

horizontally symmetrical along the hinge,

they are vertically symmetrical.

Brachiopods feed by opening the

shell and bringing food bearing

currents by lashing out the Celia

which is attached to the filament

of lophophore which is

a horse shoe shaped organ that

filters food particles from seawater.

This image shows the **Lophophore** organ,

which helps in filtering food

particles from the seawater.

They live in vertical

Burrows in soft substrate.

Generally close the shore.

For example, lingula lives in mud or sand

and is attached at the bottom of its burrow.

The animal itself also lives

in vertical position.

with the **anterior edge** of the shell

at the sediment water interface.

Brachiopods though have been

separated into two classes,

however there is enough similarity

and their general morphology

to consider them together.

Majority of the brachiopods are

fixed to the bottom rock or some

other foreign object by means of a

stalk that is called as pedicle.

The brachiopod shell encloses the

body except for the pedicle

in some brachiopods,

this pedicle opening is

shared by either of the walls,

but in most cases it lies

on the ventral valve.

This is an image showing

what pedicle looks like.

The valve on the ventral side of the

body is also called as a pedicle wall.

As the pedicle emerges out of it

while the valve on the dorsal side

is called as a brechial valve and

it takes its name from the branchia.

arm-like projections which

make up the lophophore.

In this particular image,

you can see the valve that

lies at the bottom is called as

the ventral wall from which the

pedicle is seen to emerge.

Both the valves of brachiopods have

straight beak like elevations on

the posterior called as umbones.

The umbo of the ventral valve is

usually larger of the two and is also

more prominent than that of the dorsal valve,

in most of the genera.

In this particular image,

you can see the umbo which

is on the ventral wall,

which is the more prominent one.

There is an opening at or near

the umbo, of the ventral valve, through

which the pedicle emerges that

opening is called as a foramen.

In this opening may vary in shape and

size as well as the exact location

on the shells for different genera.

In this particular image to the top,

the black and black part is the opening,

called as a foramen, through

which the pedicle emerges.

In some brachiopods a triangular area

exists between the umbo and the hinge line.

This area may be flat or slightly

concave and is described as a

hinge area or cardinal area.

The hinge area is more conspicuous

on the ventral wall.

Both the walls are equilateral.

In other words,

what it means is that a line drawn

from the umbo to the opposite

margin will divide the valves into

two equal and opposite halves.

This is an image showing how

the walls are equilateral.

You need to remember though,

They are equilateral, they are inequivalved.

The hinge in articulate consists

of two short curved processes or

teeth given out from the ventral

valve near the

umbo on the internal margin of the valve.

These teeth fit into the socket of

the dorsal valve, the teeth and the

socket together forms the hinge.

This part of the margin at the posterior

along which the two valves move together

at the time of opening and closing,

and where the teeth are born,

is called as a hinge line or

marginal: cardinal margin.

And this particular image you can see

the teeth are ejecting out from the

pedicle wall which fit into the sockets

that is present on the dorsal valve.

The opening and closing of the valve is

controlled by a system of muscles which are

attached to the inner surface of the valves.

Toward the posterior and and where they leave

muscle scars in the interior of the valves.

In this particular image,

you see the opening and closing of the

valvesis done with the help of aductor and

diductor muscles when one is contracted,

the other one is relaxed.

So this in turn helps the

valves to open and close.

The shell size may be of the size

of a few inches to 12 inches.

The shape maybe plano- convex, biconvex and

Concavo-convex as seen in these images.

The surface of the shell may be smooth or

may be marked by concentric or radial ribs

and **tubercles or spines** may also develop.

This surface ornamentation helps in

distinguishes distinguishing various species.

Most notably seen in

brachiopods the c**ommissure**.

Basically it's the edge of the

shell along which the valves close.

And this is where it meets forming

A zigzag crenulations.

Or it could even be straight.

Like Bivalves,

brachiopods,

show radial and concentric ornamentation,

mainly costae and growth

lines. In this particular image to

the left it shows the ribs as well

as the concentric growth lines.

Let us take a look at the geological history.

Brachiopods are strictly marine or

in nature and are found in almost

all parts of the world.

They first appeared in the Lower Cambrian

and diversified tremendously to become

the abundant in Ordovician and Silurian.

Brachiopods are extremely common

fossil throughout the Paleozoic.

Their diversified into

different numbers of morphology,

each clinging to the sea floor

with a muscular foot and even

accumulating into ancient reefs.

The major shift came when the Permian

extinction occurred some 250 million

years ago where they were reduced

in the worst mass extinction of all

time before the extinction event.

Brachiopods were very numerous and diverse.

than bivalve mollusks. Afterwards, in the

Mesozoic, their diversity and numbers were

drastically reduced and they were

largely replaced by Bivalve Mollusca.

This mollusk continues to dominate

even today. Theses are your references.

Thank you.