

# GASTROPODS

## CLASSIFICATION AND INTRODUCTION

<b>Phylum</b>	Mollusca
<b>Class</b>	Gastropoda (once known as univalves in contrast to bivalves)
<b>Evolution</b>	From the <b>Late Cambrian</b> to <b>present</b> Evolved slowly through the Palaeozoic Diversified/evolved greatly in the Mesozoic and reached <b>peak diversity today</b> (Cenozoic) Freshwater forms appear in the Mesozoic <b>Land forms</b> appear in the <b>Tertiary</b> (Mesozoic)
<b>Today</b>	Extant (some species are now extinct)
<b>Modern examples</b>	Snails, slugs and whelks

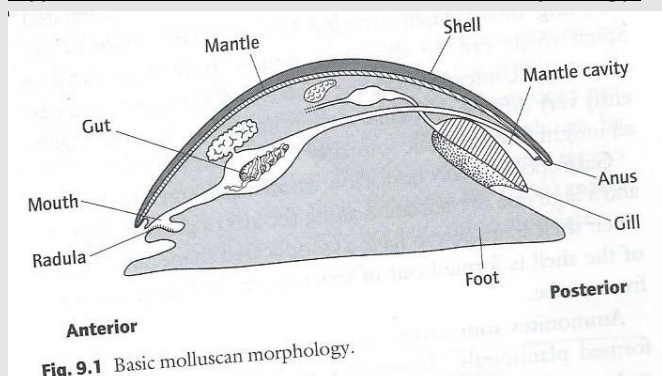
Gastropods are by far the **most abundant** and **varied group** of the **molluscs**. They show adaptations to living in a range of environments (**mostly shallow marine environments**). The Gastropod class account for 80% of the total phylum.

They have even adapted to **freshwaters** as well as **land** (although they do not survive very well in drier environments).

They utilise two/three part chitin, calcite and aragonite shell (like bivalves).

Gastropods are easily **identified by their soft parts** provided they are living. Identification of fossil gastropods is harder. Gastropods have a single (**univalve**), “limpet-like” shell on top, which is made of **proteins/chitin (organic) reinforced with calcium carbonate (aragonite/calcite which is inorganic)** and is **secreted by a mantle** covering the whole upper surface.

### Hypothetical, ancestral mollusc internal morphology:



The gastropod has a **recognisable head with tentacles** for **sensing its surroundings**. This marks the **anterior** of the animal. The **underside** of the body consists of a **singular muscular foot** which it uses to crawl along on. The rest of its **soft parts are tucked up inside the shell**. Their circulatory systems are mainly open.

To manage this, **its guts have to twist through 180°**, a biological distinguishing **characteristic of gastropods**.

1. As the gastropod grows it does so **by laying down calcium carbonate (mostly aragonite on the lips of the aperture)**.
2. The **outer lip grows faster than the inner** to **achieve coiling** as well as an **increase in size**.
3. Each complete coil is called a whorl.
4. The soft body will occupy the last whorl, which is termed the body chamber. If a gastropod feels threatened then it can tuck its **entire body** up into its **protective shell**.
5. The rest of the body (internal guts and organs) coil up to **the apex** to **make up the spire**.

## TYPES OF COILING

Most of the coiling is right-handed or dextral, which ends up with a view of the open end/aperture on the right-hand side of the shell. Coiling to the left is known as sinistral and is rarer.

The shell itself is usually a **single conical tube, coiled in a spiral (helical twist)**.

A good way to distinguish a gastropod from a cephalopod is that there are **no chambers within the shell of a gastropod**.

Gastropods can either have a **calcareous (calcite/aragonite) (and organic chitin outer layer) shell with soft parts tucked inside** or **entirely soft parts** (like slugs).

Gastropods are **coiled and can be Planispiral**, (as shown >>) and therefore may have a superficial resemblance to ammonites. But gastropods have **no chambers** in their shell. Notably freshwater species show coiling in a plane (**planispiral**) and some strange cephalopods show helical coiling (not to be confused with **helical gastropods**).



Cephalopod:  
nautilus



Planispiral gastropod ^^



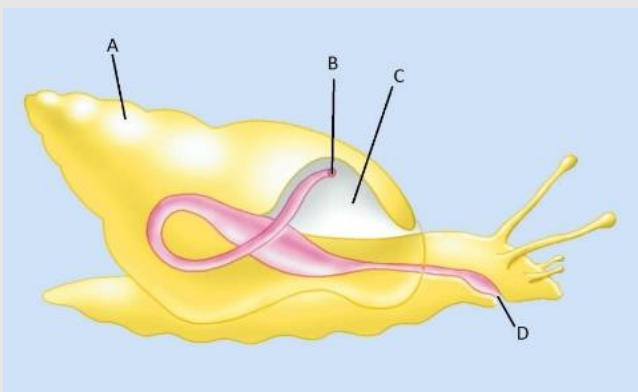
A gastropod with  
helical coiling ^^

<<Gastropod, notice there are no chambers in the shell. Whereas, there are chambers in **ammonites/nautilus/ceratites/goniatites/belemnites** and all other Cephalopods with shells!



**Torsion** is the defining feature of gastropods. **Torsion means gastropods grow spirally**, about a coiling axis. During embryonic growth the visceral mass is rotated by 180°, bringing the mantle cavity to the front, this **allows water currents to flow more easily into the cavity**.

C is the cavity which water currents can flow into.



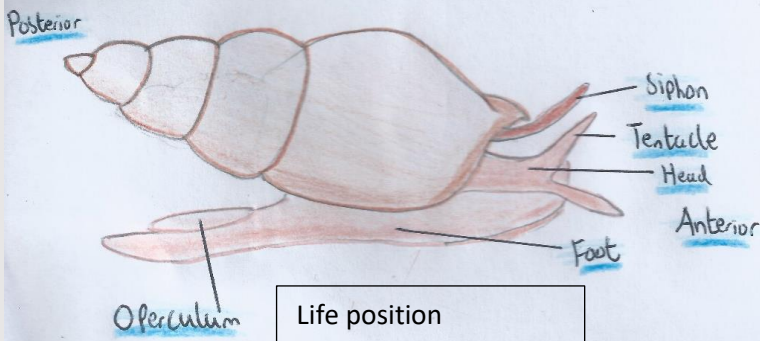
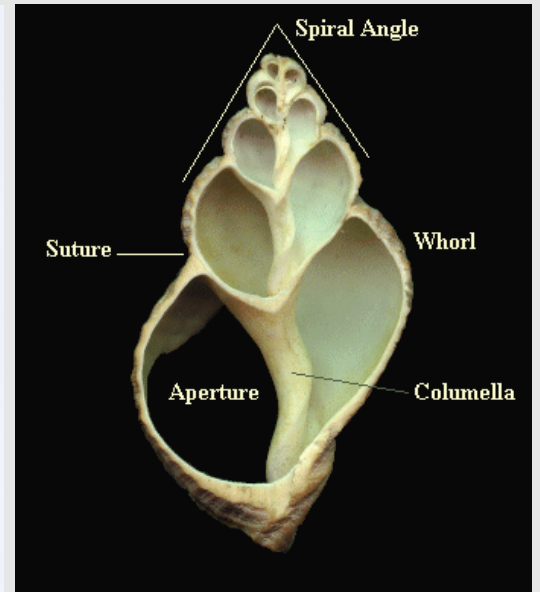
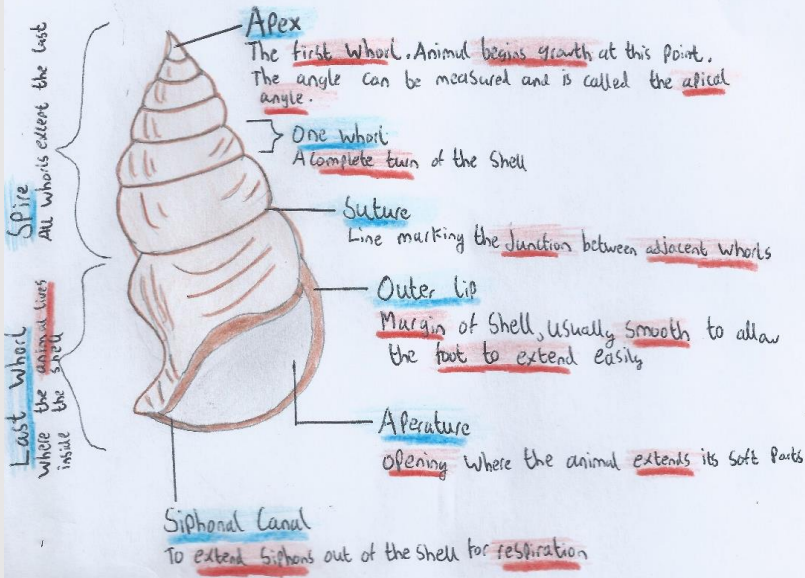
### Key terms

- **The apex** is the point at which growth begins.
- **The body chamber** is the last whorl in which the soft parts are housed.
- **Dextral** describes coiling of the shell to the right.
- **Sinistral** describes the coiling of the shell to the left.
- **Helical** means coiled to form a spire.
- **Planispiral** means coiled in a single plane, rather than the normal helical spire.
- **Siphon** means that the mantle is extended as a tube, which allows for clean water to be directed onto the gills.
- **The spire** includes all the whorls except the last whorl.
- **A whorl** is one complete turn of the shell.

MORPHOLOGY

Buccinum

Apertural view



Turritella a burrowing form



Planorbis, a thin-shelled planispiral form

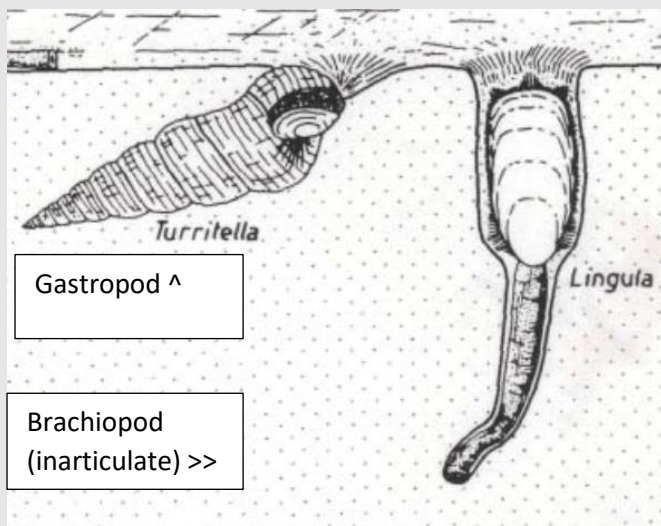


## MODE OF LIFE

ADAPTATION	REASON	ENVIRONMENT	EXAMPLE
LARGE SIPHONAL CANAL	Separates inhalant and exhalent currents.	Lives in low energy environments. Maybe a filter feeder.	
THIN SHELLS, LITTLE ORNAMENT	No need for protection against strong currents	Lives in low energy conditions or burrows into sediment for protection.	Seen in freshwater species or littoral zone burrowers e.g. <i>Turritella</i>
THICK SHELL, AND ORNAMENT	Defensive and protective	High energy environment or used to prevent predation	Littoral zone
LONG SPIRE, MAY BE INFAUNAL	Acts as an anchor	Infaunal, burrower	E.g. <i>Turritella</i>

## TURRITELLA, A BURROWING FORM

*Turritella* is a genus of medium-sized sea snails that have tightly coiled shells, whose overall shape is basically that of an elongated cone. The mode of life is **benthonic, infaunal, filter feeding**. It lives in the littoral zone (a high energy environment in the shallow continental shelf) but is protected from the currents by its burrow.



It is so tightly coiled that it ends up tapered at its apex with a **small apical angle**. This allows it to burrow and have its **aperture facing upwards**. The **long spire** helps it to **anchor** in place. *Turritella* is a **filter feeder**.

## BUCCINUM, THE COMMON WHELK, EPIFAUNAL

*Buccinum* is a genus of medium-sized sea snails, marine gastropod Molluscs in the family Buccinidae, whelks. The *Buccinum* is a **carnivore and scavenger**, feeding on **dead or damaged marine animals**. They have the power to **perforate Molluscs and crustacea**.



It has a **short siphon** that extends **upwards and forwards**. This siphon allows the animal to **take in clean water** for **respiration** (NOT FOOD) as it ploughs through the **muddy seafloor**.

*Buccinum* is **carnivorous** and uses its **rasp-like tongue** on the **soft tissue of its prey**, either alive or dead.

Many marine forms take a more aggressive stance. **One species Natica**, uses **acid to soften the shell** of its prey, **drills a hole** and then **scoops out the soft body of the animal to feed**.