

Plankton test - October 2019

Name: Maggie.

1. Define plankton.

[1] 1

plankton are organisms that can only drift in the water and be carried around passively by the flow of water.

2. Describe AND evaluate (= advantages & disadvantages) two methods used to collect plankton.

[6] 6

(i) Jar / Bucket

• Description:

lower a clean jar/bucket into the water at desired place get the plankton into the jar/bucket along w/ water. take the jar/bucket out, and plankton sample is collected.

• evaluation:

∴ : ① easy. ② cheap.

③ can collect large plankton like jellyfish.

∴ : ① can be used only when plankton is concentrated / be seen using naked eyes;

② can't go deep ③ plankton can easily fall out.

3. Compare (= similarities and differences) the morphology (= shape / physical structure) of planktonic diatoms, dinoflagellates and coccolithophores.

[4] 4

(ii) Nets

• Description:

put the net into seawater, drag it along for some time, so that the plankton concentrates at the top end. Take the net out, and the plankton is collected. ∴


• Evaluation:

∴ : ① easy. ② can collect sample from large amount of water ③ can have selective of plankton.

∴ : ① expensive.

② can kill large plankton like jellies

③ only collect sample at surface.

	Diatoms	dinoflagellates	Coccolithophores
Size	20 - 2000 μm	20 - 4000 μm	2 - 40 μm .
cell	unicellular	unicellular	unicellular.
flagella	no flagella, can't move.	2 flagella, transverse + longitudinal	2 flagella at the same end.
skeleton structure	frustule, made of 2 valves ②  - epitheca - hypotheca made of silica (glass).	cellulose, in cell walls.	covered w/ carbon calcium carbonate disks.

• same
• different

good!

4. Define *phytoplankton bloom* and explain the conditions necessary to produce a bloom. [3] 3

① *phytoplankton bloom* refers to a great increase in the population or amount of *phytoplankton* at a site.

② Requirements are:

enough light (sunlight),
nutrients (~~like~~ like iron), and
temperature. (can't be too high or too low).

5. Explain adaptations that *phytoplankton* possess to survive in marine ecosystems. [3] 3

① flagellas.

coccolithophores and *dinoflagellates*
use flagellas to move.

③ *Diatoms* like *Chaetoceros*
use ~~sp~~ spines or chains
to increase buoyancy.

② *Ceratium* grow fingers for
~~to~~ increased surface area
and thus more light and
buoyancy.

④ (May not be valid)

Noctiluca uses bioluminescence.
yes but not clear why

6. Compare the distribution (= where they live) of *phytoplankton* and *zooplankton* in the ocean. [2] 2

difference { ① *phytoplankton* live at the surface of the ocean so that they have enough light. but *dinoflagellates* like *Ceratium* sink down at night to avoid predator.

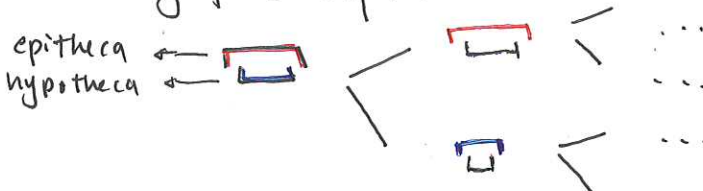
② *zooplankton* usually live in the deep ocean. but some of them (like copepods) migrate vertically to surface at night to feed on *phytoplankton*.

Similarity { ③ Both live near the shore because of abundance of nutrient. [3] 3

7. Describe the reproduction of diatoms. [3] 3

• Diatoms have both asexual and sexual reproduction

• They first experience asexual reproduction by cell division:



but ~~this~~ this process
creates smaller and smaller
diatoms. Thus, when
the diatoms get too small...

• They experience sexual reproduction!

they release eggs and sperms before death.

and when eggs and sperms combine, a new diatom of original size is produced. and this process starts again

8. Distinguish between **holoplankton** and **meroplankton** and give a named example of each. [4] 4

Holoplankton

zooplankton that spend their whole life as ~~p~~ zooplankton.
e.g. copepods, comb jelly, etc.

Meroplankton

zooplankton that spent ^{only part of} half their life as ~~zo~~ plankton, and afterwards become ~~nek~~ nekton or ~~live~~ live benically,
e.g. sea star larvae, crab larvae, barnacle larvae (nauplius?).

9. a) Explain how 'iron fertilization' might help with the problem of global warming. [3] 3

By iron fertilization, people ~~to~~ dump iron into the ocean. when getting enough nutrient, ~~phyto~~ phytoplankton grow rapidly and there will be an algae bloom.
Algae use photosynthesis to ~~convert~~ absorb the carbon (CO_2) out of atmosphere. When they die, they sink to the seafloor, carrying carbon with them. and they will remain there for millions of years.

In this way, the carbon got reduced in atmosphere and global warming (hopefully) can be relieved.

- b) Evaluate 'iron fertilization' as a solution to global warming. Give both pros and cons. [4] 4

▽ : • can reduce carbon level in atmosphere.
• Restore some phytoplankton at some places.
• ~~Re~~ Restore ecosystems. for example, algae → krill → whale.

△ : • have limited effect, only part of the ocean can be dumped.
• we don't know the consequence of such big algae growth.
• can also release nitrous oxide, which is more harmful than CO_2 .
• can cause HABs. be toxic to human, cause PSP/ASP/PSP.
• can suck O_2 out of that area and lead to dead zone.

Images:



nice!

↑
like a volcano. [2] 2

10. Describe your favourite example of zooplankton.

Barnacle ✓

a Meroplankton. First stage of life as a plankton floating around. known as nauplius larvae. then it becomes cyprid ✓ and then when it becomes juvenile, it attaches itself on hard surfaces and build itself a shell out of carbon. Then it remains at that same place for its whole life as

11. Write one question about plankton that you wish had been on this test and answer your question. [2] 2

Q: Why ^{are} ~~is~~ deep-sea jellies usually red? ✓

barnacle.
till death.

A: Because at the deep sea, ^{red} light can not penetrate, and everything is dark.

Red light has the ~~shortest~~ ^{longest} ~~wave~~ ^{frequency} wave length and thus is least visible at that deep sea. ~~level~~ ✓

By being red, deep-sea jellies will ~~be~~ less likely be seen by their predators.



$\frac{37}{37} = 100\%$ Wow!
Excellent!