Assessment in IGCSE Biology 0610
Session 3: Handout 3.5(a)
Mark schemes

This handout provides examples of mark schemes and candidates' scripts for Paper 3 June 2003.

Use the mark schemes to mark the answers from two candidates to questions 2 and 3.

The mark schemes are on the next two pages. The candidates' responses are on the following eight pages.

(11 pages total, including this page)

Assessment in IGCSE Biology 0620

Session 3: Handout 3.5(a)

Mark schemes

The mark schemes for Questions 2 and 3 from Paper 3, June 2003 are on the next two pages.

Use them to mark the answers given by two candidates.

2 (a) one mark for each column drawn and shaded correctly; **2**

(b) (i) 12 (%); **1**

(ii) AWARD 2 MARKS FOR CORRECT ANSWER, EVEN
WITHOUT WORKING
50 + 12 + 13 + 6 + 7;
= 88 (%); **2**

(c) REJECT REF. TO FLUOR<u>INE</u> ONCE in (i), (ii) or (iii)

(i) fluoride (in water) reduces (the number of) decayed teeth
<u>in children</u>; **1**

(ii) add fluoride to the drinking water in town B;
advise children to use fluoride toothpaste;
use other suitable, named, source of fluoride; **max 1**

(iii) i. ref. to side effects of too much fluoride, e.g. browning of tooth
enamel or possible cancer risk;
ii. ref. to importance of personal choice/makes water impure;
iii. ref. to allergies to fluoride;
iv. ref. to cost of fluoridation;
v. ref. to treatment of whole population when
not all benefit;

Reject refs. to fluoride flavouring water/refs. to being
bad for health/has side effects unqual. **max 1**

max 8

3 (a) involves giving the organism two names;
ref. to <u>genus</u> and <u>species</u>;   **2**

(b) (i) *Caulerpa* grows at twice their rate AW;
ref. to competition (for light/CO_2/space for attachment/other plausible
factor AW); Reject refs. to O_2 **2**

(ii) ref. to primary consumer/(organism) that feeds on plants/producers;   **1**

(iii) ref. to disease/predation or shortage of + food/herbivores/sea urchins;
resulting in death/migration AW;   **2**

(c) ref. to chlorine being + dangerous/poisonous/damaging to other
organisms/a pollutant;   **1**

(d) (i) i.   ref. to possible effects on local food chains or food webs AW;
       ii. ref. to destabilization of the ecosystem;
       iii. ref. to extinction (of other organisms);
       iv. ref. to local fishing industry;
       v.   ref. to importance of conservation;
       vi. ref. to possible use of local species for medicines;
       vii. ref. to effects on biodiversity;   **max 2**

(ii) ref. to its ability to feed on *Caulerpa*; Reject ref. to pest unqual.
reduces competition between *Caulerpa* and local seaweeds;
reduces population of *Caulerpa*;
allows other species to grow again;   **max 2**

(iii) i.   it may eat other seaweeds as well;
        ii. causing their extinction AW;
        iii. ref. to no natural predators of the sea slug present AW;
        iv. ref. to unbalancing + food chains/webs/ecosystem;
        v.   ref. to introduction of disease;   **max 2**

                                                          max 14

2 A study was carried out to compare the amount of tooth decay in the children of two different towns. Town **A** had drinking water containing fluoride at a concentration of 2 parts per million. Town **B** had no fluoride in its drinking water.

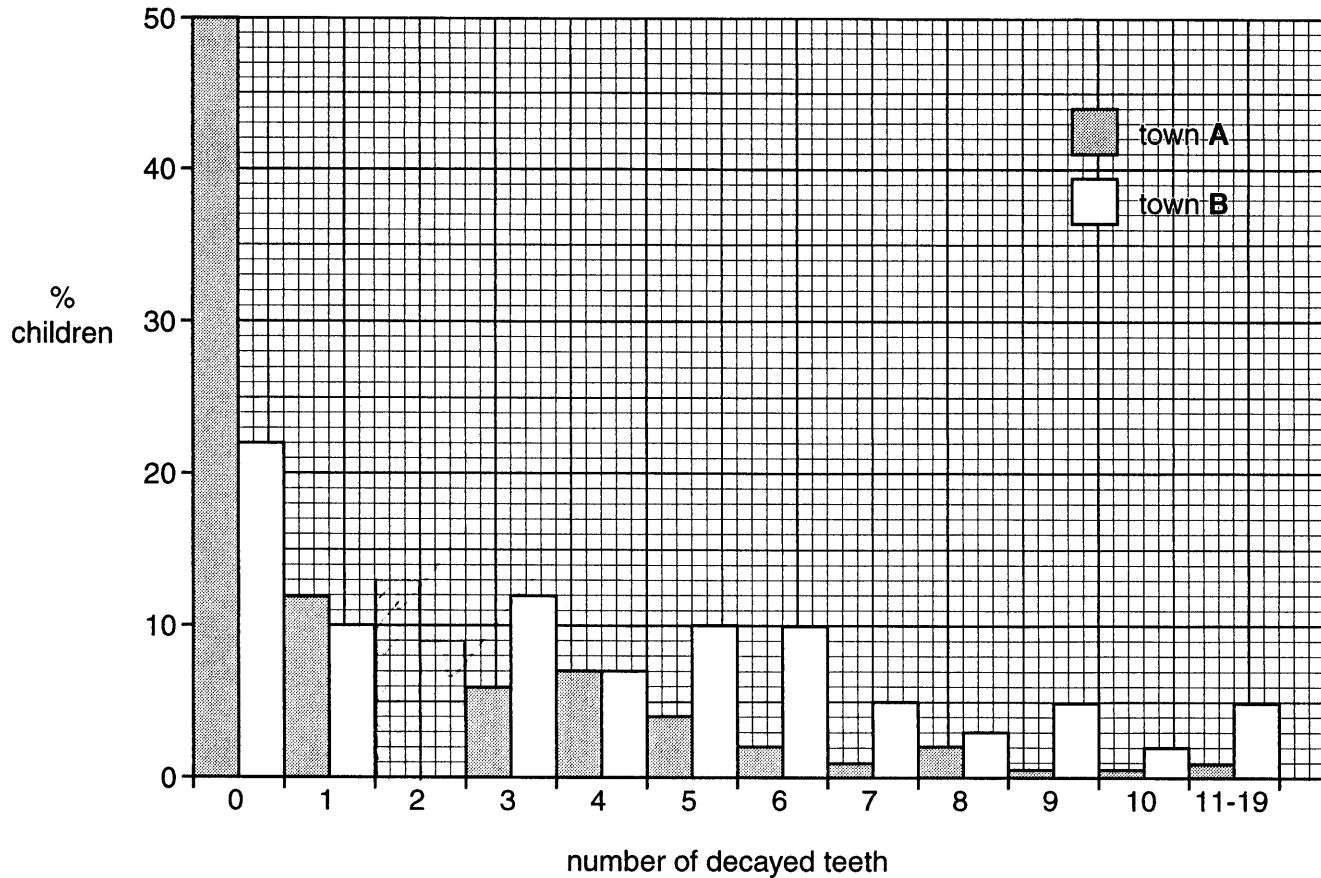Fig. 2.1 shows the results of the study, but the graph is incomplete.

Fig. 2.1

(a) Complete Fig. 2.1, using the following data.

town	number of decayed teeth	% children
A	2	13
B	2	9

[2]

(b) (i) For town **B**, state the percentage of children with three decayed teeth.

....12 %...[1]

(ii) For town **A**, calculate the total percentage of children with **less** than five decayed teeth. Show your working.

no. of decay teeth ./.

0 → 50%.
1 → 12%.
2 → 13%.
3 → 6%.
4 → 7%.
_____
5 → 4%.

50 + 12 + 13 + 6 + 7 = 88

total percentage ....88%.................................[2]

(c) **(i)** What conclusion, relating to the effect of fluoride, can be drawn from this study?

.....fluoride can help prevent tooth decay.......................

....[1]

(ii) Based on your conclusion, what recommendation should be given to town **B**?

.....mixed some fluoride into the drinking water so there is less.......

.....tooth decay..[1]

(iii) Explain why some people may object to this recommendation.

.....- expensive and unnessessary because if you brush your teeth well

.....then you won't get tooth decay anyway...........................[1]

.....- too much fluoride is not good.

[Total : 8]

3 The seaweed, *Caulerpa taxifolia*, lives in tropical oceans but is now also found in the Mediterranean sea, where it grows at twice the rate of local seaweeds. As a result, the local seaweeds are becoming rare.

Although not poisonous, *Caulerpa* produces a chemical in its cells that makes it inedible to Mediterranean herbivores, such as sea urchins. They do not feed on it and their numbers are decreasing. Carnivorous fish populations have also decreased by up to 50 %.

Marine conservationists are very concerned. At first they used chlorine to kill *Caulerpa* but are now considering the introduction of tropical sea slugs (herbivorous molluscs). *Caulerpa* is part of their natural diet.

(a) The seaweed, *Caulerpa taxifolia*, is named using the binomial system.

Explain the term *binomial system*.

binomial system gives names to organisms, by using Genus and species. Genus in capital letter, is the group that that organism belongs. Species in normal letter, is the spacific name of that organism [2]
eg. Panthera leo and Panthera tigris

(b) (i) Suggest why the local seaweeds are becoming rare.

They don't have the survival advantage and they have too much predation. get over eaten.

The Caulerpa grows on the space where they get eaten and not organisms [2] eat the Caulerpa. much

(ii) Sea urchins are herbivores. Define the term *herbivore*.

Herbivore is the animals that only eats producers or plants and does not eat other animals. [1]

(iii) Suggest why the populations of carnivorous fish have decreased by up to 50%.

The carnivorous fish decrease in number because they feed upon the Mediterranean herbivores, which feeds on local seaweeds. And local seaweeds becomes rare, number of herbivores decrease, the fish [2] have less food, so decrease in number. (more competition for food)

(c) Suggest why using chlorine to kill *Caulerpa* might **not** be a good idea.

- we're messing around with nature with chemicals.
- it kills other plants and animals too (not only Caulerpa) [1]

(d) (i) Suggest why conservationists are concerned about the effects of *Caulerpa* on other organisms in the Mediterranean.

If Caulerpa is increasing at this rate it will soon have the whole sea and will wipe out the local seaweed, mediterranean herbivores and ∧ the ecosystem is destroyed. carnivorous fish. Conservationists wants to concerve things, keep them the way they used to be. [2]

(ii) Explain how the introduction of herbivorous sea slugs from the tropics could be effective in re-establishing a balanced ecosystem.

- The sea slug will feed on the Caulerpa, so Caulerpa have some predation and decrease in number, giving chance for local seaweed to grow.

- So the carnivorous fish can feed upon the slugs and have other source of food. [2]

(iii) Outline the possible dangers of introducing tropical sea slugs.

feed upon - if they also eats the local seaweed the Mediterranean herbivores have more competition for food.

- if they're inedible to carnivorous fish they will have no predators [2] and will increase massively in number, causing imbalanced ecosystem again.

[Total : 14]

2 A study was carried out to compare the amount of tooth decay in the children of two different towns. Town **A** had drinking water containing fluoride at a concentration of 2 parts per million. Town **B** had no fluoride in its drinking water.

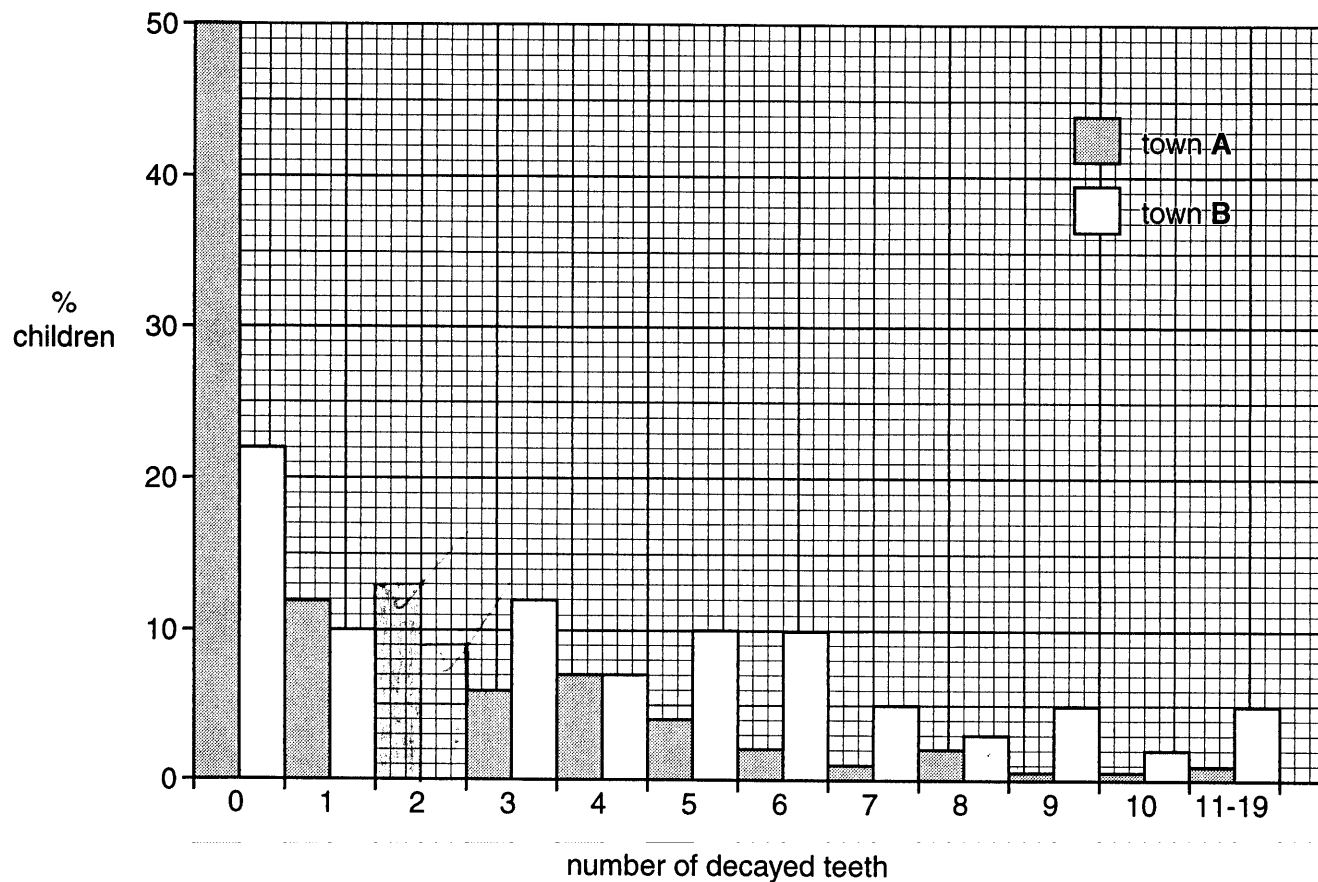Fig. 2.1 shows the results of the study, but the graph is incomplete.

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(b) (i) For town **B**, state the percentage of children with three decayed teeth.

..12%..[1]

(ii) For town **A**, calculate the total percentage of children with **less** than five decayed teeth. Show your working.

Average $= 3\% + 3\% = \dfrac{6}{2}$

$= 3\%$

total percentage ....3%..[2]

(c) (i) What conclusion, relating to the effect of fluoride, can be drawn from this study?

Fluoride is not a suitable substance for teeth and it can lead to increased tooth decay. [1]

(ii) Based on your conclusion, what recommendation should be given to town **B**?

I would tell town B to reduce the number of fluoride concentration in chlorine intake in this their water. [1]

(iii) Explain why some people may object to this recommendation.

Most people will object because most people assume that fluoride is necessary for healthy teeth which is not [1] the case because it is only calcium that is responsible for healthy teeth.

[Total : 8]

3 The seaweed, *Caulerpa taxifolia*, lives in tropical oceans but is now also found in the Mediterranean sea, where it grows at twice the rate of local seaweeds. As a result, the local seaweeds are becoming rare.

Although not poisonous, *Caulerpa* produces a chemical in its cells that makes it inedible to Mediterranean herbivores, such as sea urchins. They do not feed on it and their numbers are decreasing. Carnivorous fish populations have also decreased by up to 50 %.

Marine conservationists are very concerned. At first they used chlorine to kill *Caulerpa* but are now considering the introduction of tropical sea slugs (herbivorous molluscs). *Caulerpa* is part of their natural diet.

(a) The seaweed, *Caulerpa taxifolia*, is named using the binomial system.

Explain the term *binomial system*.

Binomial system is the way in which organisims depend on each other for food....

....[2]

(b) (i) Suggest why the local seaweeds are becoming rare.

Seaweeds are becoming rare becaus most

mediterranean herbivores feed on them [2]

(ii) Sea urchins are herbivores. Define the term *herbivore*.

A herbivore is an a living organisim that

feed on other plants [1]

(iii) Suggest why the populations of carnivorous fish have decreased by up to 50%.

Since the number of herbivorous organisims in these a animals is

decreasing the number of carnivorous fish will

decrease because carnivorous feed on herbivorous [2]

organisims

(c) Suggest why using chlorine to kill *Caulerpa* might **not** be a good idea.

This is because chlorine makes the water more

pure for the organisims to breathe [1]

(d) (i) Suggest why conservationists are concerned about the effects of *Caulerpa* on other organisms in the Mediterranean.

They are concerned about Caulerpa because it will not be fied fed on therefore its number may increase and dominate the sea. ....[2]

(ii) Explain how the introduction of herbivorous sea slugs from the tropics could be effective in re-establishing a balanced ecosystem.

The sea slugs would feed on this Caulerpa and reduce their numbers. They will also prevent them from multiplying in excess ....[2]

(iii) Outline the possible dangers of introducing tropical sea slugs.

If sea slugs are introduced they might feed on most plant organisims in the sea and reduce the number or make them become extinct.[2]

[Total : 14]