



National
Qualifications
2023

X807/77/11

**Biology
Supplementary sheet**

THURSDAY, 27 APRIL

1:00 PM – 4:00 PM

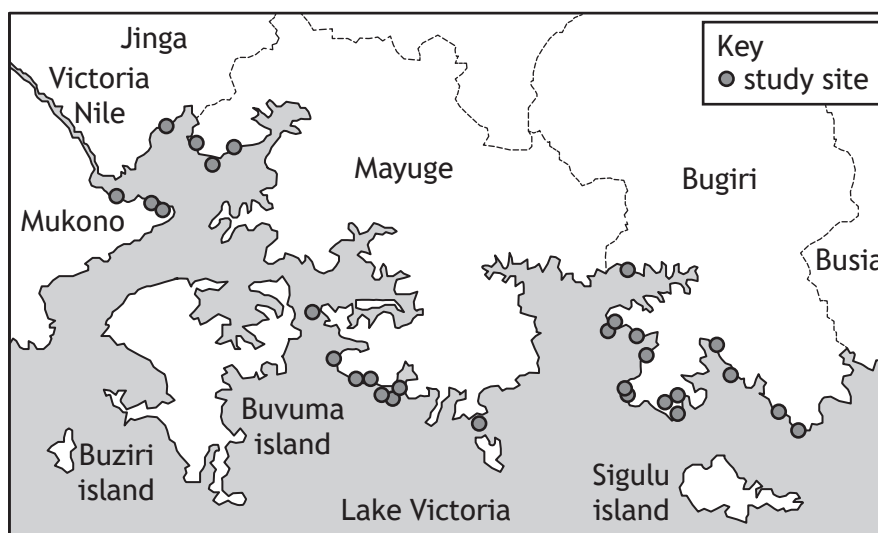
Supplementary sheet for question 1



1. Schistosomiasis is a tropical disease caused by endoparasitic flatworms of the genus *Schistosoma*. Schistosomes reproduce sexually in the human intestine. Schistosomiasis can be treated successfully by a drug called praziquantel (PZQ), which kills mature parasites but has little effect on immature ones. A recent study around Lake Victoria was carried out to compare the impact of single and double dose PZQ treatments on cure rates in children aged 1–5 years infected by *Schistosoma mansoni*.

Figure 1 shows where the schistosomiasis study sites were located on the shores of Lake Victoria.

Figure 1



Following screening for schistosomiasis, egg-positive children (those infected by *S. mansoni*) were randomly assigned to two treatment groups: single-dose or double-dose of PZQ. Actual dosage depended on body mass: 40 mg per kg body mass was administered per dose. PZQ tablets contain 600 mg of the drug, are given with water, and are easily divided into four parts so the correct dosage can be given. Children in the double-dose group were given their second dose two weeks after the first treatment.

Some results from the study are shown in Figure 2, which shows the effectiveness of PZQ on children one month after being given either a single or double dose.

Children were grouped according to the level of infection before treatment. This pre-treatment intensity was recorded as eggs per gram (epg) of samples collected from the children.

Figure 2

Pre-treatment intensity	Single dose of PZQ			Double dose of PZQ		
	Number of children	Number cured	Percentage cured	Number of children	Number cured	Percentage cured
Light (1–99 epg)	225	220	98	191	182	95
Moderate (100–399 epg)	79	49	62	77	63	82
Heavy (≥ 400 epg)	53	28	53	71	45	63

1. (continued)

One consequence of parasitic infection for children is lower academic achievement compared to uninfected children. Another study was carried out in The Philippines on children aged 7 and upward, infected by *Schistosoma japonicum*, to find out how the length of time before re-infection affects cognitive test scores.

At the start of the study, infected children were given an initial dose of PZQ. Cognitive tests were carried out after 18 months, by which time approximately 90% of the children had become re-infected.

Figure 3 shows the progress of this re-infection through the course of the study.

Figure 3

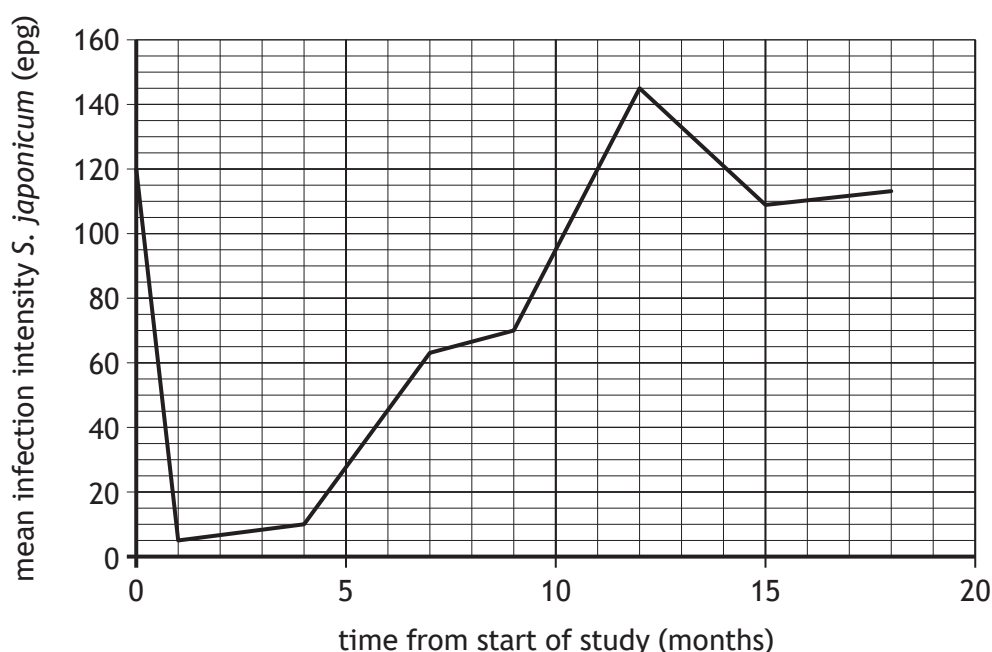


Figure 4 shows the differences in cognitive test scores obtained by children in three different re-infection groups compared to children who were re-infected very soon after the initial dose of PZQ.

Figure 4

Re-infection group	Difference in learning test score	Difference in memory test score	Difference in verbal fluency test score
Not re-infected by 18 months	4.87	5.78	1.77
Re-infected between 12–18 months	2.31	3.44	1.46
Re-infected between 6–12 months	0.58	–0.67	0.54

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