

School of Biological Sciences Bioscience Olympiad Questions

1. Some animals eat only the flowers of plants. Suggest why?
2. It is recommended to add fertilisers to aquarium plants in small portions many times during a long time interval. Why do you think this way is better than adding a large portion once?
3. Why do some animals lick themselves and others?
4. Jack, James and Cathy from England went for an expedition to Central Africa. On the 79th day they reached small village surrounded by jungles. The natives made a feast where John, James and Cathy ate some local dishes and also offered some of their leftover provisions to the natives. Next morning Jack felt very sick. Moaning from the James and Cathy sleeping bags told him that the others were also not good. "Evil locals! They poisoned us!" cried out Jack. But at this moment a small boy entered the hut and told them that all the other participants of the feast were also sick. Both travellers and locals were confident that their food was good. Why did they all get sick?? Suggest as many hypotheses as you can.
5. What characteristics and indications of plant fossils can paleobotanists use in order to identify whether the plant was perennial or annual?
6. Some free living soil bacteria permanently secrete a certain single amino acid to the outside. How and why do they do this?
7. Molecules of many enzymes are composed of several subunits. These subunits are polypeptide chains that are synthesised separately and then combined with each other into whole enzyme. Very often, only one subunit executes catalytic function of the enzyme. Moreover, if this subunit is separated it can catalyse the reaction with the same or even faster rate, than when it was constituent within the entire enzyme molecule. Why are there other subunits in the enzyme? Suggest as many explanations as you can. You can illustrate with examples if it makes your point clearer.

Guidelines

Remember, that there is no single "right" answer to these questions. You are expected to suggest as many hypotheses, explanations, examples as you can or design experimental approaches in order to test your hypotheses. Questions and short answers from the previous Olympiad with answers can be found at the Olympiad webpage.

Please send your answers as a Word document file. It must be submitted in Verdana or Arial Type Face size 10. There is no size limit, but please keep it appropriate. Answers should be clearly numbered and each answer has to be started from the new page. Pages in the document should be numerated. Figures and pictures can be attached as well or included into the document (however check the printing resolution of the images prior to sending).

Regarding teams: we are looking for mixed teams containing at least one GCSE student, one lower 6th/AS-level student and one upper 6th/A2 student. Schools have a free choice on the other team members (maximum team size is 5). One team per school.

You have to submit your answers before 23 September

All this info and general information is available at: <http://www.qub.ac.uk/Olympiad>

You can contact Dr Alexander Galkin via e-mail olympiad@qub.ac.uk

Good luck!