

National Biology Competition

Neglected Tropical Diseases and Climate Change

Brief information: design a web-page, aimed at teenagers, to raise awareness of neglected tropical diseases.

Further details of the competition can be found on the next page and on your biology class on teams.

Submit entries to Mr Pockson by 8th March.

Open to classes from Year 8 to Year 10



Sand fly: vector that transmits the parasite *Leishmania*, which causes Leishmaniasis
Image by [Blackie_Gee](#), Hector Diaz Abiler



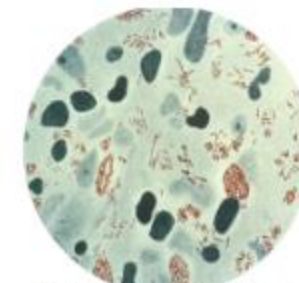
Trypanosoma brucei: parasite (yellow) that causes Human African Trypanosomiasis
Image: S. Griffiths Gull Lab, Attribution 4.0 International (CC BY 4.0)



Freshwater snail: vector that transmits the schistosome parasitic worm.
Image: World Health Organisation



Vampire bat: a vector that transmits rabies virus in Peru
Image: Daniel Stecker/Julio Benavides, University of Glasgow



Mycobacterium leprae: bacteria (red) that cause leprosy.
Public Health Image Library, CDC, US Government public domain



Triatoma pallidipennis ('kissing bug'): vector of the parasite *Trypanosoma cruzi*, which causes Chagas Disease.
Image by CDC Biomedical Photographer, James Gathany

Aim of the 36th MISAC Annual Competition

To develop an understanding among teenagers of the impact of **neglected tropical diseases** (NTDs) on global health, and how climate change may impact their distribution around the world.

Background

NTDs have not been widely studied, though they affect over *1.7 billion* people on our planet. They are usually found in tropical areas, particularly in the southern hemisphere. They largely affect impoverished communities, often in remote areas. Poor water quality, sanitation, hygiene and healthcare in these areas heighten their impact. Twenty conditions have been designated NTDs, and most are caused by a parasitic, bacterial, viral or fungal pathogen. Many are spread by various animals, that act as **vectors**, while others pass directly between infected people.

NTDs cause serious illnesses, damaging patients' attendance at school or work, and may be fatal. Some also cause disfigurement, often resulting in social stigma and isolation. In addition, some NTDs also affect animals, which can harm farming practices. Both wild and domestic animals can act as reservoirs of infection (eg, game animals for sleeping sickness) or directly transmit the infection to humans (eg, dogs spread rabies). The economic impact of NTDs is huge; in affected areas, they trap vulnerable populations in cycles of poverty, costing developing countries billions of pounds each year.

NTDs are preventable and treatable but affected communities often lack the resources to tackle them well. In general, effective vaccines against NTDs are not yet available. Treatment options are limited, may have significant side effects, or are met with pathogen resistance. In 2020, the World Health Organisation published a roadmap to control, prevent or eliminate the NTDs by 2030 and progress is being made.

However, climate change may make this more difficult. Rising temperatures and changes in rainfall patterns may alter vector habitats, allowing them to expand into new areas. Warmer winters may allow arthropod vectors to survive longer. Extreme weather events also displace people, resulting in overcrowding within temporary shelters. These can increase the spread of NTDs and may bring people and vectors closer together, helping the transmission of NTDs. Extreme weather can also disrupt healthcare, housing, sanitation and food security, and the changing climate increases poverty, malnutrition and poor health, worsening the effects of NTDs.

Neglected Tropical Diseases and Climate Change

School entry date: hand in to Mr Pockson by 8th March

Object of the competition

You are required to design an illustrated, web-page report for teenagers to raise their awareness of NTDs.

- Select **one** neglected tropical disease.
- Describe the disease, including its symptoms, where it is found in the world, preventative measures and treatments, and the impact it has on affected people and communities.
- Describe the pathogen that causes the disease and what is known about how it is transmitted.
- Discuss how climate change may alter the spread, global distribution and impact of the disease.

Format of entries

- Your entry must be produced on paper as hard copy on one A3 sheet (or two A4 sheets secured side by side with adhesive tape) using only one side of the paper.
- You may produce your entry either by hand or computer.
- The entry may be submitted by an individual or a group of **not more than four students**.

Prizes

Schools: 1st £250 2nd £125 3rd £70
Students: 1st £100 2nd £50 3rd £25

A certificate will be awarded to each student submitting an entry of scientific merit. The results, winning entries and a report of the competition will be published on the MiSAC website competition pages at www.misac.org.uk.

Five top tips

1. Use the scientific name of any pathogens you mention.
2. Don't forget that the first name (genus) begins with an upper-case letter and the second name (species) has a lower-case initial letter (eg *Trypanosoma brucei*). This can be abbreviated, for example, to *T. brucei* after its first use.
3. Use *italics* for the scientific name - or underline it if your entry is hand-written.
4. Use your own words because plagiarism (which is cheating) will be penalised.
5. For data and other material used to illustrate your entry, provide information of their sources.

What makes a good web page?

Effective web pages rely on being not only informative but attractive, lively, well-designed and often amusing, in order to make an immediate visual impact. This can be achieved by using photographs, diagrams, drawings, plus data and sources of further information. Make the presentation of your entry entertaining for its intended audience - teenagers.

Website articles

- <http://misac.org.uk/article-downloads/MiSAC-briefings-5-18-08-2023-JT-JS.pdf>
- <https://dndi.org/diseases/neglected-tropical-diseases/>
- <https://unitingtocombatntds.org/en/neglected-tropical-diseases/>
- <https://www.who.int/publications/i/item/9789240010352>
- <https://www.gia.ac.uk/research/az/wcip/research/>
- https://apps.who.int/iris/bitstream/handle/10665/44440/9789241564090_eng.pdf
- <https://earth.stanford.edu/news/how-does-climate-change-affect-disease>
- <https://www.euronews.com/green/2022/10/20/most-diseases-worsened-by-climate-change-new-research-reveals-heres-what-we-can-do-about-it>
- <https://academic.oup.com/trstmh/article/115/2/147/6121885>

The original flyer and links can be found here:

[Final Misac Comp 2024 31:8:2023](#)

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