



## 1st International Young Biologists' Tournament Problems 2024

### Biological Fight 1

- 1. Fertilizers and Plant Growth :** Investigate the effects of different types of fertilizers on plant growth and analyze their impact on soil quality.
- 2. PH and its effect on aquatic life:** Explore the impact of various water pH levels on the survival and growth of aquatic organisms e.g. koi fish.
- 3. Germination of seed:** Analyze the factors affecting the germination rate of seeds from different plant species such as Zea mays L.
- 4. Leaf shape and transpiration:** Investigate the relationship between leaf shape and the rate of transpiration in various plants.
- 5. Plant Growth and Light:** Analyze the influence of different wavelengths of light on the growth of a particular plant species..
- 6. Effects of Environmental Factors on Plant Growth:** Investigate how different factors like light intensity, temperature, or soil type affect the growth of a particular plant species.

### Biological Fight 2

- 7. Microorganisms and Antibiotics:** Test the effectiveness of common household items (like garlic or honey) in inhibiting the growth of bacteria compared to commercial antibiotics.

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- 8. Genetics and Inheritance:** Study inheritance patterns in traits (e.g., eye color, blood type) within your family or among classmates.
  - 9. Effect of pH on Enzyme Activity:** Investigate how changes in pH levels affect the activity of enzymes, using common enzymes like catalase from potatoes.
  - 10. Microbial Growth and Hand Hygiene:** Test the effectiveness of different hand sanitizers or washing techniques in reducing bacterial growth on hands.
  - 11. Fermentation and Yeast Activity:** Investigate the factors that affect the rate of fermentation in yeast, such as temperature or sugar concentration.

### **Invent Yourself**

- 12. Effect of Food Type on Digestion:** Explore how different types of food (e.g., carbohydrates, proteins, fats) digest in the human digestive system using simulated digestion experiments.
- 13. Climate Change and Phenology:** Monitor changes in the timing of natural events (e.g., flowering of plants, arrival of migratory birds) in response to climate change
- 14. Structure of Protein:** Investigate the potential of using bioinformatics to predict the structure and function of proteins.
- 15. Extremophiles:** Examine the physiological adaptations of extremophiles (to extreme environments, such as deep-sea hydrothermal vents or acidic hot springs).
- 16. CRISPR-CAS9:** Explore the potential of using CRISPR-Cas9 technology to enhance the disease resistance of crops.
- 17. Gene Expression in Response to Stress:** Examine how the expression of specific genes changes in response to environmental stressors in a chosen organism.

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**18. Bioinformatics Challenge:** Design a computational experiment involving sequence analysis, protein structure prediction, or other bioinformatics techniques to solve a biological problem.

