Malaria Interactive

**Your Mission (Overview):** In this interactive simulation, you will learn about one of the most significant global health problems in the world: malaria.

You will then investigate various ways to help deal with malaria. After researching various methods for controlling malaria and evaluating data from your experiments, you will propose a program to combat this disease that takes into account various factors such as:

1. Effectiveness
2. Cost (**You have a $10 million budget**)
3. Effects on Humans
4. Effects on Ecosystems and Other Organisms

The most successful proposals will balance these various competing issues.

**Background Research:** Recommended time: 10 minutes (in groups of 4 where each student investigates one question and shares his or her findings with the group)

Research malaria on your own (or in groups), focusing on the following:

1. How common is it and how dangerous?
2. What causes it and how is it transmitted?
3. What are its effects?
4. What are some methods used to control it and why might these work?

**Collect and Analyze Data:** The small geographic region that we will investigate in this simulation is severely affected by malaria, with 1 million cases of the disease per year.

Your goal is to investigate potential solutions to this problem and come up with a plan to reduce (and ultimately eradicate) malaria in this region.

It is recommended that you test each solution by itself initially to see its effects. Then, come up with a plan that utilizes the best techniques to reduce malaria infections in the area. You will need to defend your plan with the 5 year data you collect. Hint: Be sure to analyze trends in the data using the automatically generated graphs of your data!

**Final Product:** After independently analyzing your data, get together with your group members and discuss the most effective methods for dealing with the malaria problem. You must use your data and take into account the following:

1. Effectiveness
2. Cost (**You have a $10 million budget**). Note: you **CANNOT** spend more than $10 million!
3. Effects on Humans
4. Effects on Ecosystems and Other Organisms (including effects on fish, birds, and insects)

Implement your best plan on the simulation and collect your data (you may wish to screenshot it). Create a presentation in PowerPoint or Google Slides defending your plan. You MUST DEFEND YOUR PLAN WITH DATA (including GRAPHS)!!!!

We will Peer Review your findings (to see if we can replicate them), just like scientists do in real life, so **you must fill in this table** and share with the class (at the *beginning* of your presentation):

|  |  |  |
| --- | --- | --- |
| **Target** | **Action** | **Percent of Budget Spent on this Action** |
| Targeting Mosquitoes | Mosquito Nets Over Beds |  |
| Pesticides on Mosquito Nets |  |
| Pesticides on Indoor Walls |  |
| DDT Sprayed in Water |  |
| Experimental Pesticide A |  |
| Experimental Pesticide B |  |
| Targeting the Parasite | Drug A (*Before* Exposure) |  |
| Drug B (*Before* Exposure) |  |
| Drug A (*After* Exposure) |  |
| Drug B (*After* Exposure) |  |
| Targeting the Environment | Drain Bodies of Fresh Water (where mosquitoes breed) |  |
| Introduce Non-Native Biological Controls |  |
| Increase Native Biological Controls |  |

You may also suggest other creative ways to improve results that are not found in the simulation and/or explain how you could improve your plan with more funding. But you must be able to JUSTIFY your ideas using evidence and reasoning! Be creative!

The best plan WINS the grant (and *possibly* a bit of extra credit)!

**Peer Review**

Students not presenting should Peer Review other students’ proposals to check for accuracy and honesty:

Here is an example Peer Review Checklist:

|  |  |
| --- | --- |
| Was the data reproducible? (Yes or No) | What errors did you find? |
|  |  |