

BIOLOGY & SOCIETY MAGAZINE Spring Issue

**New Haven Energy:
Local and Global Impacts**
Pollution and Asthma,
Climate Change and Malaria

Each student must complete three pieces for the magazine (including at least one visual and one text assignment). Additional high-quality assignments completed beyond the required three will be counted as extra credit.

| Visual Assignments (Graph, Image, etc. WITH caption) | Text Assignments (Informational or Argumentative Essay) |
|---|--|
| <p>POLLUTION AND ASTHMA</p> <ul style="list-style-type: none"> ○ <u>Photosynthesis and Respiration Diagrams</u> <ul style="list-style-type: none"> ● Graph showing energy (y-axis) vs. reaction progress (x-axis) for the “photosynthesis” and “respiration” reactions ● Take pictures of starting reactants to go on left of graph and ending products of each to go on the right (both the substance itself and a molecular model of the substance) ○ <u>Lung and pollution photographs</u> <ul style="list-style-type: none"> ● Prepare, take, and label photographs through the microscope of human lung tissue and our pollution samples ● Prepare, take and label photographs of the polluted and non-polluted pig models of the lungs made from straw, balloons, and a bottle ○ <u>Pollution sample data</u> <ul style="list-style-type: none"> ● Create and label a satellite map of our pollution sample collection sites ● Create and annotate graph(s) of our pollution data ○ <u>OTHER:</u> _____ | <p>POLLUTION AND ASTHMA</p> <ul style="list-style-type: none"> ○ Explanation of <u>why we need to breathe</u> and why we need oxygen ○ Information about what <u>energy</u> is used for <u>in New Haven</u> and how it is produced with specific details we learned in class ○ Argument about whether and <u>which fossil fuel uses affect air quality</u> and particle pollution based on data collected from our petroleum jelly dishes on sticks ○ Description of <u>how particle pollution can affect our lungs</u> referencing our observations of the pig lung and data from our microscope analysis of human lung and pollution samples ○ Analysis and interpretation of data from our exercise lab with and without restricted (through-the-straw) breathing to clarify <u>how asthma and other breathing issues affects the rest of our body and our health</u> ○ Explanation based on evidence for <u>why asthma rates are so much higher in some New Haven neighborhoods</u> than elsewhere ○ <u>OTHER:</u> _____ |

[VISUAL]

CLIMATE CHANGE AND MALARIA

- **Hand-drawn diagram of carbon cycle**
 - Showing the places visited in our dice game simulation and the paths between
 - Include one version for before 250 years ago and one version for today
- **Diagram showing DDT bioaccumulation and biomagnification**
 - Diagrams should be of your own creation, be well-labeled, and include clear caption
- **Photographs and diagrams explaining the “greenhouse effect”**
 - Include photographs of thermal camera imaging of hand in the fish bowl
 - Diagram explaining thermal photograph and connection to global greenhouse effect
- **Diagram showing how mosquitos spread malaria and their range**
 - Include both the inside workings of mosquito feeding that spread the disease and a map/description of the range and environmental conditions of malaria-spreading mosquitos
- **Labeled microscopic photograph of sickle cell and normal human blood cells**
 - Linked to diagram of lungs meeting blood vessels (alveoli) to exchange oxygen with red blood cells
- **Photograph of normal hemoglobin model and mutated sickled hemoglobin model**
 - Included diagram of DNA and amino acid sequence differences between

○ **OTHER:** _____

[TEXT]

CLIMATE CHANGE AND MALARIA

- Explanation of **how the carbon cycle works** and how humans have changed it
- Discussion of **causes and possible solutions to climate change** that reference the inputs to and outputs from of the carbon cycle the atmosphere
- Description of why **DDT** was harming and killing a variety of organisms and how Rachel Carson’s book ***Silent Spring*** affected the use of DDT
- Response to the argument that stopping the use of DDT resulted in an increase in deaths from malaria including **why DDT stopped working**
- Explanation of **how and why malaria will be affected by climate change**
- **How sickle cell anemia protects against malaria and how it is inherited** (including Punnett square)
- Answer to the question **“Is sickle cell anemia a racial disease?”** that includes an analysis of **whether races are real in a biological sense and/or a social sense**
- Explanation of **what anemia is and all the different ways that it can be caused** (for example: nutrition, lead poisoning)
- Identification and explanation of **funding and research disparities for sickle cell anemia vs. cystic fibrosis**
- **OTHER:** _____