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| Lesson Topic | Environmental Justice & Public Health |
| Class/Grade | 7-12th Grade; Current Events, Social Studies, Science |
| Activity Type | Analysis, Research, Writing, Presentation |
| Lesson Objectives | Students will  1. Identify and research incidents of environmental contamination caused by industry  2. Document the underlying causes, scientific evidence and human impact of a specific incident of environmental contamination  3. Make connections between environmental justice and public health  4. Present their research to classmates  5. Discuss the roles and responsibilities of industry, government oversight and citizens in promoting public health, preventing future contamination, and responding to existing environmental justice in the world |
| Essential Questions | What is environmental justice?  What can be done to expand environmental justice globally?  What is the relationship of environmental justice and public health? |
| Standards/  Benchmarks | CCSS Anchor Standards for Reading:  7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.  CCSS Anchor Standards for Writing:  7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.  Next Generation Science Standards:  MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. |
| Sources Used | *The Minamata Story: An EcoTragedy* by Sean Michael Wilson and Akiko Shimojima  Lesson Plan- Mystery of the Dancing Cat by the Center for Urban Resilience, Loyola Marymount University  Mystery of the Dancing Cat Lesson Materials |
| Required Materials | Classroom set of *The Minamata Story: An EcoTragedy*  Copies of Mystery of the Dancing Cat Lesson Materials for students  Student access to computers  See Lesson Plan-Mystery of the Dancing Cat for materials related to classroom demo of the process of biomagnification in nature  Materials for poster-making |
| Time Requirement | 1-2 weeks, depending on time given to students in class for reading, research and presentation preparation.  Alternatively, teachers may choose to present elements of the lesson in partnership with colleagues as a cross-curricular unit. The Minamata Story could be read and discussed in a Language Arts class, the biomagnification demonstration and Minamata case study could be carried out in a science class, and the research and presentation project could be conducted in Social Studies. |
| Procedure | |
| Pre-lesson Preparation | Read through all Sources Used and Required Materials. Determine which learning supports your students will need to access the information provided. |
| Lesson Introduction | Begin the lesson by introducing the concept of Environmental Justice. You may start by showing a short video that defines the concept and offers examples of environmental injustices. Some options here: <https://www.youtube.com/watch?v=y8cAhsr5j6U>  <https://www.youtube.com/watch?v=FxidrcrbC1M>  <https://www.youtube.com/watch?v=fIu-AfQ0cBM>  There are many other brief videos on Environmental Justice available on YouTube. Preview the videos to determine which will be most appropriate for your students.  After watching the selected video, ask students to brainstorm examples of environmental contamination they have heard about, locally, nationally, and internationally. This will help you gauge what students know and understand about the topic. Next, ask students to identify the impact on public health of the disasters on the brainstormed list.  Explain to students that they will be reading a graphic novel that describes the impact of an incidence of environmental contamination in Japan, and the public health impact of the contamination.  Distribute *The Minamata Story: An EcoTragedy* to students. Explain to students that the graphic novel tells the story of an incident of environmental contamination caused by industrial waste dumping that poisoned generations of people and animals in Japan.  The protagonist in the book is a student working on a research problem about the contamination at Minamata. Explain to students that after reading the book, they will carry out a similar project. Encourage students to begin paying attention to the news, noticing stories about environmental contamination, and discussing the topic with their family and friends to help them select a topic for their research that appeals to them. |
| Activity 1 | Assign students to read The Minamata Story. Determine how much class time to provide for reading, discussion, and review of the text based on your students’ ability level. As students read, ensure that they understand the key events in Minamata and the impact of the populace including the economic, political, and social aspects of the crisis. |
| Activity 2 | Lesson Plan-Mystery of the Dancing Cat (1-2 class periods)  Guide students through the activities and classroom demonstration described in the lesson plan. The students will examine the context of the Minamata mercury poisoning and will read a case study designed to help them analyze evidence and form conclusions from data. The purpose of the lesson is to help students analyze the structural reasons for the Minamata Crisis, the initial lack of assistance provided, the stigmatization of victims, and the scientific explanation for how the mercury poisoning discussed in the book occurred. Additionally, the lesson includes a simple classroom demonstration to help students understand the impact of mercury poisoning at various levels of the food chain (biomagnification). |
| Activity 3 | **Research incidents of environmental contamination and their impact on public health**  Explain to students that they will now begin internet research on a topic related to industrial contamination of the environment.  Assign students to a research group. Provide a list of industry (or government) caused environmental contamination. You may also want to have students help brainstorm topics (e.g. Flint Water Crisis; Guiyu, China e-waste hub water contamination; Union Carbide Corporation in Bhopal India; Sarnia, Ontario petrochemical industry contamination of Aamjiwnaang First Nations lands; San Juanico disaster, Mexico City; Warren County landfill protests; Dakota Access Pipeline; Uranium mining and the Navajo People).  Some students may self-select topics from the list, others will likely need to be assigned a topic. This project can also be carried out individually, it just depends on how you want to group the students.  Explain to students that they will gather information about the incident, analyze the information, and create a poster presentation with the relevant facts and details for their classmates.  Students in groups of three or four can be assigned specific research roles. Ask students to arrange the information in a similar way to the analysis carried out during the Mystery of the Dancing Cat activity: Economic Status, Motive, and Pollution Path. Student-created poster should reflect this three-part structure.  Provide adequate time in class for students to conduct research, read information, and create their poster.  **Presentation of Posters**  When all posters are completed, display around the classroom. Organize the presentation day so that the class moves around the room. As each group’s poster is approached, that group leads a brief presentation about the information they gathered on the environmental incident they researched. Students can be given individual grades on group projects depending on how they divided the work and how they contributed to the group’s final product. For example, one student could be made responsible for the section on Economic Status. The individual grade can be assigned based on the student writing and presenting the information in that section. |
| Wrap-up/Extension | Lead students in discussion about the similarities and differences in the incidents described by their classmates. What are common threads? What power do students have to combat environmental injustice? How can individuals work for environmental justice globally and locally?  Ask students to write a personal response about what they have learned and how they see their role in promoting environmental justice and public health. |