

**Environmental Health Online – C. Sobin, Instructor  
Video Project Conceptual Outline Form**

<b>Name: (EXAMPLE)</b>	<b>Student ID: (EXAMPLE)</b>
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**Defining the Problem and Solution (page 1):**

<b>What is your climate change topic ("the problem")?</b>	<p><b>The problem is "fracking," the shortened term for hydraulized fracturing, which breaks apart deep shale layers to release gas and/or oil. Fracking sites can emit huge amounts of methane into the atmosphere. Methane is 30 times more potent in driving global warming than CO2 emissions over time. Methane causes 25 percent of anthropogenic climate change. In 2019, atmospheric methane reached a 20-year high. Methane emissions are not monitored or recorded and people do not understand the risks from fracking of methane. Methane is directly damaging to human health and is damaging the planet through its effect on global warming.</b></p> <p><b>We need to raise public consciousness about the dangers of fracking. The general public needs to know about fracking and its dangers, so people can make choices about how to respond to fracking if it comes close to their homes, and to help educate others.</b></p>
<b>What is your KEY MESSAGE about this topic?</b>	<p><b>Make a choice and say "no" to fracking.</b></p>
<b>What is your one solution to this problem?</b>	<p><b>Teach people through this video to spread knowledge about fracking. Get accurate information to people that live near fracking sites. Give people enough information to begin educating others, particularly people who live near fracking operations. Let people know about groups that can help them fight against fracking. Convince people that they have a choice.</b></p>
<b>Who is your target audience, and why?</b>	<p><b>Families, including parents and older children, who live near fracking sites, because it will be local people who can help change the situation by refusing to allow fracking sites in their communities.</b></p>

**Factual evidence of “the problem;” provide a minimum of 10 details and references:**

<b>Detail</b>	<b>Reference</b>
The climate is changing.	1. Cook J, Oreskes N, Doran PT, Anderegg WRL, Verheggen B, Maibach EW, Carlton JS, Lewandowsky S, Skuse AG, Green SA, Nuccitelli D, Jacobs P, Richardson M, Winkler B, Painting R, Rice K. (2016) Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. <i>Environmental Research Letters</i> Vol. 11 No. 4, (13 April); DOI:10.1088/1748-9326/11/4/048002
Over the past 50 years, man has released tons of damaging gasses into the atmosphere.	2. Environmental Protection Agency. (2020, Jan 10). Green House Gas Reporting Program (GHGRP). EPA. <a href="https://www.epa.gov/ghgreporting">https://www.epa.gov/ghgreporting</a>
These gases have built up, are trapping heat from the sun, and are warming our planet and oceans. The extra heat is harming human health and destroying nature ecosystems that support human life.	3. National Aeronautic Space Agency. (2020, Jun 26). Scientific Consensus: Earth’s Climate is Warming. Global Climate Change: Vital Signs of the Planet. <a href="https://climate.nasa.gov/scientific-consensus/">https://climate.nasa.gov/scientific-consensus/</a>
What gases are heating our planet? One is carbon dioxide.	4. National Aeronautic Space Agency. (2020, Jun 26). Vital Signs: Carbon Dioxide. Global Climate Change: Vital Signs of the Planet. <a href="https://climate.nasa.gov/scientific-consensus/">https://climate.nasa.gov/scientific-consensus/</a>
Fewer people know about a much more dangerous gas, called methane. Methane is 30 times more potent than carbon dioxide in heating up our planet.	5. Hamburg, S, (2020, Nov) “Methane: The other important greenhouse gas.” Environmental Defense Fund. <a href="https://www.edf.org/climate/methane-other-important-greenhouse-gas">https://www.edf.org/climate/methane-other-important-greenhouse-gas</a> .
New evidence shows that methane emissions have massively increased since 2006 at the rate of 25 million tons per year.	6. Worden J, Bloom A, Pandey S, Jiang Z, Worden H, Walker T, Houweling S, Röckmann T. (2017). Reduced biomass burning emissions reconcile conflicting estimates of the post-2006 atmospheric methane budget. <i>Nature Communications</i> . 8. 10.1038/s41467-017-02246-0.
Newest “fingerprinting” studies show that the increases have come largely from from unmonitored methane leakage from fracking sites; and increase began at about the same time that shale gas fracking operations expanded across the U.S.	7. Howarth, R. (2019) Ideas and perspectives: Is shale gas a major driver of recent increase in global atmospheric methane? <i>Biogeosciences</i> , 16, 3033 – 3046, Aug 14.
One study from 2015 study showed that in a fracking area of northeast Texas, (Barnett Shale, Fort Worth basin) 544,000 tons of methane were leaked.	8. Zavala-Araiza D, Lyon DR, Alvarez RA, Davis KJ, Harriss R, Herndon SC, Karion A, Kort EA, Lamb BK, Lan X, Marchese AJ, Pacala SW, Robinson AL, Shepson PB, Sweeney C, Talbot R, Townsend-Small A, Yacovitch TI, Zimmerle DJ, Hamburg SP. <i>Proceedings of the National Academy of Sciences</i> , 112 (51) 15597-15602; DOI: 10.1073/pnas.1522126112.

<p>And methane emissions from leakage and flaring are not the only problem. Horizontal drilling is producing earthquakes in unexpected areas;</p>	<p>9. Rogers N. (2020, February 21). 2019: The Year Fracking Earthquakes Turned Deadly. Inside Science. <a href="https://www.insidescience.org/news/2019-year-fracking-earthquakes-turned-deadly">https://www.insidescience.org/news/2019-year-fracking-earthquakes-turned-deadly</a></p>
<p>local water supplies are becoming depleted; and fracking waste water is contaminating water supplies and killing local livestock.</p>	<p>10. U.S. EPA. Hydraulic Fracturing For Oil and Gas: Impacts From the Hydraulic Fracturing Water Cycle on Drinking Water Resources In the United States (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-16/236F, 2016.</p>
<p>The very industry that gets rich from fracking takes no responsibility for monitoring and reporting their methane gas emissions. How is it possible that fracking methane emissions are not monitored and reported to the public?</p>	<p>11. Ingraffea AR, Wawrzynek PA, Santoro R, Wells M. 2020, Reported Methane Emissions from Active Oil and Gas Wells in Pennsylvania, 2014–2018. <i>Environ. Sci. Technology</i>, 54, 9, 5783–5789.</p>
<p>What can be done? You have a right to know about contaminants that can damage your health, that can damage your family’s health, and that can damage our planet. In America, you have a right to know. In America, you have a voice and you have a vote.</p>	
<p>Change begins with people, that means you and me. Change begins with knowledge. Change begins with people standing up and saying, “NO.” Change begins with people standing up and saying, “This is not right.” People should have a choice.</p>	<p>12. Berlekamp, L. (2013, June 19) Influence of Grassroots Anti-Fracking Movement Spreads Like Wildfire. EcoWatch. <a href="https://www.ecowatch.com/influence-of-grassroots-anti-fracking-movement-spreads-like-wildfire-1881764241.html">https://www.ecowatch.com/influence-of-grassroots-anti-fracking-movement-spreads-like-wildfire-1881764241.html</a></p>
<p>Fracking operations today are located mainly in the U.S. and Canada.</p>	<p>13. McBride J, Sergie MA. (2015, June 10). Hydraulic Fracturing (Fracking). Council on Foreign Relations. <a href="https://www.cfr.org/background/hydraulic-fracturing-fracking">https://www.cfr.org/background/hydraulic-fracturing-fracking</a></p>
<p>Entire countries, including France and Germany, have already acted to ban all fracking within their border. Within the U.S., New York State, Maryland and Vermont have also enacted bans on fracking.</p>	<p>14. <i>ibid</i> (same reference as above)</p>

<p><b>Change is possible. By coming together, through “grass-roots” organizations, we can become like other advanced nations that recognize the dangers of fracking for its citizens, and have completely prohibited fracking operations.</b></p>	<p><b>15. Food &amp; Water Watch (2020, September 24). The Grassroots Fight to Protect Colorado Communities from Oil and Gas Development Heats Up.</b> foodandwaterwacht.org. <a href="https://www.foodandwaterwatch.org/news/grassroots-fight-protect-colorado-communities-oil-and-gas-development-heats">https://www.foodandwaterwatch.org/news/grassroots-fight-protect-colorado-communities-oil-and-gas-development-heats</a></p>
<p><b>You, your children, your grandchildren and your great-grandchildren need a planet that supports human life, deserve a planet that supports human life.</b></p>	
<p><b>You can say “NO” to industries that are destroying our planet. You can say “NO” to fracking in the United States.</b></p>	
<p><b>Join the movement. You deserve better. Share this video. Call now to find out how you can make change now in your area.</b></p>	<p><b>16. Food &amp; Water Watch (retrieved 2020, June 14). About: Fracking.</b> foodandwaterwacht.org. <a href="https://www.foodandwaterwatch.org/problems/fracking">https://www.foodandwaterwatch.org/problems/fracking</a></p>
<p><b>Additional History:</b></p>	
<p><b>Since 2005, over 140,000 fracking wells have been drilled in over 20 states.</b></p>	<p><b>Leahy, S. (2019). Fracking boom tied to methane spike in Earth’s atmosphere. National Geographic, 15 Aug.</b></p>
<p><b>By 2015, the number increased to over 300,000 sites.</b></p>	<p><b>Marusic, K. (2020). Oil and gas methane missions in US are at least 15% higher than we thought. Environmental Health News, 23 Apr.</b></p>
<p><b>As of February 2017, Texas had 279,615 active gas and oil wells.</b></p>	<p><b>Zhang Y et al. (2020) Quantifying methane emissions from the largest oil-producing basin in the United States from space Science Advances, 22 Apr 2020: Vol. 6, no. 17.</b></p>
<p><b>As much as 75% of the methane emissions increase is attributable to fossil fuels production.</b></p>	<p><b>Pandey S, Gautam R, Houweling S, Denier van der Gon H, Sadavarte P, Borsdorff T, Hasekamp O, Landgraf J, Tol P, van Kempen T, Hoogeveen R, van Hees R, Hamburg SP, Maasakkers JD, Aben I. (2019) Satellite observations reveal extreme methane leakage from a natural gas well blowout. Proceedings of the National Academy of Sciences 116 (52) 26376-26381; DOI: 10.1073/pnas.1908712116</b></p>
<p><b>Others have suggested that a small number of operations are responsible for the majority of methane leaked into the atmosphere.</b></p>	<p><b>Howarth, RW, Ingraffea, A, 2011. Should Fracking Stop? Nature, 477, pg 271 – 272.</b></p>

<p><b>High levels of atmospheric methane are predicted to damage children's health and development.</b></p>	<p><b>Perera FP. 2017. Multiple threats to child health from fossil fuel combustion: impacts of air pollution and climate change. Environ Health Perspect 125:141–148; <a href="http://dx.doi.org/10.1289/EHP299">http://dx.doi.org/10.1289/EHP299</a></b></p>
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**Factual evidence showing the efficacy of your “solution;” provide a minimum of 10 references:**

Detail	References (that show education “works”)
<p><b>Educate families living near current or potential fracking sites. Motivate them to become active in the fight against fracking; motivate them to vote.</b></p>	<p>Global Education Monitoring Report (2015, December 8). Education increases awareness and concern for the environment. World Education Blog, UNESCO. <a href="https://gemreportunesco.wordpress.com/2015/12/08/education-increases-awareness-and-concern-for-the-environment/">https://gemreportunesco.wordpress.com/2015/12/08/education-increases-awareness-and-concern-for-the-environment/</a></p>
	<p>Denworth, L. (2019). Children Change their Parent’s Mind’s about Climate Change. Scientific American, 6 May.</p>
	<p>Kollmuss, A &amp; Agyeman, J. (2002) Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8:3, 239-260, DOI: <a href="https://doi.org/10.1080/13504620220145401">10.1080/13504620220145401</a></p>
	<p>Urevig, A. (2016, May 16) 6 things we learned about changing people’s minds on the climate. Frontiers in the Environment; Institute on the Environment, University of MN. <a href="http://environment.umn.edu/news/6-things-we-learned-about-changing-peoples-minds-on-climate/">http://environment.umn.edu/news/6-things-we-learned-about-changing-peoples-minds-on-climate/</a></p>
	<p>North American Association for Environmental Education. (retrieved 2020, Jun 12). About EE and Why It Matters. What is Environmental Education? <a href="https://naaee.org/about-us/about-ee-and-why-it-matters">https://naaee.org/about-us/about-ee-and-why-it-matters</a></p>
	<p>Brown, E., Imron, M., Campera, M., &amp; Nekaris, K. (2020). Testing efficacy of a multi-site environmental education programme in a demographically and biologically diverse setting. Environmental Conservation, 47(1), 60-66.</p>
	<p>Brundtland, G. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations General Assembly document A/42/427.</p>
	<p>UNESCO, Intergovernmental Conference on Environmental Education, Tblisi, USSR, Oct 14 – 26, 1977. Reports and Governance (Declaration on Definition of Environmental Education (available on NAAEE website). <a href="https://naaee.org/about-us/reports-and-governance">https://naaee.org/about-us/reports-and-governance</a></p>
	<p>McComas W.F. (2014) Environmental Education (EE). In: McComas W.F. (eds) The Language of Science Education. SensePublishers, Rotterdam</p>
	<p>Brandl, R, Alvarado, A, Peltomaa, A. (2019) Evaluating efficacy of environmental education programming. School Science and Mathematics. 2019; 119: 83– 93. <a href="https://doi.org/10.1111/ssm.12319">https://doi.org/10.1111/ssm.12319</a></p>
	<p>Ardoin NM, Bowers AW, Gaillard E. (2020). Environmental education outcomes for conservation: A systematic review, Biological Conservation, Volume 241, 2020.</p>

**Script Development:**

Fill in the script below. After you have completed the script, speak each sentence or group of sentences aloud and time how long each sentence takes. Record the timings in the right-hand column. You will use these in laying out your story board.

<b>Act I: "The Problem"</b>	<b>Time (secs)</b>
<p><b>The climate is changing.</b>  <b>Over the past 50 years, man has released tons of gasses into the atmosphere. These gasses have built up, are trapping heat from the sun, and are warming our planet and oceans.</b>  <b>The extra heat is harming human health and destroying nature ecosystems that support human life.</b></p>	<b>23</b>
<p><b>What gasses are heating our planet?</b>  <b>One is carbon dioxide.</b>  <b>Fewer people know about a much more dangerous gas, called methane. Methane is 30 times more potent than carbon dioxide in heating up our planet. And in recent years, there have been massive increases of methane gas emissions (2015, John Worden, NASA Jet Propulsion Laboratory) at a rate of 25 million tons per year (Zou et al., 2019, Remote Sensing).</b>  <b>What has produced this alarming increase in atmospheric methane gas?</b></p>	<b>32</b>
<p><b>Newest "fingerprinting" studies show that the increases have come largely from from unmonitored methane leakage from fracking sites. (Robert Howarth, Biogeosciences Aug 14, 2019). One fracking area alone in northeast Texas, was responsible for the emission of 544,000 tons of methane gas into the atmosphere (Barnett Shale, Fort Worth basin) (PNAS, 2015, Zavala-Araiza, D. Dec 22).</b></p>	<b>22</b>
<p><b>And methane emissions from leakage and flaring are not the only problem. Horizontal drilling is producing earthquakes in unexpected areas; local water supplies are becoming depleted; and fracking waste water is contaminating water supplies and killing local livestock.</b></p>	<b>18</b>
<p><b>The very industry that gets rich from fracking takes no responsibility for monitoring and reporting their methane gas emissions.</b>  <b>How is it possible that fracking methane emissions are not monitored and reported to the public?</b></p>	<b>17</b>

<b>Act II: "The Bridge"</b>	<b>Time (secs)</b>
<p><b>What can be done?</b></p> <p><b>You have a right to know about contaminants that can damage your health, that can damage your family's health, and that can damage our planet.</b></p> <p><b>In America, you have a right to know.</b></p> <p><b>In America, you have a voice and you have a vote.</b></p>	<p><b>23</b></p>

Act III: A Solution	Time (secs)
<p>Change begins with people, that means you and me.                      Change begins with knowledge.                      Change begins with people standing up and saying, "NO."                      Change begins with people standing up and saying, "This is not right."                      People should have a choice.</p>	21
<p>Fracking operations today are located mainly in the U.S. and Canada. Entire countries, including France and Germany, have already acted to ban all fracking within their border (24 Jun 16 The Guardian). Within the U.S., New York State, Maryland and Vermont have also enacted bans on fracking (State Impact Pennsylvannia, 4 apr 17, EPA).</p>	24
<p>Change is possible.                      Together, through "grass-roots" organizations, we can become like other advanced nations that recognize the dangers of fracking for its citizens, and have completely prohibited fracking operations.</p>	17
<p>You, your children, your grandchildren and your great-grandchildren need a planet that supports human life, deserve a planet that supports human life.</p>	15
<p>You can say "NO" to industries that are destroying our planet.                      You can say "NO" to fracking in the United States.</p>	6
<p>Join the movement.                      You deserve better</p>	13
<p>Share this video.</p>	(Food and Water
<p>Call now to find out how you can make change now in your area.</p>	Watch info
<p>Food and Water Watch</p>	shows on
<p>Phone: 202-683-2500 / Toll Free: 855-340-8083</p>	screen
<p>1616 P Street NW</p>	during
<p>Suite 300</p>	previous
<p>Washington, District of Columbia 20036</p>	13 sec
	voiceover)

**TOTAL TIME: 3 mins, 51 secs**