

## Lesson 1: Getting a temp on what your students know about climate change

*Summary:* This lesson’s focus is on giving students the opportunity to note their prior knowledge on climate change and learn about a few ways climate change is impacting Northwest Indiana.

*Lesson Components:*

Activity	Students will...	Indiana State Standard Addressed (*8.ESS.1)
“Hot Building” Whiteboard Splash	predict how organisms respond to a changing environment	<b>SEPS.6</b>
“Wordle” Pre-Unit Knowledge Check	reflect on prior knowledge about climate change	
JigSaw Activity with Local News Articles	read/discuss ways climate change is impacting northwest Indiana & the Indiana Dunes National Park	<b>SEPS.8 6-8.LST.1.1</b>

*Teacher’s Homework:*

- Please review the seven “slides” located at <https://www.nationalgeographic.com/magazine/2017/04/seven-things-to-know-about-climate-change/>. At the top of each page is a graphic that helps to illustrate the concept that is explained further down the page.
- Please read boxes II and III at <http://www.gettingthepicture.info/intro/>

*A metaphor to help introduce climate change:*

**The way scientists have determined that Earth is experiencing rapid climate change is similar to the way a doctor diagnoses a patient with a disease.** When a patient visits a doctor, they run tests and note the symptoms the patient is experiencing. Doctors then compare this information to baseline data. For example, how does the patient’s current temperature compare to normal human’s body temperature? Scientists, too, look for symptoms and compare current data (temperature, precipitation, carbon dioxide levels, intense storm patterns. etc.) with old data. Given the data collected, scientists have diagnosed Earth with rapid climate change.

*Lesson Set-Up:* board space, Wordle loaded (see link in lesson), copy of jigsaw news articles (links listed in lesson and copies provided in folder)

## Lesson 1 “Hot Hospital” Whiteboard Splash<sup>1</sup>

*Purpose:* get students thinking about ways we can detect environmental changes and about how different organisms will respond differently to change. There are many indicators- observable, quantifiable characteristics- that can tell us whether or not an environment is experiencing change.

*Procedure:*

- Assign groups of 3-4 students a space at the board
- A hypothetical situation will be read aloud. When prompted teams should brainstorm a list of answers to the question on their designated board space. Follow-up questions are also included in the table.

<b>Situation/questions to be read aloud:</b>	<b>Potential student answers:</b>	<b>Connections &amp; transitions:</b>
As you are headed toward the entrance of a building, you hear some people who are leaving the building talk about how hot it is on the first floor. “The air conditioning unit has got to be broken,” they claim. What are some of the things you would expect to see people in the lobby doing if, in fact, the air conditioning unit was broken on a 95 degree day? In other words, what are some ways that humans respond to heat?	crack a window open, put hair up, red cheeks, sweating, fanning themselves, maybe sitting, taking layers off, looking for water, maybe people leave the room	Regroup and have students share answers aloud, emphasizing the fact that all these human behaviors <u>INDICATE</u> that there is a change in temperature.
If you were to walk into the lobby, and see almost everyone in that lobby doing a few of these behaviors (sweating and fanning themselves, for example), how sure, <i>how certain</i> , would you be that the room was getting warmer?	students will probably be pretty sure. All humans are showing more than one sign of heat.	
If we are pretty sure that the temperature in this room is hot, should we take action? Should we do something about it?	students would probably be probably be willing to do something to help... they can recognize that there are enough people who are in need.	
If you were to walk into the lobby and see <i>only a few humans</i> doing only one of the listed behaviors, or all of them only doing	there should be more uncertainty about this because	<i>If everyone in the lobby had red cheeks, and experienced no</i>

<p>one (ex: cheeks are red), do you think you would be <i>as sure</i> that the room temperature was getting hotter?</p>	<p>this situation has <u>a lot less evidence</u>.</p>	<p><i>other symptoms, is it possible that red cheeks might be a symptom of something else? What if it's the day after the Fourth of July and they are all a little sunburnt? What if there is something in the room that they are allergic to?</i></p>
<p>If only a few people are showing symptoms, or everyone is showing one specific symptom, should we take action? Should we do something about it?</p>	<p>The room is probably going to be more divided than they were before. Some might claim there isn't enough evidence, others might claim if a few are impacted it's enough to raise a red flag. Some might say we need more information.</p>	
<p>Let's assume almost all people in the lobby are showing some symptoms of exposure to heat). If the hospital is showing all the signs of being hot, how <u>can we make sure it's hot because the air conditioning is broke?</u> Are there other reasons the hospital could be hot? Brainstorm other reasons the hospital could be hot.</p>	<p>the heat got turned on, someone opened up the windows, the AC isn't broken- it just got turned off, the vents are closed</p>	
<p>If we think it's the AC, what do we do about it?</p>	<p>We check it! How do we know if it's broken? If it isn't working the same way we are used to it working... we have something to compare it to.</p>	<p>Now make the connection between figuring out what's going on in this hypothetical scenario and climate change.</p>
<p>How do you think this scenario relates to climate change?</p>	<p>answers will vary; <u>the goal is for you to help students make the following connection:</u> <i>Earth is experiencing symptoms of an increase in</i></p>	<p><b>We have ways of telling why the temperature on Earth is getting warmer, just like we</b></p>

	<p><i>temperature.</i> If the world is getting warmer, what are some changes that we can anticipate in our environment? temperatures are increasing, ice is melting, sea levels are rising, weather events are intensifying, animals are moving north, plants who can't move are struggling</p>	<p>have ways of checking to see why the temperature in the hospital is getting warmer.</p>
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## Lesson 1 “Wordle” Pre-Unit Knowledge Check<sup>2</sup>

*Purpose:* get an idea on student understanding/misconceptions of climate change. This info can help launch discussions and tailor future lessons.

*Set-Up:* During this activity, student will be asked to think about what comes to mind when they hear the words “climate change.” This info will then be plugged into a program that generates a collage based off of its input. Load this program before the start of class. Students will be working as individuals for this part of the lesson.

*Procedure:*

- Ask students to write down the first 5 words that come to mind when they hear the phrase “climate change.”
  - EX: polar bears, melting, global warming
  - EX: myth, fake news, hurricane, drought
- Students need to input these words on an electronic document so that you can transfer their answers into the Wordle program. Students should modify their words, though, because of the way the program works.
  - “Polar bears” should be written as “polarbears” to ensure that the program doesn’t split these words up in the collage
- Insert information on the electronic document into Wordle at <http://www.wordle.net/create>.
- Wordle will generate a word collage. All words that have been submitted will be presented on the collage. Words that have been repeated will be presented as larger. This is a good way to see what your students are thinking about.
- Ways to use this as a way of launching a discussion (this can be done the same day or later on in the unit):
  - A lot of us said “global warming”...
  - Many of you said “myth” or “fake news”...
  - There are some indicators mentioned here (“hot, ice melts, fossil fuels”)...
    - It’s recommended to use this time to get students acquainted with where they are at, and where they are going, not to spend too much time on any one part.
      - Example: A lot of us said “global warming.” Later this week we are going to talk about the difference between global warming and climate change.
      - Example: Many of you mentioned “fake news.” This is interesting. Is this because you think it is fake news, or because you’ve heard people refer to it this way.

## Lesson 1 JigSaw Activity with Local News Articles

*Purpose:* In reading articles about how climate change is already impacting the region in which they are from, the goal of this activity is to stress the relevance of this topic to students.

*Set-Up:* Students will probably finish their Wordle submissions at different times. If news articles are passed out early on in the period, students can start this activity as soon as their Wordle contribution is done. Copies of these articles can be found at the sites listed below, or in the pages following this lesson. Please see article descriptions for reading level information. If the teacher chooses, these articles can be differentiated based off of reading ability. We encourage you to look to see if there are more recent articles online that may be supplemented in this activity.

*Procedure:*

- Students read their designated journal article. Guiding Question: How is climate change already impacting or going to impact the area discussed in your article?
- When students are finished reading, they can (depending on time):
  - Meet with others who read their article, then be put in a group with people who read all different articles
  - Be put directly into a group with others who read different articles
  - Talk to a neighbor who read a different article
  - Talk as a class
- When students are in their group, they are to give a brief summary of the article and share the impacts of climate change. The group/pair should keep a running list.
  - This list serves as a good exit slip. Ask students to star any impacts that they have questions about, and then write their question or an additional question on the side of the page.
- Review these slips prior to the next class period... this will inform how you approach certain questions, or areas where more clarification might be needed.

### News article options:

(1) <http://www.chicagotribune.com/news/ct-midwest-climate-infrastructure-20171010-story.html#>

- Level: Advanced Reader

(2) <https://money.cnn.com/2017/04/20/news/corn-farmers-climate-change/index.html>

[https://www.nps.gov/subjects/climatechange/upload/INDU\\_2018\\_Birds\\_-\\_CC\\_508Compliant.pdf](https://www.nps.gov/subjects/climatechange/upload/INDU_2018_Birds_-_CC_508Compliant.pdf)

- Level: Average Reader

(3) <https://indianaeconomicdigest.com/Main.asp?SectionID=31&SubSectionID=120&ArticleID=67431>

- Level: Below Average Reader (due to shortness in length)

(4)<http://greatlakesecho.org/2009/11/03/report-climate-change-greatest-threat-to-national-parks-indiana-dunes-among-most-at-risk/>

- Level: Average Reader

(5)<http://www.chicagotribune.com/suburbs/post-tribune/news/ct-ptb-field-museum-nirpc-st-0204-20180203-story.html#>

- Level: Average Reader

(6)<http://www.toledoblade.com/local/2015/05/03/Ominous-signs-add-up-for-endangered-species.html>

- Level: Advanced Reader

*Lesson 1 References:*

(1) Adapted from Dr. Laurie Eberhardt at Valparaiso University.

(2) Adapted from the “What Three Words Come to Mind” from the Field Museum’s Climate Change Community Tool Kit.

<https://www.fieldmuseum.org/sites/default/files/What%20Three%20Words%20Come%20to%20Mind.pdf>