

Standards and Suggestions



Common Core Literacy Standards and Teaching Suggestions

The Common Core State Standards (CCSS) span grades K-12 and include skill sets like reading, writing, language usage, and speaking and listening. In this section, we do not aim to suggest all possible CCSS connections to climate change education. Instead, we offer examples to demonstrate the many possibilities for making the connections.

One point that deserves emphasis is that instruction on climate change provides ample opportunities for interdisciplinary teaching. To underscore the interdisciplinary opportunities, we have included writing activities to help language arts teachers connect language arts to science. We have done so by providing activities that explore the science of climate change *and then suggesting writing activities that use the science as a stimulus for writing*. You will find these writing activities under “Common Core” in the Standards section of this Web site.

In addition, we would like to call to your attention to two critical CCSS standards that may assist your climate change instruction.

1. Distinguishing between facts and speculation

The standard **CCSS.RST.6-8.1** reads as follows:

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. (*Common Core State Standards*, Washington, D.C.: National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010, 62.)

Many debates about climate change pit scientific findings against beliefs. This CCSS establishes the literacy goal of having students distinguish between the

scientific knowledge and beliefs instead of considering them as equally-supported perspectives.

2. Should anything be done?

The standard **CCSS.SL.8.4** reads as follows:



Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (*Common Core State Standards*, 49).

Consider challenging students to discuss *if* action needs to be taken to reverse climate change. Engaging students in a well-informed dialogue about this issue may generate more authentic action than if teachers skip this discussion and proceed immediately to solving the problem.

Common Core State Standards and Teaching Climate Change

A major goal of the POLCA is to be relevant not only to science professionals, but for teachers across disciplines. This section provides examples of activities for climate change education that will cover related common core standards. Each of the following three grade bands is covered: K-2, 3-5, and 6-8. For each grade band, you will find descriptions of or links to activities, suggestions for extension, and a chart with relevant common core learning standards.

Grade Band: K-2

Activity Title: Weather Walks

Weather walks engage students in relevant and real time exploration of weather events such as sunny days, rainy days, hot days, etc. Students note the characteristics of weather events with related literature connections. See full activity at: <http://www.uen.org/Lessonplan/preview?LPid=10665>

Language Arts Connection (K-2): Explanatory Writing About a Weather Walk

Purpose: The K-2 science unit, “Weather, Weather, Everywhere!” has students develop a deeper understanding of weather by engaging in a variety of activities. One of the activities is to have students engage in weather walks in which they observe details about the weather.

Objective: The students will develop their informative/explanatory writing skills by writing a description of the weather on one of their weather walks.

1. As the students take their weather walk, have them take notes about what they see, feel, taste, touch, and smell. Encourage them to write as many details as they can.
2. When they return to the classroom, have the students arrange their details in the order that they followed on their walk.
3. The students should write a topic sentence that summarizes the weather on the day on which they walked. For example, they might describe the weather as sunny, rainy, or snowy.
4. After they have their details in the order in which they want, ask them to write a first draft of their paragraph. Tell them to use as many vivid details as they can.
5. Ask the students to revise their paragraphs. Have they used as many details as possible? Will the order make sense? Have they checked their spelling?
6. Have the students share their paragraphs by reading them aloud to their class.

Reading Standards for Informational Text K-5 (for example, grade K)

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| CCSS.RI.K.1 | With prompting and support, ask and answer questions about key details in a text. |
| CCSS.RI.K.2 | With prompting and support, identify the main topic and retell key details of a text. |
| CCSS.RI.K.3 | With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text. |
| CCSS.RI.K.4 | With prompting and support, ask and answer questions about unknown words in a text. |
| CCSS.RI.K.5 | Identify the front cover, back cover, and title page of a book |
| CCSS.RI.K.6 | Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text. |
| CCSS.RI.K.7 | With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts) |
| CCSS.RI.K.8 | With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures). |

Writing Standards K-5 (for example, grade 1)

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| CCSS.W.1.1 | Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure. |
| CCSS.W.1.2 | Write informative/explanatory texts in which they name a topic, and provide some sense of closure. |
| CCSS.W.1.5 | With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed. |
| CCSS.W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |

Language Standards K-5 (for example, grade 2)

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| CCSS.L.2.1 | Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. |
| CCSS.L.2.2 | Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. |
| CCSS.L.2.3 | Use knowledge of language and its conventions when writing, speaking, reading, or listening. |
| CCSS.L.2.6 | Use words and phrases acquired through conversations, reading, and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other kids are happy that makes me happy). |

Speaking and Listening Standards K-5 (for example, grade 2)

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| CCSS.SL.2.1 | Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. |
| CCSS.SL.2.2 | Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. |
| CCSS.SL.2.4 | Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences. |
| CCSS.SL.2.6 | Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. |

Grade Band: 3-5

Activity Title: Solutions and Service Projects

Students learn about the impact of climate change and what they can do to reduce their individual and school's carbon footprint. Students view a music video (link below) on the causes and effect of climate change, and then view a short video on how one individual has worked to reduce his family's carbon footprint. The students conduct an action project by participating in the National Wildlife Federation's Cool School Challenge or conduct an energy audit of their school and propose ways of reducing their school's energy use.



TAKE AIM AT CLIMATE CHANGE

<http://passporttoknowledge.com/polar-palooza/whatyoucando/taacc/>

This music video features a rap song about some of the causes and effects of climate change with the goal of increasing awareness of climate change and how it will impact nature and humans. The website also includes links to short fact sheets with lyrics to the song that are annotated with the sources of the information in the lyrics. Video length 4 minutes

A STRICT CARBON DIET

<http://www.pbs.org/wgbh/nova/tech/carbon-diet.html>

Doug Hamilton, Producer, *NOVA*, WGBH-TV

This short video follows San Francisco inventor and engineer Saul Griffith as he determines his family's carbon footprint and develops a special cargo bike to further reduce his individual footprint. This video highlights innovation, creativity, and design as solutions to problems. The overall message is inspiring and proactive.

Video length: 2:58 min.

THE COOL SCHOOL CHALLENGE-NATIONAL WILDLIFE FEDERATION ECO-SCHOOLS PROGRAM

Students challenge classrooms to reduce their carbon emissions and use a carbon calculator to evaluate progress. Students conduct classroom energy audits and identify major sources of carbon dioxide emissions and ways to reduce their schools energy use. The Cool School Challenge is an educational program intended to engage students and teachers in practical strategies to reduce carbon dioxide (CO₂) and other greenhouse gas emissions school wide. Through improved energy efficiency, reduced consumption, increased recycling and changes in transportation behaviors, Challenge participants will learn how simple actions, taken together, can create a climate of change.

Action project that includes an energy audit, evaluation and action project. Elementary and secondary materials. <http://www.nwf.org/Eco-Schools-USA/Become-an-Eco-School/Cool-School-Challenge.aspx>

Language Arts Connection (3-5): Writing an Opinion About Climate Change

Purpose: The 3-5 science unit, "Earth's Changing Climate," has students develop a deeper understanding of global climate change through several activities. In one activity, the students look at solutions and service projects to reduce carbon use.

Objective: The students develop their writing skills by writing an opinion paragraph about an effective way to encourage people to take one step that will reduce the use of carbon.

1. Have students brainstorm a number of ways to save energy, such as by riding bicycles rather than riding in cars.
2. Have students select one energy-saving strategy about which they will write an opinion.
3. Ask the students to write a topic sentence in which they state why they think that the energy-saving strategy they have selected is important.
4. Have the students outline the reasons, facts, and examples that will support their opinion.
5. After they have organized their reasons, facts, and examples in the order in which they want, ask them to write a first draft of their paragraph. Tell them to use connects such as *because*, *for example*, and *as a result*.
6. Ask the students to revise their paragraphs. Have they clearly stated their opinion in the topic paragraph? Does the order of reasons, facts, and examples make sense? Have they checked their spelling?
7. Have the students share their paragraphs by reading them aloud to their class.

Reading Standards for Informational Text K-5 (for example, grade 3)

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| CCSS.RI.3.1. | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. |
| CCSS.RI.3.2 | Determine the main idea of a text; recount the key details and explain how they support the main idea. |

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| CCSS.RI.3.6. | Distinguish their own point of view from that of the author of a text. |
| CCSS.RI.3.7 | Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur) |
| CCSS.RI.3.9 | Compare and contrast the most important points and key details presented in two texts on the same topic |

Writing Standards K-5 (for example, grade 4)

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| CCSS.W.4.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. |
| CCSS.W.4.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. |
| CCSS.W.4.4 | Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. |
| CCSS.W.4.5 | With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. |
| CCSS.W.4.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. |

Language Standards (for example, grade 5)

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| CCSS.L.5.1 | Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. |
| CCSS.L.5.2 | Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. |
| CCSS.5.3 | Use knowledge of language and its conventions when writing, speaking, reading, or listening. |
| CCSS.5.6 | Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition). |

Speaking and Listening Standards (for example, grade 5)

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| CCSS.SL.5.1 | Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. |
| CCSS.SL.5.2 | Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. |

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| CCSS.SL.5.4 | Report on a topic or text or present an opinion, sequencing ideas, logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. |
| CCSS.SL.5.6 | Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. |

Grade Band: 6-8

Activity Name: Arctic Investigations

[CLEAN](http://cleanet.org/index.html) is the Climate Literacy and Energy Awareness Network (<http://cleanet.org/index.html>). Using activities from [CLEAN](http://cleanet.org/index.html), the students will investigate the following questions:



- How is climate change impacting the Arctic region?
- What is causing these changes?
- How do scientists track changes? Predict future climate?
- How does arctic climate change affect people, wildlife, global climate?
- What can we do?

Language Arts Connection (6-8): Arctic Investigations

Purpose: The 6-8 science unit, "Arctic Investigations," invites students to examine how climate change is affecting the earth's arctic region. The students will research and write a news report on one species of animal that is being affected by climate change. For example, they might report on how disappearing Arctic ice will affect polar bears.

Objective: The students develop their informative/explanatory skills by writing a news report on how an animal species is being affected by climate change.

1. Have the students do preliminary research into animal species that are being affected by climate change. In addition to polar bears, some possibilities include turtles, frogs, whales, giant pandas, elephants, and tigers.
2. Once the students have decided on a species, they should do research to examine how the animal is being affected by warmer temperatures. They should also consider how rising sea levels may be affecting the species.
3. Encourage the students to present their information in a news report. Ask them to write a lead—one to three sentences that will capture the reader's attention.
4. Then have students outline the rest of their report. They should arrange the information about the animal in an order that is logical and will make sense to the reader.

5. Ask them to write a first draft of their paragraph. Tell them to use connectors such as *one effect* and *another impact*.
6. Ask the students to revise their paragraphs. Have they grabbed the reader's attention with a strong lead? Have they clearly explained how climate change will affect the species?
7. Have the students share their paragraphs by reading them aloud to their class.

Reading Standards for Literacy in Science and Technical Subjects 6-12

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| CCSS.RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. |
| CCSS.RST.6-8.2 | Determine the central ideas or conclusions of a text: provide an accurate summary of the text distinct from prior knowledge or opinions. |
| CCSS.RST.6-8.6 | Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. |
| CCSS.RST.6-8.8 | Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. |
| CCSS.RST.6-8.9 | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. |

Reading Standards for Informational Text 6-12(for example, a sixth grade focus)

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| CCSS.RI.6.1 | Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. |
| CCSS.RI.6.2 | Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. |
| CCSS.RI.6.6 | Determine an author's point of view or purpose in a text and explain how it is conveyed in the text. |
| CCSS.RI.6.7 | Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. |
| CCSS.RI.6.8 | Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. |

Writing Standards 6-12 (for example, a sixth grade focus)

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| CCSS.W.6.1 | Write arguments to support claims with clear reasons and relevant evidence. |
| CCSS.W.6.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of a relevant content. |
| CCSS.W.6.4 | Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. |

Language Standards 6-12 (for example, a seventh grade focus)

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| CCSS.W.7.1 | Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. |
| CCSS.W.7.2 | Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. |
| CCSS.W.7.3 | Use knowledge of language and its conventions when writing, speaking, reading or listening. |
| CCSS.W.7.6 | Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. |

Speaking and Listening Standards 6-12 (for example, an eighth grade focus)

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| CCSS.SL.8.1 | Engage effectively in a range of collaborative discussion (one-on-one, in groups, and teacher-led) with diverse partners in grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. |
| CCSS.SL.8.2 | Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation. |
| CCSS.SL.8.4 | Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. |

RESOURCES FOR TEACHERS AND STUDENTS (6-8) FOR ARCTIC INVESTIGATIONS

Changes Ahoof: Could Climate Change Affect Arctic Caribou?

http://forces.si.edu/arctic/pdf/ACT%205_CHANGES%20AHOOF.pdf

Time: One 45-minute period

Summary: Students run a simplified computer model and create board games to explore how climate conditions can affect caribou—the most abundant grazing animal in the Arctic.

2) *March of the Polar Bears: Global Change, Sea Ice, and Wildlife Migration*

http://mynasadata.larc.nasa.gov/lesson-plans/1332-2/?page_id=474?&passid=90

Time: Two 45-minute periods

Summary: Students will use NASA satellite data to study temperature and snow-ice coverage in the South Beaufort Sea, Alaska. The data can be used to correlate with USGS ground tracking of polar bears, and to relate this to global change, sea ice changes, and polar bear migration. The data can be used to draw conclusions surrounding any migration patterns in the region.

GLOBAL CLIMATE (FEEDBACK EFFECTS)

Changing Planet: Thawing Permafrost and Methane (Video)

<http://www.nbclearn.com/changingplanet/cuecard/52627>

Time: 20-25 minutes to watch video and discuss with class

Summary: This video examines the thawing of permafrost due to changes in climate and shows examples of the impacts that warming temperatures have on permafrost in the Arctic, including the release of the greenhouse gas methane. Dramatic results are shown, including sink holes forming on the landscape and beneath buildings, roads, and other infrastructure, causing some communities to relocate.