

### 1.1 Air Quality: More than Meets the Eye

#### [NGSS Disciplinary Core Ideas:](#)

[MS-PS1-4](#)

[MS-ESS3-4](#)

#### [NGSS Science and Engineering Practices:](#)

Asking Questions and Defining Problems

Developing and Using Models

Planning and Carrying Out

Investigations

Analyzing and Interpreting Data

#### [NGSS Crosscutting Concepts:](#)

Patterns

Cause and Effect

Systems and System Models

Stability and Change

#### [Colorado Academic Standards:](#)

6<sup>th</sup> grade Physical Science 1.2

6<sup>th</sup> grade Physical Science 1.3

21st Century Skills and Readiness

Competencies in Science:

- Critical Thinking and Reasoning
- Information Literacy
- Collaboration

### 1.2 Oh No, O<sub>3</sub>zone: “Good Up High, Bad Nearby!”

#### [NGSS Disciplinary Core Ideas:](#)

[MS-PS1-2](#)

[MS-LS2-5](#)

#### [NGSS Science and Engineering Practices:](#)

Asking Questions and Defining Problems

Developing and Using Models

Analyzing and Interpreting Data

Engaging in Argument from Evidence

Obtaining, Evaluating, and Communicating Information

#### [NGSS Crosscutting Concepts:](#)

Patterns

Cause and Effect

Scale, Proportion, and Quantity

Systems and System Models

Stability and Change

#### [Colorado Academic Standards:](#)

6<sup>th</sup> grade Physical Science 1.2

6<sup>th</sup> grade Life Science 2.1

21st Century Skills and Readiness

Competencies in Science:

- Critical Thinking and Reasoning
- Information Literacy
- Collaboration

## Know Your **AQ**: Tracking Air Quality in Colorado

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### 1.3 Sherlock NOx: Solving the Mystery of Unnatural Pollution in Natural Places

#### NGSS Disciplinary Core Ideas:

[MS-LS2-4](#)

[MS-LS2-5](#)

[MS-ESS3-3](#)

#### NGSS Science and Engineering

##### Practices:

Asking Questions and Defining Problems

Analyzing and Interpreting Data

Engaging in Argument from Evidence

Obtaining, Evaluating, and

Communicating Information

##### NGSS Crosscutting Concepts:

Patterns

Cause and Effect

Scale, Proportion, and Quantity

Energy and Matter

Stability and Change

##### Colorado Academic Standards:

6<sup>th</sup> grade Life Science 2.1

6<sup>th</sup> grade Life Science 2.2

8<sup>th</sup> grade Life Science 2.1

21st Century Skills and Readiness

Competencies in Science:

- Critical Thinking and Reasoning
- Information Literacy

### 1.4 Carbon Gases CSI: Mobile Lab, Methane & More

#### NGSS Disciplinary Core Ideas:

[MS-LS2-3](#)

[MS-PS1-1](#)

[MS-ESS3-5](#)

#### NGSS Science and Engineering

##### Practices:

Asking Questions and Defining Problems

Analyzing and Interpreting Data

Engaging in Argument from Evidence

Obtaining, Evaluating, and

Communicating Information

##### NGSS Crosscutting Concepts:

Patterns

Cause and Effect

Scale, Proportion, and Quantity

Energy and Matter

Stability and Change

##### Colorado Academic Standards:

6<sup>th</sup> grade Physical Science 1.2

6<sup>th</sup> grade Life Science 2.2

6<sup>th</sup> grade Earth Science 3.3

21st Century Skills and Readiness

Competencies in Science:

- Critical Thinking and Reasoning
- Information Literacy
- Collaboration

## Know Your AQ: Tracking Air Quality in Colorado

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The “Know Your AQ” learning objectives apply Bloom’s Taxonomy (revised):

- Educational psychologist Benjamin Bloom developed the Bloom’s Taxonomy of Educational Objectives in 1956. During the 1990’s, Lorin Anderson and David Krathwohl, former students of Bloom, led a new group of experts in updating the taxonomy to be relevant to 21st century student learning goals.
- The six educational objectives of *Bloom’s Taxonomy* classify the levels of intellectual behavior important in learning. The objectives are sequential from lower order thinking skills to higher order thinking skills. Each element of the model and its focus from student perspective are:
  1. Remember – *retrieve relevant knowledge from long-term memory*
  2. Understand – *construct meaning from instructional messages, including oral, written and graphic communication*
  3. Apply – *carry out or use a procedure in a given situation*
  4. Analyze – *break material into constituent parts and determine how parts relate to one another and to an overall structure or purpose*
  5. Evaluate – *make judgments based on criteria or standards*
  6. Create – *put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure*

Source: Bloom’s Taxonomy of Educational Objectives (revised):

<http://www.celt.iastate.edu/teaching-resources/effective-practice/revised-blooms-taxonomy/>

[http://epltt.coe.uga.edu/index.php?title=Bloom's\\_Taxonomy](http://epltt.coe.uga.edu/index.php?title=Bloom's_Taxonomy)

The “Know Your AQ” curriculum applies the 5E Instructional Model:

- Biological Sciences Curriculum Study (BSCS) developed the *BSCS 5E Instructional Model* in 1987. The model’s five phases are designed to facilitate the process of conceptual change.
- The use of this model brings coherence to different teaching strategies, provides connections among educational activities, and helps science teachers make decisions about interactions with students.
- Each phase of the model and its purpose from a student perspective are:
  1. Engagement - *students’ prior knowledge accessed and interest engaged in the phenomenon*
  2. Exploration - *students participate in an activity that facilitates conceptual change*
  3. Explanation - *students generate an explanation of the phenomenon*
  4. Elaboration - *students’ understanding of the phenomenon challenged and deepened through new experiences*
  5. Evaluation - *students assess their understanding of the phenomenon*

5E Instructional Model website:

<http://www.bscs.org/bscs-5e-instructional-model>