

# Science Reference Center

## Common Core Curriculum Standards Alignment



This document demonstrates to educators the ways in which *Science Reference Center* can be used to accomplish the curriculum goals set out by the Common Core State Standards for high school students. *Science Reference Center* is designed for a high school audience; therefore, this document will focus on Grades 9-12.

This document illustrates how a Science, English, and/or Mathematics teacher might:

- Interpret the Common Core State Standards.
- Use the Science Reference Center to identify relevant content applicable to a number of Common Core State Standards.
- Use the texts and multimedia available through *Science Reference Center* to develop a curriculum aligned to The Common Core State Standards.

### What is *Science Reference Center*?

- A comprehensive science reference database, with **informational texts** covering applied science, life sciences, physical sciences, and earth & space sciences.
- A completely full-text database that provides content at varying **reading levels, text complexity, and source types** including books, monographs, journals, magazines, encyclopedias, and reference works.
- A **multimedia** resource with over 30,000 images and over 500 videos useful for classroom presentation and instruction.
- A source for **graphs, charts, statistical models, and raw data** which helps develop mathematical skills and comprehension. A tool which guides students through thematically organized search topics to develop **research skills**.

### How do the Common Core State Standards relate to Science?

Common Core State Standards are divided into English Language Arts Standards and Mathematics Standards; however, both sets overlap with science content and processes.

#### **Text Complexity:**

- Read and comprehend text at 9-10 grade level of complexity by grade 10, and 11-12 level of complexity by grade 12.

#### **Text Types:**

- Integrate multiple sources across formats and media types.

#### **Key Ideas and Details:**

- Cite specific evidence to support science analysis.
- Summarize the central ideas of a text.
- Follow multistep procedures for experiments, measurements, and technical tasks.

#### **Craft and Structure:**

- Determine meanings of symbols and terms from context.
- Analyze relationships of key terms.
- Analyze author's purpose for providing explanations, procedures, and experiments.

### **Integration of Knowledge and Ideas:**

- Translate information from words to visuals, and from visuals to words.
- Assess the extent to which evidence in a text supports claims and conclusions.
- Corroborate or challenge conclusions of a text using other sources of information.
- Synthesize information from texts, experiments, simulations, etc. into a coherent understanding; noting and resolving conflicting information.

### **Writing:**

- Writing science arguments.
- Informative writing including scientific procedures and technical processes.
- Research of science literature to build and present knowledge.

### **What is the Common Core?**

Common Core State Standards Initiative developed in 2013 by the National Governor's Association Center for Best Practices and the Council of Chief State Officers:

- Provides a clear set of educational standards for educators
- Outlines major subject areas and skills the student is to develop using the specific curriculum provided at the state level
- Centers around language and mathematical literacy, analysis, and problem-solving
- Applicable across disciplines, including Social Studies and Science
- Requires a significant change in the type of content being read in the classroom
- Presents a heavy shift toward non-fiction reading and analysis in all classrooms

### **Speaking & Listening:**

- Collaborative discussion and summarization of issues and evidence.
- Integration of information from multiple sources.
- Evaluation of credibility and reasoning.
- Presentation of ideas with supporting evidence, reasoning, and appropriate terminology.

### **Mathematics:**

- Use units in problem solving and interpret units from formulas and graphs.
- Create equations in two or more variables to represent relationships between quantities.
- Produce equivalent forms of an expression to reveal properties of the quantity.
- Interpret features of a graph to describe relationships of quantities.
- Estimate and calculate rate of change from functions and graphs.
- Apply concepts of density based on area and volume.
- Summarize, represent, and interpret data and linear models.
- Understand and evaluate random processes underlying statistical experiments.
- Understand the differences among sample surveys, experiments, and observational studies and use appropriately.
- Interpret and develop probability distributions and use probability to evaluate outcomes.

## **How Science Reference Center can help**

### **Text complexity:**

- Identify appropriate text complexity using **Lexile values** available on most content.
- Search result lists can be filtered to a specified text complexity range by using the advanced search feature and choosing a Lexile range, by typing in a specific Lexile value, or by limiting the result list by clicking "Show More" under the "limit to" area of the "Refine Results" tool.

## Text Types:

- Find specific **text types** (called “Source Types” on *Science Reference Center*) by choosing specified Document type(s) and Publication type(s) under the Advanced Search option.
- Result lists can also be limited using the “Source Types” limiter available under the “Refine Results” tool.
- Provides samples of text types and purposes often used for conveying science information. Teachers can use these samples to supplement their explanation of various writing styles, audiences, **text types and writing purposes**.

## Mathematics:

- Provides “real world” examples of the **application of mathematical concepts** in scientific research.
- Search for graphs and charts from any article on the database using The Image Quick View Collection is available through the top tool bar by clicking “Images/Video” under “More.”

## Sample Uses

### 1. Applicable to English and Science classes.

Science draws on past discoveries and research findings. When conducting a new study, scientists must review existing literature on a topic and consolidate that information to set the stage for new research.

**\*\*The Science Feature Area** provides a result list of about 10 articles on a single topic. Note: it changes every couple of weeks.

Ask students to read and review these articles. Students can either discuss the articles in class or write a summary of the information provided in the articles. Depending on the topic or articles chosen, analysis may include debate or comparison of contrasting ideas and data or argumentative writing.

#### Students will practice literacy skills applying to the following standards:

- CCSS.ELA-Literacy.RST.9-10.2, 9-10.9, 9-10.10, 11-12.2, 11-12.7, 11-12.9, 11-12.10
- CCSS.ELA-Literacy.WHST.9-10.1

### 2. Applicable to English, Mathematics, and Science classes.

A fundamental component of science communication is presenting data in a form that is accessible to the reader. This includes translating text into visuals (charts and graphs) and translating statistical values into words.

**\*\* Search for “Charts”** in the *Science Reference Center*. Choose an article that contains charts and graphs. (Example article: 3. *Petroleum*. Use search-string “**AN 84690568**” in the basic search bar)

Ask students to interpret the graphs prior to reading the text. If tables of data are available, ask students to review the data and create their own graphs. Discussions may include recognizing patterns in data, use and limitations of statistics, and instances of bias, skewed data, or multiple interpretations. Have students read the full article following the group discussion; students should compare the interpretation of the author with topics discussed in class and write a review of the author’s conclusions.

#### Students will practice mathematics and literacy skills applying to the following standards:

- CCSS.ELA-Literacy.RST.9-10.7, 9-10.10, 11-12.8, 11-12.10
- CCSS.ELA-Literacy.WHST.9-10.1
- CCSS.Math.Content.HSS-ID.A.1, B.6, C.9

### 3. Applicable to Mathematics and Science Classes.

Rates are used across many science disciplines. Physical science in particular often looks at rates such as speed, power, etc. In biology scientists study population dynamics like birth rates. Students need to know how to calculate rates and interpret them.

\*\*Click on Science experiments in the reference shelf to get a result list of all science experiments in the *Science Reference Center*. By adding the words **and graph** to the searchstring and clicking search, the result list will reduce to a few articles which focus on graphs. (Example article: *Graphing Predictions*. Use search-string “**AN 23902314**” in the basic search bar)

Have students collect data of their own to graph and interpret. Mention that units are very important when comparing values. After comparing calculations and interpretations of data, discuss the difference between correlation and causation, have students identify the relationship between the two variables and determine if it is causation or a correlation.

**Students will practice mathematics skills applying to the following standards:**

- CCSS.Math.Content.HSN-Q.A.1
- CCSS.Math.Content.HSF-IF.B.6
- CCSS.Math.Content.HSF-BF.A.1, A.1c
- CCSS.Math.Content.HSS-ID.C.9