


Slide 1



Science Reference Center

An Introduction

This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries, and the Commonwealth of Pennsylvania, Tom Wolf, Governor. © 2016 Hosted by HSLC

Slide 2

What is Science Reference Center?

- A comprehensive research database that provides access to a multitude of full-text science-oriented content

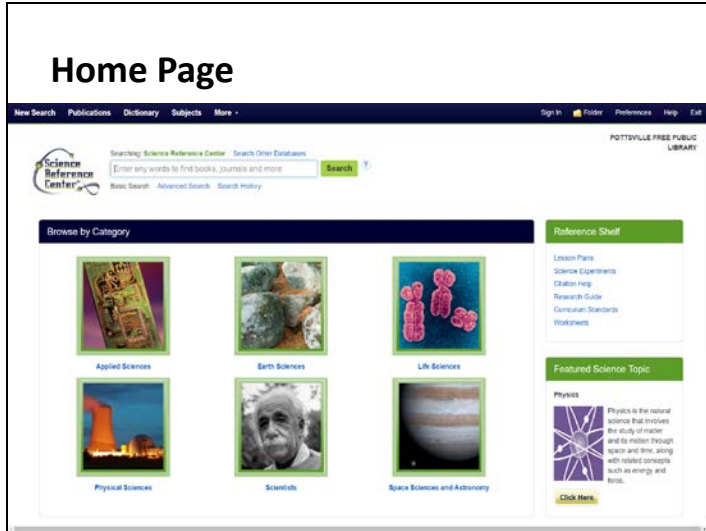
Slide 3

Science Reference Center Contains

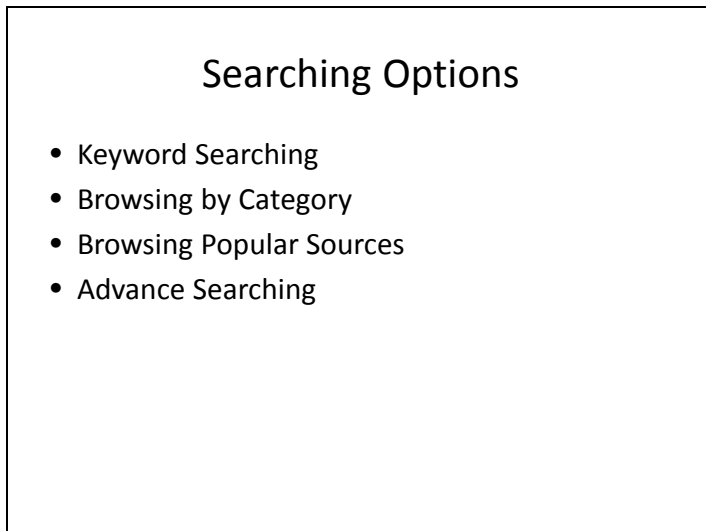
- *Full text science reference books*
- *Full text science encyclopedias*
- *Experiments, activities and science fair projects*
- *Biographies*
- *And more*

POWER Library – Science Reference Center (An Introduction)

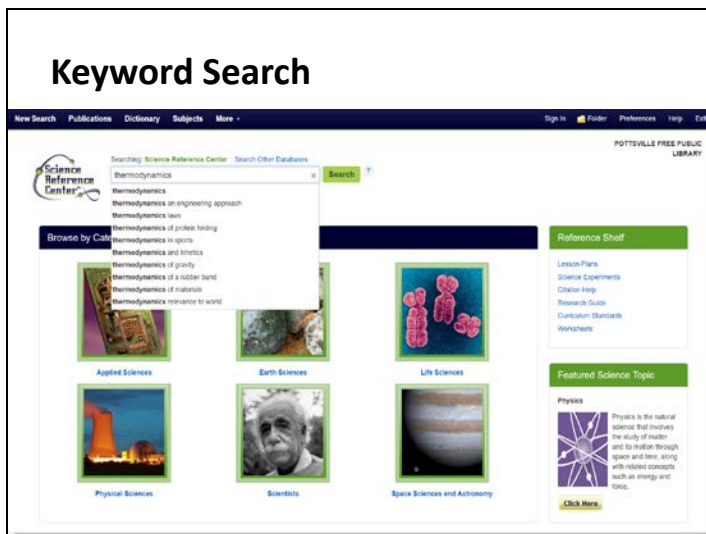
Slide 4



Slide 5



Slide 6



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Slide 7

Results List

Search Results: 1 - 10 of 796

1. Cr(VI) removal from synthetic textile effluent using Tamarindus indica bark: a kinetic and thermodynamic study.
2. Gravty is thermodynamics.
3. How the Second Law of Thermodynamics Has Informed Ecosystem Ecology through Its History.
4. THE LAWS OF HEAT GO SMALL.
5. The Physics of Forgetting: Thermodynamics of Information at IBM 1959-1982.

Slide 8

Search Results Identifiers

Breadbox Result List Sort Page Options Share Related Information

Limiters

Source Types

Slide 9

Relevance

Relevance

Date Newest

Source

Author

Slide 10

Page Options

Page Options

Use this drop-down menu to customize how your result list page is displayed.

Note: The setting currently being used is highlighted with a yellow box.

To set your Page Options:

- Result Format** - Click the select a result list format.
- Image QuickView** - Select whether or not you would like thumbnails of images from your articles to display on the result list.
- Results per page** - Select the number of results per page you would like displayed.
- Page Layout** - Select your desired column layout for the Result List.

Result Format:

Standard Title Only
 Brief Detailed

Image QuickView:

View thumbnails of the images in an article right from the Result List.

On Off

Results per page:

Page Layout:

3 Columns 2 Columns
 2 Columns 1 Column

Slide 11

Share Menu

Share Menu

To use the Share menu:

- Add to folder** - Add all displayed articles to the folder or add the search to the folder as a persistent link to a search.
- Create an alert** - Create a search alert e-mail or an RSS feed right from the Result List, even if you are not signed in to My EBSCOhost.
- Use Permalink** - Highlight the link text and copy using your browser's copy function. You can immediately paste the link into a web site, document or e-mail.
You can also store links to your EBSCOhost pages to social bookmarking sites such as dig, del.icio.us, Technorati, bloglines, etc.
- Export Results** - If enabled by your administrator, click to email a link to download exported results.

Add to folder:

Results (1-10)
 Add search to folder: [global warming](#)

Create an alert:

E-mail Alert RSS Feed

Use Permalink:

Persistent link to search (copy & paste)

Slide 12

Single Result

4. THE LAWS OF HEAT GO SMALL.

By: Grant, Andrew . Science News , 3/19/2016, Vol. 189 Issue 6, p18, 21, 4p, 2 Color Photographs, 2 Diagrams; Reading Level (Lexile): 1250; (AN 113479611)

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Slide 13

Detailed Record

Search: Science Reference Center Search Other Databases
thermodynamics

THE LAWS OF HEAT GO SMALL

Author: Grant, Andrew
Source: Science News, 3/19/2016, Vol. 189 Issue 6, p18-21, 4p, 2 Color Photographs, 2 Diagrams
Document Type: Article
Subject Terms: THERMODYNAMICS
QUANTUM entanglement
PARTICLES
ENTROPY
SECOND law of thermodynamics

Abstract: The article explores thermodynamics in the quantum realm. It hopes to identify violations of thermodynamics' second law by exploiting the way quantum entanglement interacts with the laws of a few particles. However, thermodynamics still rules (degree of order) to well-aged levels of heat, work and entropy. It is suggested that stranger particles someday could break the second law.

Level: 1380
Full Text Word Count: 2027
ISSN: 00368423
Accession Number: 11347611

THE LAWS OF HEAT GO SMALL

Slide 14

HTML Record

Search: Science Reference Center Search Other Databases
thermodynamics

THE LAWS OF HEAT GO SMALL

Database: Science Reference Center

Contents: Lists American Account

Section: Features
Features: Physicists explore thermodynamics in the quantum realm

When French engineer Sadi Carnot calculated the maximum efficiency of a heat engine in 1824, he had no idea what heat was. In those days, engineers thought heat was a fluid called caloric. But Carnot, often accused (in a primer on establishing the second law of thermodynamics, 486) have to know these particulars, because thermodynamics is insensitive to messenger details. Heat flows from hot to cold regardless of whether it consists of a fluid or, as it turns out, the collective motions of trillions of billions of molecules. Thermodynamics, the laws and equations governing energy and its usefulness to do work, concerns itself only with the big picture.

It's a successful approach. As thermodynamics requires, energy is always conserved (the first law), and when it flows from hot to cold it can do work, be it the generation of disorder, or entropy (the second law). These laws dictate everything from the miles per gallon a car engine gets to the battery life of a smartphone. They help physicists better understand black holes and why time moves forward but not backward (SN, 7/25/15, p. 15).

Not the big picture approach, considering the forest rather than the trees, has made physicists wonder if thermodynamics holds at all scales. Would it work if an engine consisted of three molecules rather than the typical trillion trillion? In the realm of the very small, governed by the quirky rules of quantum mechanics, perhaps the thermodynamic code is not so rigid.

"Thermodynamics was designed for big stuff," says Janet Anders, a theoretical physicist at the University of Exeter in England. "We haven't really integrated thermodynamics with quantum mechanics."

Slide 15

PDF View

THE LAWS OF HEAT GO SMALL



THE LAWS OF HEAT GO SMALL

By Andrew Grier

Physicists explore thermodynamics in the quantum realm

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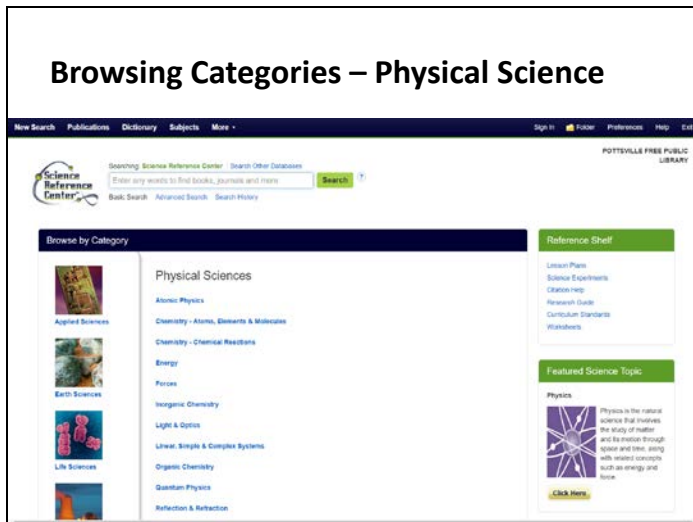
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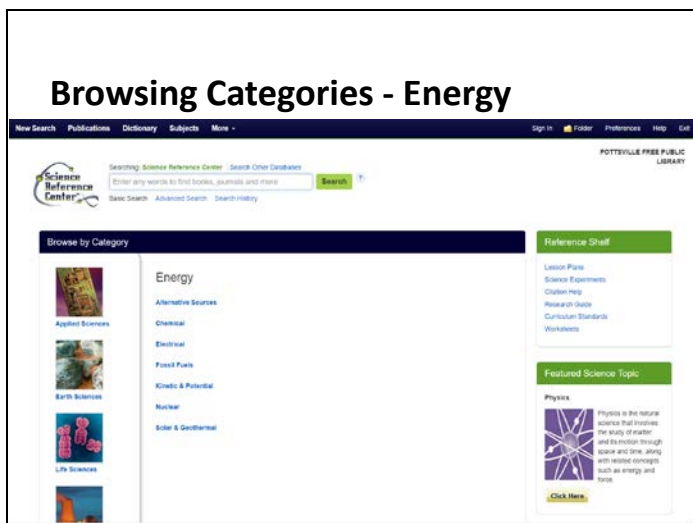
Slide 16



Slide 17



Slide 18



POWER Library – Science Reference Center (An Introduction)

Slide 19

Browsing Categories – Results

Search Results: 1 - 10 of 3,618

- greenhouse goo.**
By: Beth, David. Scientific American, Jul2013, Vol. 308 Issue 1, p26, 61. 1 Color Photograph, 2 Maps. Reading Level (Lexile): 940. (AN 8840483)
[HTML Full Text](#)
- Natural beauty or clean energy?**
By: Pearce, Fred. New Scientist, 4/18/2009, Vol. 202 Issue 2704, p22, 36. 1p. Reading Level (Lexile): 1250. (AN 3698010)
[HTML Full Text](#)
- Our Invisible Energy**
By: Kung'u, Robert. PopularPhoto, Photo: Discover, Aug2010, Vol. 20 Issue 8, p84, 89, 6p. 1 Map. Reading Level (Lexile): 1090. (AN 3396333)
[HTML Full Text](#)
- An Efficient Solution.**
By: JOCHIM, EDENHARD K., Jochen, Edelhard K.. Scientific American, Sep2006, Vol. 295 Issue 3, p84, 87, 4p. 2 Color Photographs. Reading Level (Lexile): 1130. (AN 2184800)
[HTML Full Text](#)
- Toward a solar Civilization.**
By: von Hippel, Frank, Williams, Robert K.. Bulletin of the Atomic Scientists, Oct1977, Vol. 32 Issue 8, p12, 40, 9p. 2 Black and White Photographs, 1 Chart, 2 Diagrams, 2 Captions or Callouts. (AN 2189271)
[PDF Full Text \(if full\)](#)

Slide 20

Browsing Popular Sources

Browse Popular Sources

- Physical Science: Matter & Motion
- Grasslands
- Stars
- 100 REPTILES & AMPHIBIANS
- Endangered Species Handbook

Slide 21

Advanced Search

Search Options

Search Modes and Expanders

Search modes:

- Boolean/Phrase
- Find all my search terms
- Find any of my search terms
- SmartText Searching (beta)

Apply related words

Also search within the full text of the articles

Limit your results

Full Text

Scholarly (Peer Reviewed) Journals

Date of Publication

Publication Type

Lexile Reading Level

Slide 22

Benchmarks

- Benchmarks are a standard or point of reference again which things may be compared or assessed.
- There are 80 benchmarks includes in this resource:
 - Applied (24)
 - Earth and Space (15)
 - Life (14)
 - Mathematics (9)
 - Physical Science (18)

Slide 23

Experiments

- Science experiments can also be located using the Advanced Search
- For example:
 - Type Circulation in the Find Field
 - Select Grades 9-12 in the Lexile Reading Level
 - Select Science Experiment in the Document type

Slide 24

Reference Shelf

Reference Shelf

- [Lesson Plans](#)
- [Science Experiments](#)
- [Citation Help](#)
- [Research Guide](#)
- [Curriculum Standards](#)
- [Worksheets](#)

POWER Library – Science Reference Center (An Introduction)

Slide 25

Lesson Plans

- Clicking on the link in the Reference Shelf will provide links to over 2,013 lesson plans.
- Lesson plans are in PDF format

The screenshot shows a lesson plan for 'Inside a Volcano'. It includes a 'Preparing to Read' section with preview text and 'Sharing Knowledge' activities. The 'Close-Reading Questions' section contains several questions about Sam Cosman's trip. There are also sections for 'What's Online', 'FEATURED VIDEO', 'BONUS VIDEOS', 'BONUS SKILLS SHEETS', and 'KNOW THE NEWS GAME'.

Slide 26

Science Experiments

- View the 1,313 science experiments in one place
- In most cases, these are available in both HTM and PDF format.

Slide 27

Citation Help

The screenshot shows a 'Citation Help' page. It discusses 'Styles of Citation' and lists three common styles: Modern Language Association (MLA), Chicago Manual of Style, and American Psychological Association (APA). It also includes a section for the 'Modern Language Association' and a 'Top of Page' link.

Slide 28

Research Guide

Research Guide Close Window

Guide to Research, Writing and Critical Reading

Science Reference Center provides virtually all the information you will need to effectively conduct research on science topics and write research papers. Because there is a wealth of information contained in this database, this guide is provided to support your research and writing process, helping you to write the best possible paper. The following guides and tools are provided:

- [1. Plagiarism: How to Avoid Common Pitfalls](#)
- [2. A Step-By-Step Approach to Writing Your Research Paper](#)
 - [Step One: Understanding the Scope of Your Assignment](#)
 - [Step Two: Choosing Your Topic](#)
 - [Step Three: Beginning Your Research](#)
 - [Step Four: Taking Notes](#)
 - [Step Five: Sorting Cards and Making a Working Outline](#)
 - [Step Six: Drafting - How to Integrate and Balance Your Paper](#)
 - [Step Seven: Revising](#)
 - [Step Eight: Editing and Proofreading](#)
 - [Creating a Schedule for Your Work](#)
 - [Some General Tips When Writing Your Research Paper](#)
- [3. Worst Case Scenario - My paper is nearly due and I've barely started!](#)
- [4. A Guide To Evaluating Information Sources For Your Research Paper](#)
 - [Information in Print and Online](#)

Slide 29

Curriculum Standards

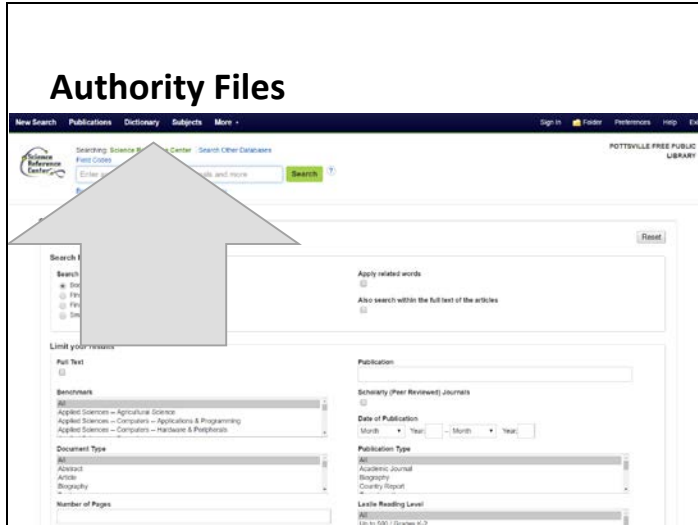
- Contains over 900 standards aligned to the curriculum for specific U.S. States.
- A standard will contain many educational benchmarks that an educator can use to build their lesson plans.
- Opens a module for searching on standard

Slide 30

Worksheets

- Provides a static link for pulling up all the worksheets included with Science Reference Center.

Slide 31



Slide 32

Publications

- This authority file allows you to search for specific publications found in Science Reference Center
- List publications alphabetically
- Provides access to all available volumes and issues of a selected publication

Slide 33

Dictionary

- This link on the top bar provides access into the New Oxford American Dictionary.
- You can browse or enter a keyword for searching.
- Provides definitions and word origins

Slide 34

Subjects

- Use this link to browse the subject terms assigned to all records found in Science Reference Center.
- Items are displayed alphabetically

Slide 35

Images and Video

- This link allows you to search for videos or science images.
- You can refine your results by a specific collection.
