Homepage

Check Out the New Homepage

- Streamlined top level menu for ease of browsing content
- Rotator display of new and highlighted content
- Persistent site search bar
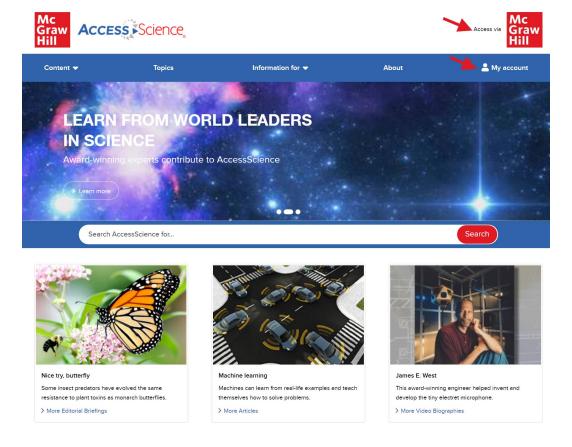- Content blocks emphasizing available content types

Access through your institution

AccessScience is available through institutional subscriptions. A message saying "Access via [Your Institution]" will appear in the top right corner of AccessScience if you have been properly authenticated and the site is recognizing your affiliation.

If you are not sure if your institution subscribes, or are not seeing the access message after authenticating, contact Customer Success for assistance.

My Account

Log in to your personal account, create a new account, or see content saved to your account using the "My Account" button in the site header. See the section on Personal Accounts for more on creating a personal account and available features.
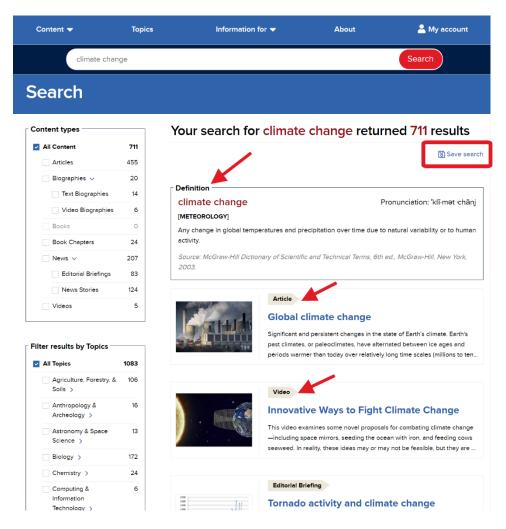
Searching

The general search bar is available in the site header from all AccessScience pages and can be used to search across all content on the site. Boolean search techniques, such as 'AND' 'OR' and 'NOT' are supported.

Search Results

Search results pages on AccessScience are organized by relevancy. A dictionary definition for the search term will appear at the top of the results list when available. Definitions are from the latest edition of the *McGraw-Hill Dictionary of Scientific and Technical Terms.*

Each result item will have a content type label, an image, and a brief description. Click on the item to view the full text.

The Save Search button is available at the top of any results page, allowing you to save the search to your personal account. There are also optional search alerts that can be activated to send an email if new items are added that match the search terms. For more on the personal accounts see the Personal Account section.

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Filtering

From the results page, there are filters available on the left to narrow down results by content type or topic. Use the checkboxes to select or remove filters. The parenthetical number shows how many results from the current results set are tagged to a specific filter.

Filter results by Topics

All Topics	1083
Agriculture, Forestry, & Soils >	106
Anthropology & Archeology >	16
Astronomy & Space Science >	13
Biology >	172
Chemistry >	24
Computing & Information Technology >	6
☑ Earth Science >	333
☑ Ecology & Environmental Science >	203
Engineering & Materials >	76
Food Science & Technology >	15
Forensic Science	2
General Science Concepts	1
Mathematics >	0
Medicine & Health Sciences >	36
Paleontology >	57
Physics >	22
Psychiatry & Psychology >	1
Scientific & Engineering Instruments	0

Content types

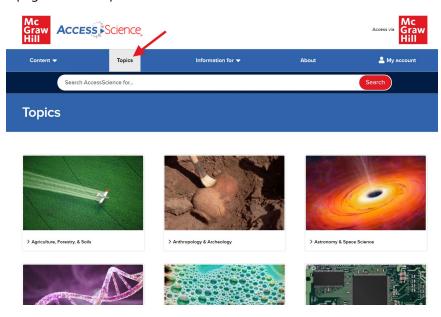| All Content	322
Articles	131
Biographies ⌄	29
Text Biographies	26
Video Biographies	3
Books	1
☑ Book Chapters	143
News ⌄	16
Editorial Briefings	9
News Stories	7
Videos	2

More About Search

The search engine operates by seeking matches with search terms from two distinct types of data pulled from the contents of AccessScience: a layer of semantic metadata associated with each article or other feature, and the exact matches of words or phrases in the text. Semantic matches are those based on the meaning of the search terms and the concepts they describe, allowing the user to find pertinent articles without having to search for all synonyms of a given search term. To supplement these semantic results, the search engine provides all articles and other types of content that contain exact matches to the search terms.
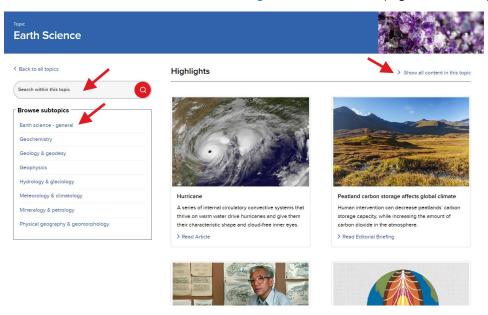
Browsing by Topic or Content Type

Browse by Topic

To browse by topic, select Topic from the top-level menu. This will show the topic browse page, with 18 major topic areas represented by an engaging image. Click on the image or topic name to view the individual browse page for that topic.

On the individual topic page, highlighted content for that topic will be displayed on the right. Click on the link below an item to open that content item.
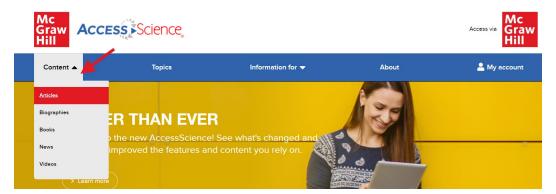
To explore a topic further, use the left menu to browse available subtopics, enter search terms to Search within this topic, or select Show all content in this topic. Each of these options will lead to a results page featuring relevant content. See the section on Searching for more on results pages and filtering.
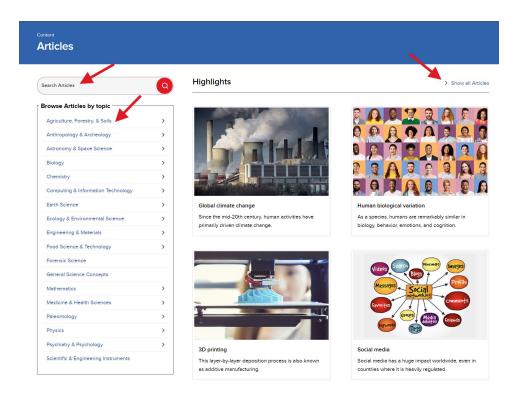
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Browse by Content Type

To browse by content type, select Content from the top-level menu and choose from the available content types in the dropdown menu. The next sections of this guide describe the content types in more detail.

Selecting a content type will lead to a browse page for that content, featuring highlighted content items on the right. Click on the link below an item to open that content item.

To explore a content type further, use the left menu to browse available content by topic, enter search terms to Search within this content type, or select Show all. Each of these options will lead to a results page featuring relevant content. See the section on Searching for more on results pages and filtering.
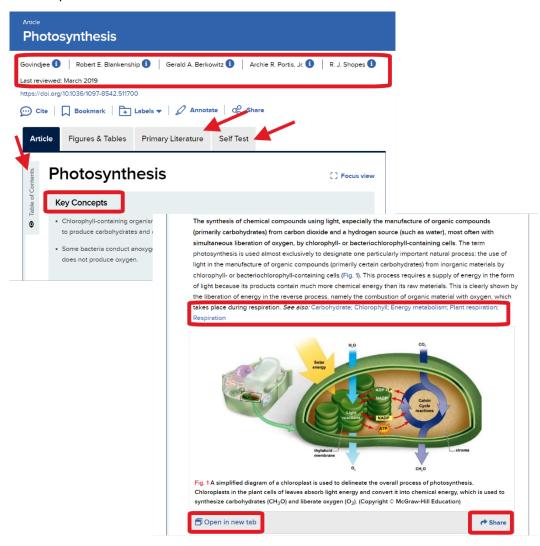
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Content Types

Articles

AccessScience Articles include updated source material from the last edition of the McGraw-Hill Encyclopedia of Science & Technology and previous McGraw-Hill Yearbooks of Science & Technology, including articles exclusive to AccessScience.

Features of articles include:

- Article metadata: expert authors and their affiliations and the date the article was last reviewed.
- Collapsible table of contents and tabs pulling out additional content within articles.
- Figures and graphs with the option to open in a new tab or share a direct link.
- Cross-references to related articles at the end of each paragraph in the article.
- Key Concepts highlighting major points students should be able to identify from the article.
- Self-Test questions to evaluate understanding of the content and encourage critical thinking.
- Related primary literature links to articles from reputable scientific journals to deepen research on a topic.

Article
Photosynthesis

Govindjee | Robert E. Blankenship | Gerald A. Berkowitz | Archie R. Portis, Jr. | R. J. Shopes

Last reviewed: March 2019

https://doi.org/10.1036/1097-8542.511700

Cite | Bookmark | Labels ▾ | Annotate | Share

Article | Figures & Tables | Primary Literature | Self Test

Photosynthesis
[] Focus view

Key Concepts

- Chlorophyll-containing organism to produce carbohydrates and
- Some bacteria conduct anoxyg does not produce oxygen.

The synthesis of chemical compounds using light, especially the manufacture of organic compounds (primarily carbohydrates) from carbon dioxide and a hydrogen source (such as water), most often with simultaneous liberation of oxygen, by chlorophyll- or bacteriochlorophyll-containing cells. The term photosynthesis is used almost exclusively to designate one particularly important natural process: the use of light in the manufacture of organic compounds (primarily certain carbohydrates) from inorganic materials by chlorophyll- or bacteriochlorophyll-containing cells (Fig. 1). This process requires a supply of energy in the form of light because its products contain much more chemical energy than its raw materials. This is clearly shown by the liberation of energy in the reverse process, namely the combustion of organic material with oxygen, which takes place during respiration. *See also:* Carbohydrate; Chlorophyll; Energy metabolism; Plant respiration; Respiration

Fig. 1 A simplified diagram of a chloroplast is used to delineate the overall process of photosynthesis. Chloroplasts in the plant cells of leaves absorb light energy and convert it into chemical energy, which is used to synthesize carbohydrates (CH_2O) and liberate oxygen (O_2). (Copyright © McGraw-Hill Education)
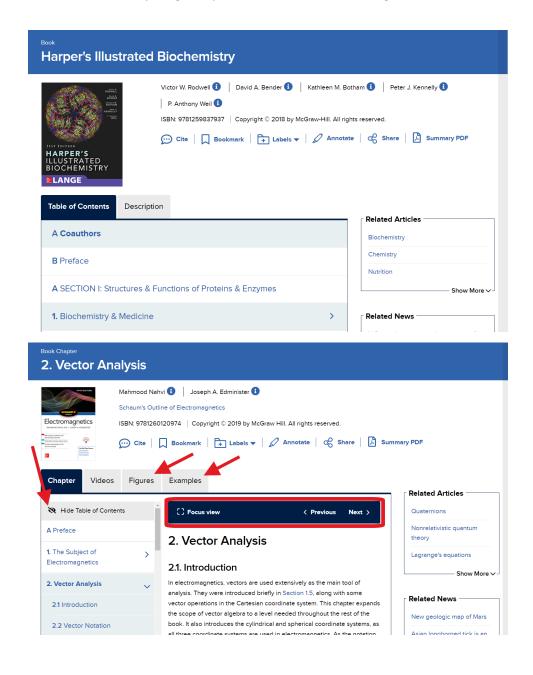
Open in new tab | Share

Books

AccessScience Books include select McGraw Hill college-level science books and Schaum's Outlines available in full for students and teachers alike.

Features of books include:

- Collapsible table of contents and tabs pulling out additional content within chapters.
- Previous and next buttons to move through the chapters.
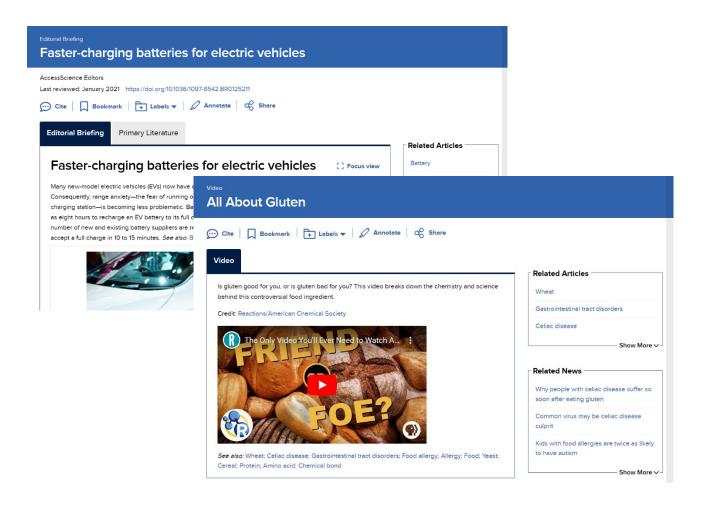- Focus view to hide everything except the text for ease of reading.

News

AccessScience News includes Editorial Briefings, topical overviews of newsworthy subjects, designed to engage and inform, and News Stories, timely stories from Science News with links to relevant AccessScience content.

Biographies

AccessScience Biographies include life histories of well-known scientists from the Hutchinson Dictionary of Scientific Biography, plus video biographies of Franklin Institute Award winners

Videos/Animations

AccessScience Videos/Animations include engaging multimedia selections that bring complex concepts to life. Videos all have closed captioning available and some videos can be downloaded for offline use.

Content Tools

Content tools are available at the top of any content page. Some of the content tools require the creation of a personal account, which is described in the Personal Account section.

- Cite provides a citation for the content item, available in several styles or for download as an RIS file.
- Bookmark saves the item to your list of bookmarks in your personal account.
- Label saves the item to a folder within your personal account.
- Annotate allows highlighting and commenting using the Hypothesis browser plug. See the next section on Annotations for more details.
- Share provides a direct link to the content and the option to share that direct link via social media
- Summary PDF downloads a PDF copy of the content item for offline use.

Related Content

All content pages also include a related content sidebar on the right. This section highlights additional content that is relevant to the content item currently being viewed. The related content is separated by content type, with each content type box having the option to expand and Show More suggestions.

At the bottom of the related content list is a section for Topics which shows the site topics that are tagged to the content item being viewed. These topics are linked so you can launch a search and see all other content on the site tagged to that specific topic.
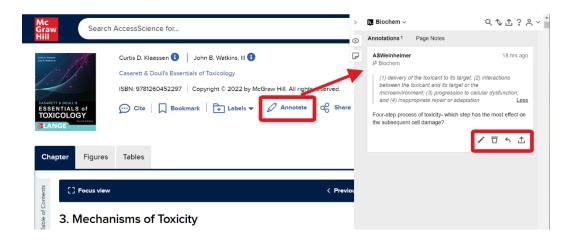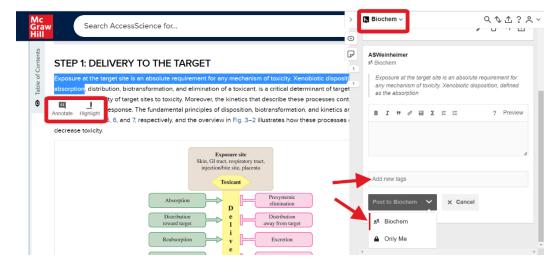
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Annotations

For annotating content on AccessScience, we've teamed up with [Hypothesis](https://hypothes.is), an open-source annotation tool that can be used across any digital resource. Create a free Hypothesis account to save and access annotations in AccessScience and across any other websites you use.

To annotate in AccessScience:

- Click the Annotate button from any content page to open the Hypothesis toolbar.
- Choose a group to share annotations with or save to your personal account.
- Select text quickly highlight or add an annotation.
- Categorize your annotations with tags, edit or delete your annotations, or reply to annotations.
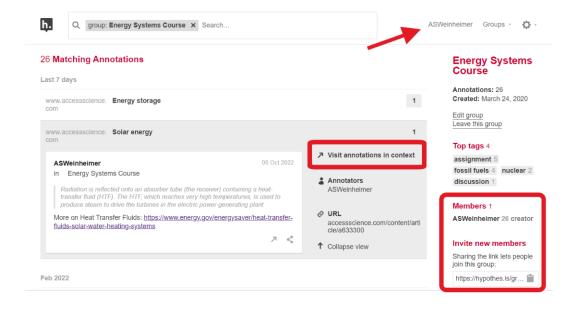
To manage annotations in your Hypothesis account:

- Click on your account to see all your annotations across different resources or groups.
- View annotation content and link to visit in context.
- Display current group members or invite new members with the shareable link.
- Get additional help on using Hypothesis from their FAQs and tutorials.

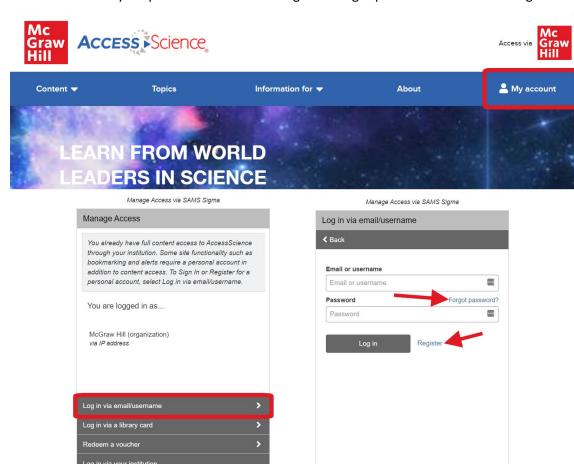**accessscience.com**

Personal Account

AccessScience has several features which are available only after signing up for a free personal account. Personal accounts are an optional feature and are not required to view or use any of the content on the site. Personal accounts do not replace authentication via your institution; you must first be logged in through your institution to use AccessScience.

To register for a free personal account:

- Click on My Account in the top menu to open the Manage Access window, where you will see your subscribing organization information.
- Select log in via email/username.
- Register for an account by entering the required information.
- You can reset your password if needed using the "Forgot password?" link on the login screen.
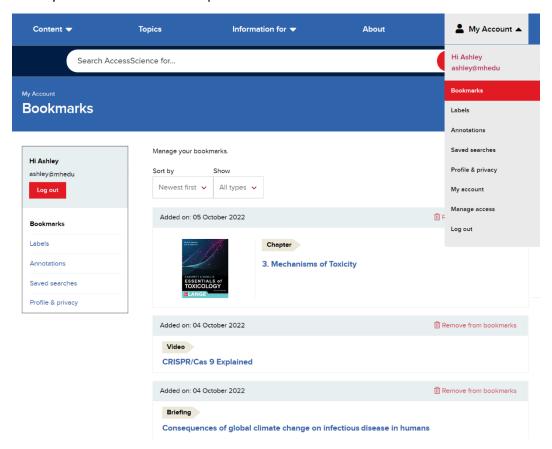
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Personal Account features include:

- Add bookmarks or labels to content to organize and easily retrieve content.
- Save searches and set up email alerts for new content that matches your search terms.
- Select your interests to receive updates when new content is added in those areas.

Support

The Information For option from the top-level menu provides additional resources for Educators and Librarians.

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The Educators page includes:

- Link to a document containing answers to the Self-Test article questions
- Guide to using AccessScience in distance learning
- Recordings of author-led topical webinars

The Librarians page includes:

- Information on setting up Proxy Server access
- Instructions for accessing the SAMS Sigma admin portal for usage statistics and account information
- MARC records
- Site accessibility information
- Promotional materials
- User guides and video tutorials
- Information on upcoming trainings and recordings of previous training sessions and topical webinars

There is also a Help/FAQ page linked in the site footer which contains additional information on using the site and common issues.

Contact Us

For further questions and help, please email **Customer Success** at **McGraw Hill** at **customersuccess@mheducation.com**.