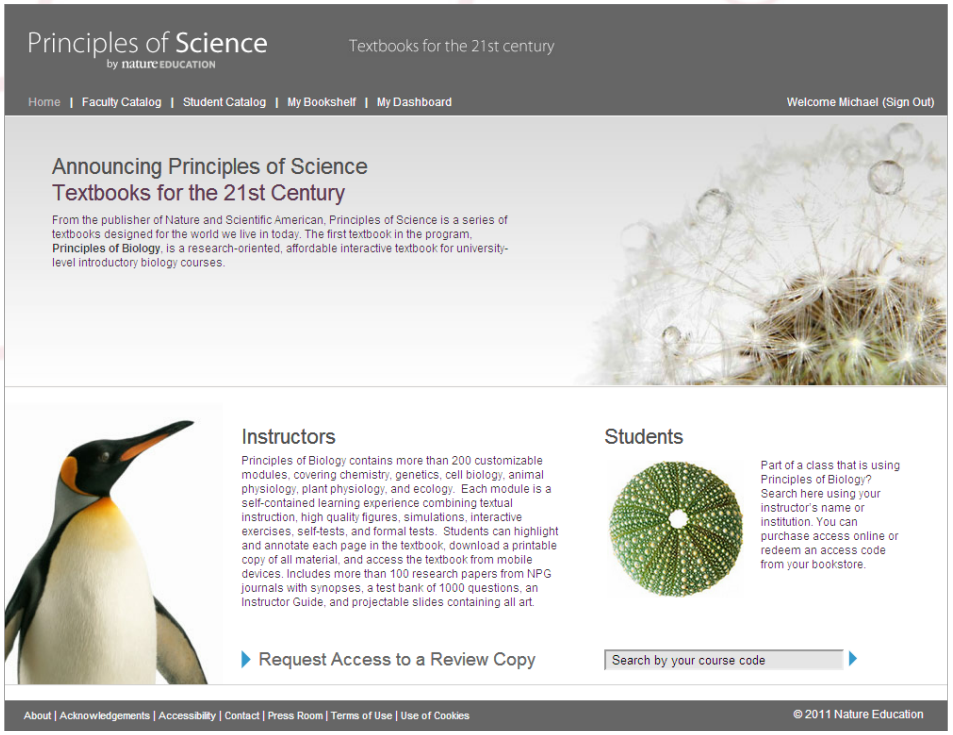
Nature Education

Principles of Science Interactive Textbooks

IDPF Digital Book 2012

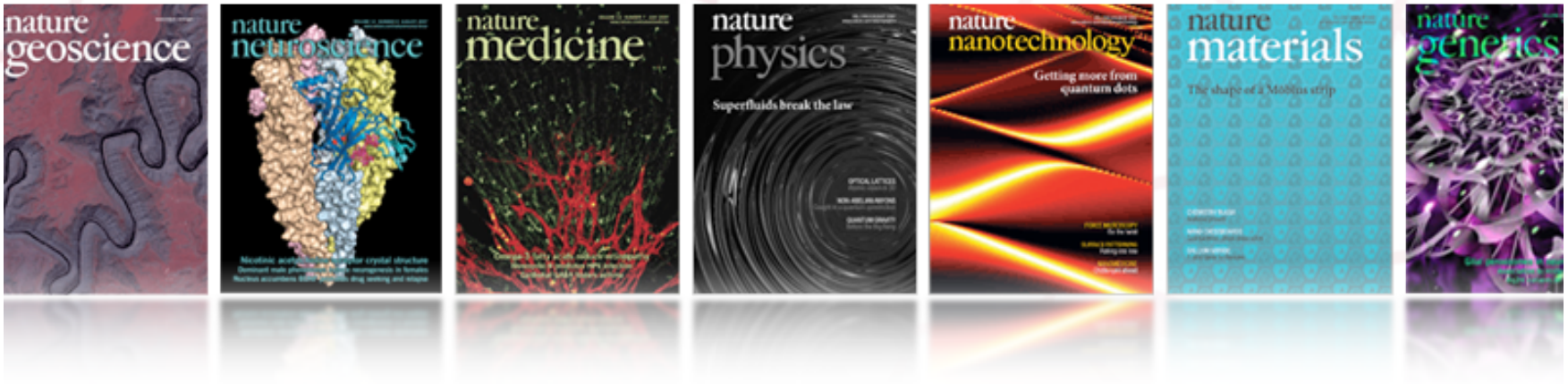


Nature Publishing Group

Division of Macmilllan Publishers Ltd.

60 journals from the flagship *Nature* to research journals such as *Nature Neuroscience* and *Nature Genetics.*

Created education division in 2007



Mission

1. Publish 21st century science textbooks for mature markets

2. Strengthen developing world capacity in science education

Science Publishing for the Developing World: Open Education

Content + tools + community

Supporting formal education systems

Collaboration with UNESCO and other international organizations

UNESCO

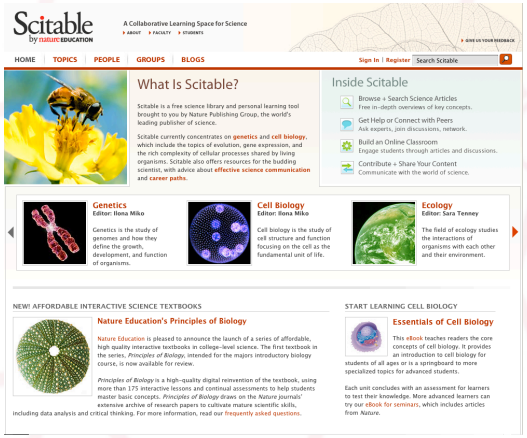
Scitable: A Collaborative Learning Space for Science

Content library with 2000+ standalone instructional pieces in the life sciences.

Community of faculty, students, tutors, scientists, and parents.

Classroom tools including reading lists, discussions, assessments.

Launched in Dec 2008, currently 500,000 users per month, supported by corporate sponsorship



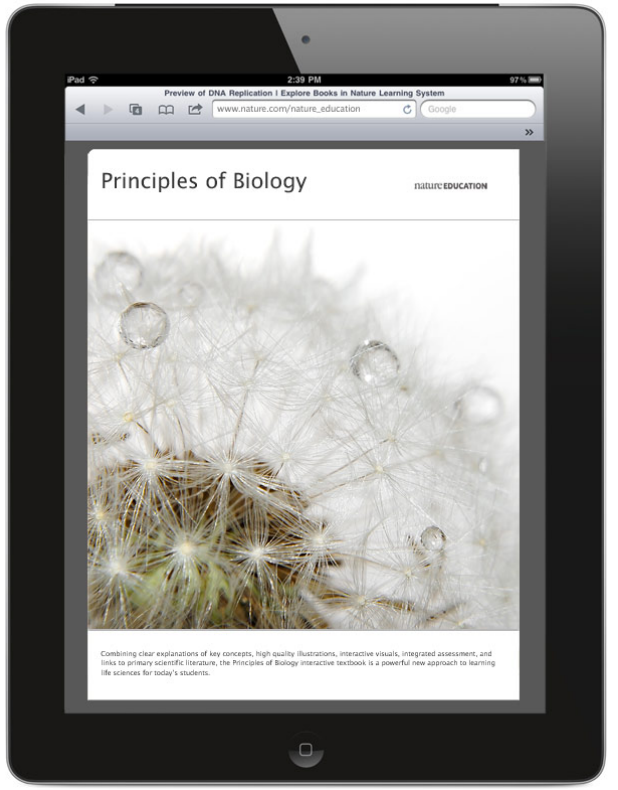
Interactive Textbooks . . . Science Education for Mature Markets

Current challenges of textbook

- Poor sell-thru through apathy
- Complicated user experience
- Cost and difficulty of keeping up with digital innovation
- Lost opportunities for measurable, effective instruction

Textbooks moving forward

- Born digital
- User-friendly
- Skills-oriented
- Affordable



Born Digital

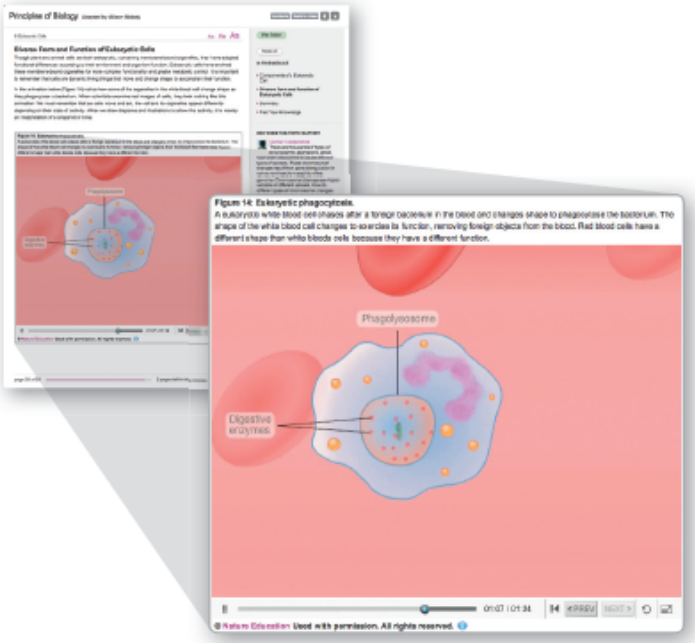
Designed creatively for the special characteristics of digital media

Easy to customize
Multimedia
Interactive
Intertextual
Social
Brief
Adaptive
Flexible

User Friendly

Seamless workflow

Anytime / anywhere

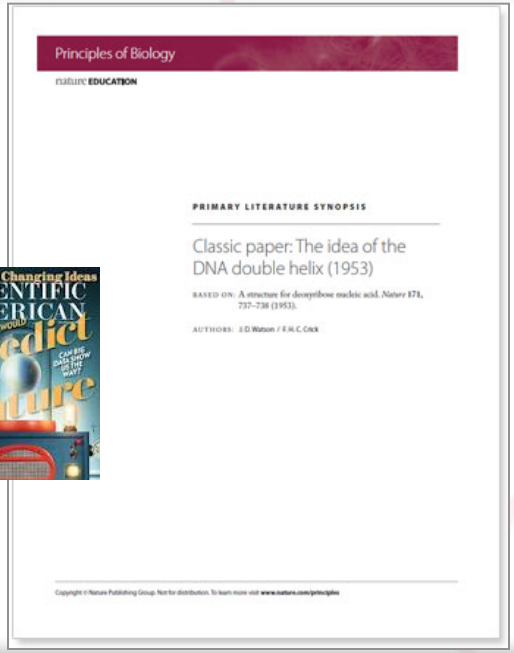


Skills-Oriented

Connected with primary literature and data sets

Active learning

Case-based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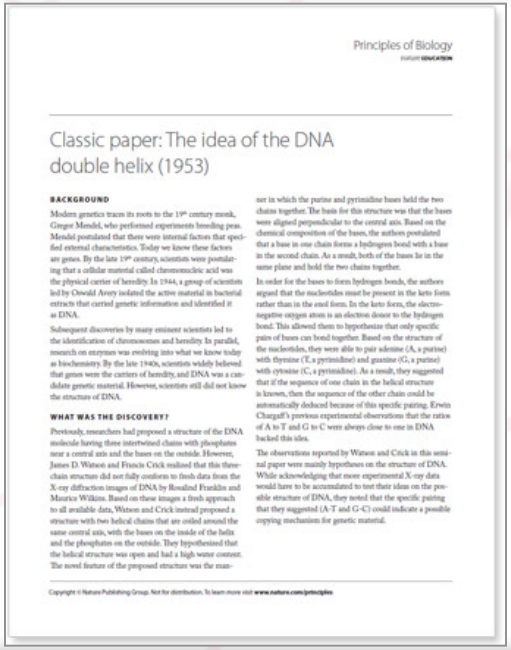
PRIMARY LITERATURE SYNOPSIS

Classic paper: The idea of the DNA double helix (1953)

BASED ON: A structure for deoxyribose nucleic acid. *Nature* **171**, 737–738 (1953).

AUTHORS: J.D. Watson / F.H.C. Crick


Principles of Biology

Classic paper: The idea of the DNA double helix (1953)

BACKGROUND

WHAT WAS THE DISCOVERY?

Affordable

Price that incentivizes sell-thru and disincentivizes piracy

Value-based pricing

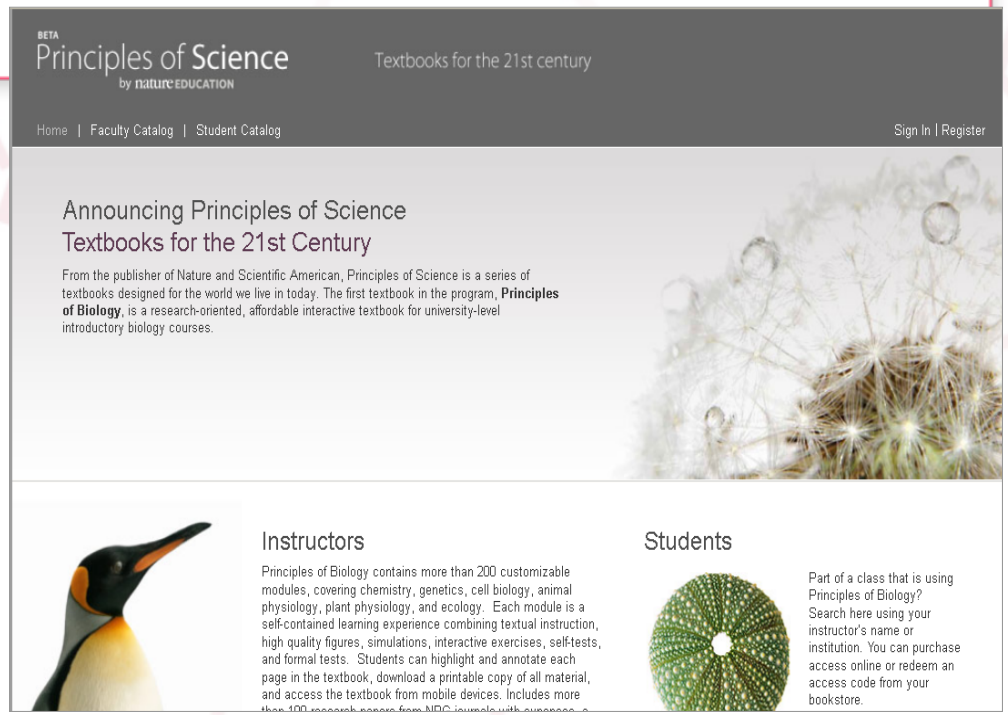
Lifetime access

Principles of Science

Interactive textbooks in the life and physical sciences

First textbook *Principles of Biology*, $49

100+ adoptions in Y1



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Contents

Understanding Hydrogen Ions

Most people recognize water as a neutral substance. Yet water can dissociate into ions that lead to the formation of acidic and basic solutions. Water, a polar covalent compound, consists of two hydrogen atoms and one oxygen atom. Each water molecule dissociates into two ions — a hydrogen-oxygen pair and a single hydrogen ion, or proton (Figure 1). The hydrogen-oxygen pair has a stronger electronegativity than the single hydrogen atom and therefore steals the electron from the single hydrogen, forming a **hydroxide ion** [OH^-]. The free **hydrogen ion** [H^+] rarely occurs by itself in nature. In most cases, it combines with another water molecule to form a **hydronium ion** [H_3O^+].

Test Yourself

Describe what happens when a water molecule dissociates.

Submit

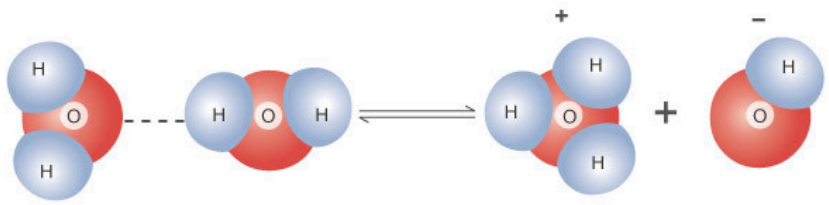

Figure 1: Dissociation of water.
Water dissociates into a hydronium ion and a hydroxide ion.

All scientists use the same system to measure acids and bases.

What makes a solution acidic or basic? In pure water, the concentration of hydrogen ions (protons) and hydroxide ions is the same, approximately 10^{-7} molar (or moles/L). The product of the concentrations of these two ions is 10^{-14} molar. This product remains constant such that if the concentration of hydrogen ions increases, the concentration of hydroxide ions must decrease. The amount of change in ion concentrations is

Notes on

IN THIS MODULE

- Understanding Hydrogen Ions
- The Effect of Changes in Acidity on Living Things
- Ocean Buffering System
- Summary
- Test Your Knowledge

WHY DOES THIS TOPIC MATTER?

The Climate Connection
How is life on Earth reacting to climate change?

A Sea of Microbes Drives Global Change
Do floating microbes in the ocean's surface waters play an outsize role in global climate?

PRIMARY LITERATURE

How elevated carbon dioxide levels affect coral reefs
Coral reefs are challenged by an increasingly more acidic environment due to elevated carbon dioxide levels in the water, accelerating the growth of macroalgae and seagrass, which alters the dynamics of the ecosystem
View | Download

The next generation of pipetting uses tiny droplet-making machines
An ingenious droplet-based microfluidic device, a type of "lab-on-a-chip," promises to replace not only the conventional pipette for making large-scale serial dilutions in chemistry and biological applications, but also robotic-based approaches.
View | Download

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PRIMARY LITERATURE SYNOPSIS

Manmade leaves may solve energy crisis

BASED ON: A renewable amine for photochemical reduction of CO_2. *Nature Chemistry* **3,** 301–303 (2011). doi:10.1038/nchem.1000

AUTHORS: Robert D. Richardson / Edward J. Holland / Barry K. Carpenter

Test Your Knowledge

1. An unidentified lipid is placed in front of you. It is liquid at room temperature. With this basic information, how was this lipid produced?

   - By a plant
   - By a mammal
   - In the human liver
   - By the bonding of a carboxyl functional group with glycerol
   - None of the above

2. What characteristic of lipids accounts for the separation of oil into droplets in salad dressing even after shaking?

   - Lipids combine with functional groups.
   - Lipids form ester links.
   - Lipids form double bonds between the carbon atoms on the fatty acid.
   - Lipids are hydrophobic.
   - Lipids are hydrophilic.

3. What materials can pass easily through a phospholipid bilayer?

   - Carbon dioxide
   - Glucose
   - Water
   - Sodium ion
   - All of the above

Principles of Science

Introductory Biology Sample Classroom

Nature Publishing Group | Nature Education

Welcome Michael (Sign Out)

Main | Textbook | Assignments | Discussions | **Gradebook** | Teaching Resources | Help

Gradebook

Download as Excel

Display Options

Show scores (•) as points ( ) as % Calculate total from Last Score

Student	HIDE MODULE NAMES	Module 1 (7) Evolution and Life on Earth	Module 2 (5) Energy and Matter	Module 3 (5) Biological Information and	Module 4 (5) Practicing Science	Module 5 (5) Atoms, Elements, and	Grade to Date
				SHOW DUE DATES			
Walrath	Cassie	7	4	4	5	3	51%
Purdy	Katherine	7	5	5	5	5	87%
Cholhan	Remy	7	5	5	4	4	79%
Mason	Kevin	7	5	5	5	5	89%
Shields	Jennifer	7	5	5		5	89%
Bates	Jamie	7	5	5	3	4	55%
Hartle	Matthew	5	5				83%
Class Average		81%	91%	83%	78%	85%	
Site Average		81%	89%	82%	77%	86%	


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9:41 AM
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www.nature.com/princi...
Google
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Textbooks for the 21st century
Announcing Principles of Science
Textbooks for the 21st Century
From the publisher of Nature and Scientific American, Principles of Science is a series of textbooks designed for the world we live in today. The first textbook in the program, Principles of Biology, is a research-oriented, affordable interactive textbook for university-level introductory biology courses.
Instructors
Principles of Biology contains more than 200 customizable modules, covering chemistry, genetics, cell biology, animal physiology, plant physiology, and ecology. Each module is a self-contained learning experience combining textual instruction, high quality figures, simulations, interactive exercises, self-tests, and formal tests.
Students can highlight and annotate each page in the textbook, download a printable copy of all material and access the textbook from mobile devices.
Includes more than 100 research papers from NPG journals with synopses, a test bank of 1100 questions, an instructor Guide, and projectable slides containing all art.
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Case Study: Mobility

Apps are exciting . . . But a challenge for long-term supportability

Browser-based access is a wiser strategy

Solve crucial technical and content management challenges:

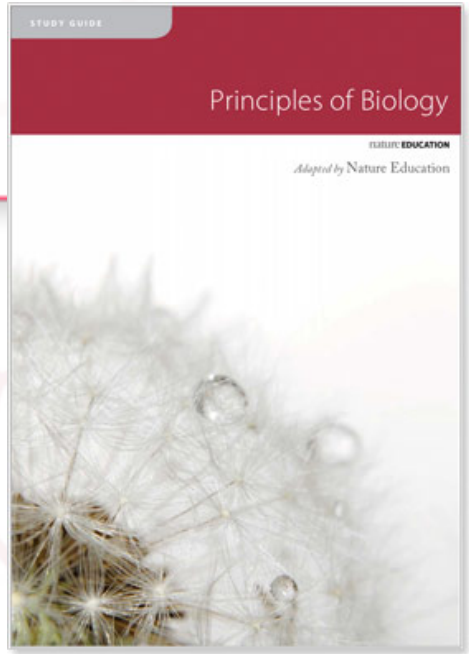
- Automatic transcoding of media / resizing of images
- Multiple HTML versions for different form factors
- Synch information across multiple formats
- Maximize aggregate SEO value

Case Study: DRM

Don't penalize "virtuous" students because of rule-breakers

Build essential value into full online access

Make it difficult to easily pirate whole books



Distribution

Familiar to customers
- Bookstores
- E-commerce
- But not Amazon or Apple

New to customers
- Site licenses

Questions?