From OpenCourseWare to Open Education

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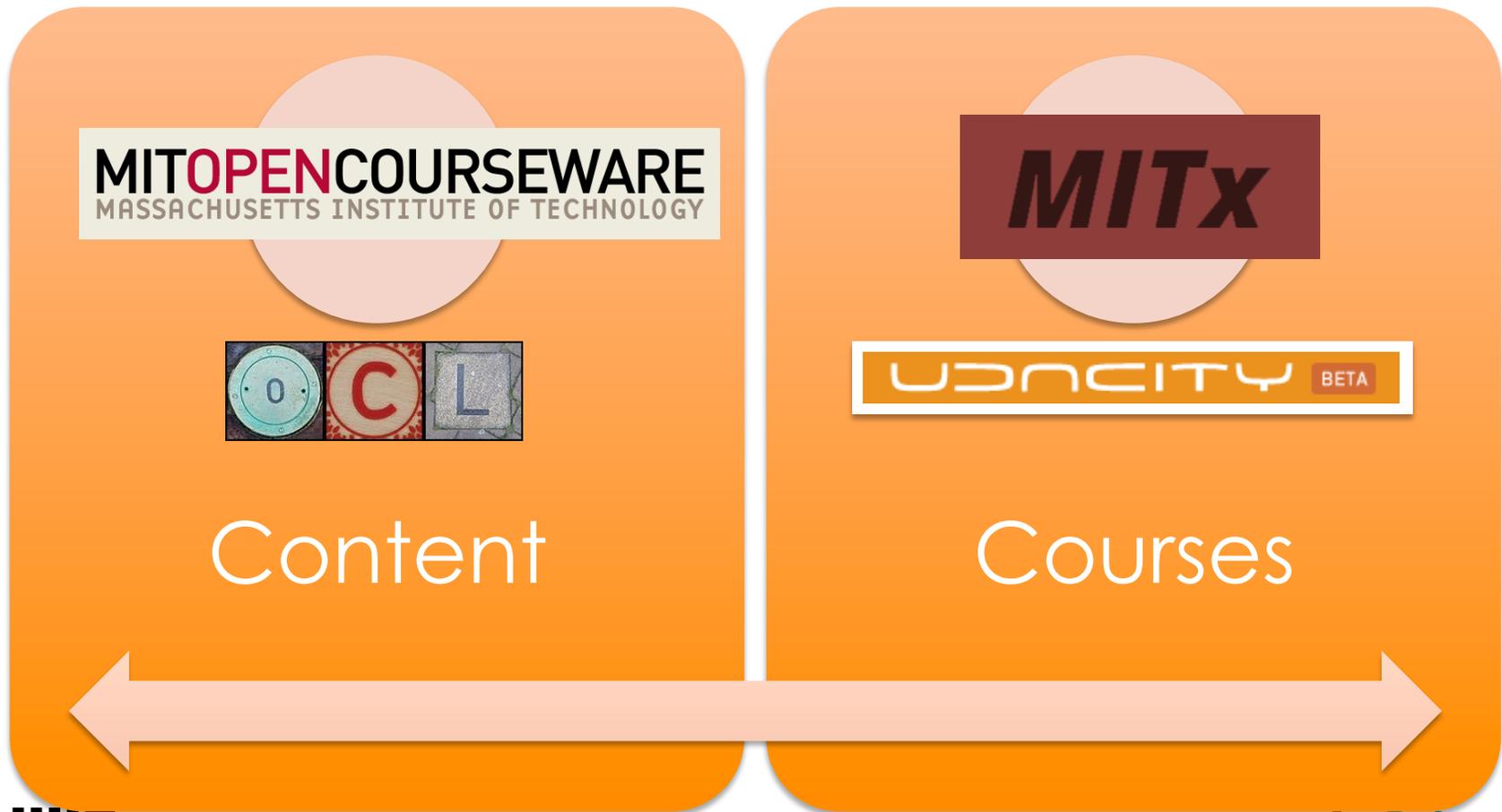
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Outline

- **More educational resources**

  - Open Course Library, Saylor.org, MITx

- **Content -> Courses**

- **Opportunities**

Innovations in Open Education

MITOPENCOURSEWARE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

O C L

Content

MITx

UDACITY BETA

Courses

Massachusetts Institute of Technology

OEIT

Comparing Content to Courses

Content (Materials)

- **Lecture notes & videos**
- **Syllabi**
- Textbooks

- No grade / certificate

Courses

- Complete learning experience
- Online homework & exams
- Discussion forums

- Grade / certificate

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Washington's Open Course Library

A collection of openly licensed (CC-BY educational materials for 81 high-enroll college courses

Project Goals:

1. Lower textbook costs for studer
2. Improve course completion rate
3. Provide new resources for faculty

Haitian Universities could do something similar. Collaborate to develop course materials in Kreyól to be shared.

Please visit: http://opencourselibrary.org

Open Course Library Phase I – Available Now

- Principles of Accounting I
- Principles of Accounting II
- Cultural Anthropology
- Physical Anthropology
- Art Appreciation
- General Biology with Lab
- Human Anatomy and Physiology 1
- Human Anatomy and Physiology 2
- Introduction To Business
- General Chemistry with Lab I
- General Chemistry with Lab II
- General Chemistry with Lab III
- Introduction to Chemistry (Inorganic)
- Public Speaking

- Macroeconomics
- Microeconomics
- Pre-College English
- English Composition I
- English Composition II
- Introduction To Literature I
- Technical Writing
- Introduction to Physical Geology
- US History I
- US History II
- US History III
- Research for the 21st Century
- Elementary Algebra
- Intermediate Algebra
- Calculus I
- Calculus II
- Calculus III

- Introduction to Statistics
- Precalculus I
- Precalculus II
- Music Appreciation
- Introduction To Oceanography
- Introduction To Logic
- Introduction To Philosophy
- Engineering Physics I
- General Psychology
- Lifespan Psychology
- Try College / College Success Course

Open Course Library Phase II – Available 2013

- Principles of Accounting III
- Survey of Anthropology
- American Sign Language I
- American Sign Language II
- American Sign Language III
- Introduction To Astronomy
- Microbiology
- Survey of Biology
- Majors Biology - 1st in series
- Majors Biology - 2nd in series
- Majors Biology - 3rd in series
- Business Law
- Introduction To Communication
- Introduction To Mass Media

- Interpersonal Communication
- Small Group Communication
- Intro to Drama
- American Literature I
- Survey of Environmental Science (no lab)
- French I
- French II
- French III
- Western Civilization I
- World Civilizations I
- Women in US History
- Pacific NW History
- Health for Adult Living
- Intro to Humanities
- Math in Society
- Business Calculus

- Nutrition
- Physics: Non Science Majors
- Introduction To Political Science
- American Government
- Abnormal Psychology
- Introduction To Sociology
- Social Problems
- Spanish I
- Spanish II
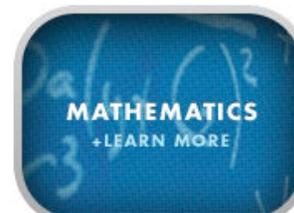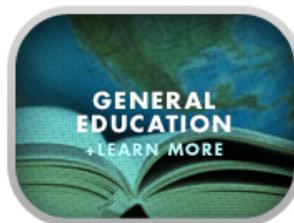- Spanish III

Extending Open Content

- **Content: A portion of a course, the materials in a course**

- **Open (Creative Commons License) enables others to build upon the content**

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8

HARNESSING TECHNOLOGY TO MAKE EDUCATION FREE

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| Search | f | t | 8+ | You Tube |

Saylor.org is a free and open collection of college level courses. There are no registrations or fees required to take our courses, and you will earn a certificate upon completion of each course. Because we are not accredited, you will not earn a college degree or diploma; however, our team of experienced college professors has designed each course so you will be able to achieve the same learning objectives as students enrolled in traditional colleges. More Information ▸

To take a course, select an area of study.

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+LEARN MORE

BIOLOGY
+LEARN MORE

BUSINESS ADMINISTRATION
+LEARN MORE

CHEMISTRY
+LEARN MORE

COMPUTER SCIENCE
+LEARN MORE

ECONOMICS
+LEARN MORE

ENGLISH LITERATURE
+LEARN MORE

HISTORY
+LEARN MORE

MATHEMATICS
+LEARN MORE

Foundational Material

● MA001: Beginning Algebra **(100%)** Ⓔ

◑ MA003: Precalculus II **(99%)** Ⓔ

● MA005: Calculus I **(100%)** Ⓔ

Core Program

● MA101: Single-Variable Calculus I **(100%)** Ⓔ

● MA102: Single-Variable Calculus II **(100%)** Ⓔ

● MA103: Multivariable Calculus **(100%)** Ⓔ

○ MA111: Introduction to Mathematical Reasoning **(0%)**

● MA211: Linear Algebra **(100%)** Ⓔ

◑ MA221: Differential Equations **(99%)**

● MA231: Abstract Algebra I **(100%)** Ⓔ

● MA241: Real Analysis I **(100%)** Ⓔ

◑ MA302/CS101: Introduction to Computer Science I **(98%)** Ⓔ

Advanced Mathematics

● MA212: Linear Algebra II **(100%)** Ⓔ

○ MA213: Numerical Analysis **(0%)**

● MA222: Introduction to Partial Differential Equations **(100%)**

● MA232: Abstract Algebra II **(100%)** Ⓔ

○ MA233: Elementary Number Theory **(0%)**

○ MA242: Real Analysis II **(0%)**

◑ MA243: Complex Analysis **(98%)**

● MA252: Introduction to Probability Theory **(100%)** Ⓔ

Course Completeness Legend

○ Not yet developed

◑ Partially developed

● Completed

Ⓥ Course has alternate versions

Ⓔ Course has a final exam

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✓ **Questions? Consult the FAQ's!**

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▸ Final Exam

We still need...
▸ Web Media

Legend

❓ Course Question & Answer

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99% **Precalculus II**

Precalculus II continues the in-depth study of functions addressed in Precalculus I by adding the trigonometric functions to your function toolkit. In this course, you will cover families of trigonometric functions, as well as their inverses, properties, graphs, and applications. Additionally, you will study trigonometric equations and identities, the laws of sines and cosines, polar coordinates and graphs, parametric equations and elementary vector operations.

You might be curious how the study of trigonometry, or "trig," as it is more often referred to, came about and why it is important to your studies still. Trigonometry, from the Greek for "triangle measure," studies the relationships between the angles of a triangle and its sides and defines the trigonometric functions used to describe those relationships. Trigonometric functions are particularly useful when describing cyclical phenomena and have applications in numerous fields, including astronomy, navigation, music theory, physics, chemistry, and—perhaps most importantly, to the mathematics student—calculus.

In this course, you will begin by establishing the definitions of the basic trig functions and exploring their properties and then proceed to use the basic definitions of the functions to study the properties of their graphs, including domain and range, and to define the inverses of these functions and establish properties of these. Through the language of transformation, you will explore the ideas of period and amplitude and learn how these graphical differences relate to algebraic changes in the function formulas. You will also learn to solve equations, prove identities using the trig functions, and study several applications of these functions

Learning Outcomes

Course Overview

Unit 1 **Unit 2** **Unit 3** **Unit 4** **All Units**

Unit Outline

Unit 1: Trigonometric Functions of Angles

Imagine standing some distance from a building and trying to guess at its height. With some simple measurements and the tools you learn in this unit, you will be able to find the height of the building precisely. This is one of the many application problems you will be able to solve after your study of trigonometry.

In this unit, you will explore the properties of circles and use those properties to investigate angles within the circle. In particular, you will begin with a new definition of angle measure related to arc length in a circle. A review of the equation for a circle with radius r leads to a definition of the sine and cosine functions, and you will use these to define the remaining trigonometric functions and explore their basic properties and identities. These definitions will be used to derive similar definitions for right triangle trigonometry, which is precisely the tool needed to solve problems like the one mentioned above.

Unit 1 Time Advisory show

Unit 1 Learning Outcomes show

1.1 Circles
▸ Reading: Lippman and Rasmussen's Precalculus: An Investigation of Functions: "Chapter 5: Trigonometric Angles of Functions"

1.1.1 The Pythagorean Theorem

Note: This topic is covered in the reading under subunit 1.1. To learn about the Pythagorean Theorem please focus on the material on page 297.

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▸ Final Exam

We still need...
▸ Web Media

Legend
❓ Course Question & Answer

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EXPAND ALL

Assessments

▾ 1.2.5 Assessment: Washington State Board for Community and Technical Colleges' "Chapter 5 Quiz 1"

Link: Washington State Board for Community and Technical Colleges' "Chapter 5 Quiz 1" (PDF)

Instructions: This assessment covers subunits 1.1.and 1.2. Complete this quiz after you have worked through the readings, web media, and assignments for subunits 1.1 and 1.2.

See a broken link? Please let us know!

▸ 1.3.4 Assessment: Washington State Board for Community and Technical Colleges' "Chapter 5 Quiz 2"

▸ 1.4.3 Assessment: Washington State Board for Community and Technical Colleges' "Chapter 5 Quiz 3"

▸ 1.5.3 Assessment: Washington State Board of Community and Technical Colleges' "Chapter 5 Quiz 4"

▸ Assessment: Washington State Board for Community and Technical Colleges' "Chapter 5 Exam 1a"

▸ 2.1.5.3 Assessment: Washington State Board for Community and Technical Colleges' "Chapter 6 Quiz 5"

▸ 2.2.4 Assessment: Washington State Board for Community and Technical Colleges' "Chapter 6 Quiz 6"

▸ 2.5.2 Assessment: Washington State Board of Community and Technical Colleges' "Chapter 6 Quiz 7"

Credit: Saylor Foundation, CC BY

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MA003 Final Exam

Review of attempt 1

Finish review

Started on	Tuesday, March 27, 2012, 08:00 PM
Completed on	Tuesday, March 27, 2012, 08:02 PM
Time taken	2 mins 8 secs
Marks	1/50
Grade	0.2 out of a maximum of 10 (2%)

1

Marks: 1

If $\sin\theta = \frac{4}{5}$, find (i) $\cos\theta$ and (ii) $\tan\theta$.

Choose one answer.

- A. $\cos\theta = -\frac{3}{5}, \tan\theta = -\frac{4}{3}$
- B. $\cos\theta = \frac{3}{5}, \tan\theta = \frac{4}{3}$
- C. $\cos\theta = -\frac{3}{4}, \tan\theta = -\frac{3}{5}$
- D. $\cos\theta = \frac{3}{4}, \tan\theta = \frac{3}{5}$

Incorrect

Marks for this submission: 0/1.

2

Marks: 1

Find the reference angle for an angle of measure $\frac{13}{5}\pi$.

Choose one answer.

- A. $-\frac{3}{5}\pi$
- B. $\frac{3}{5}\pi$ ✔
- C. $\frac{13}{5}\pi$
- D. $-\frac{13}{5}\pi$

Correct

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MITx   Log In
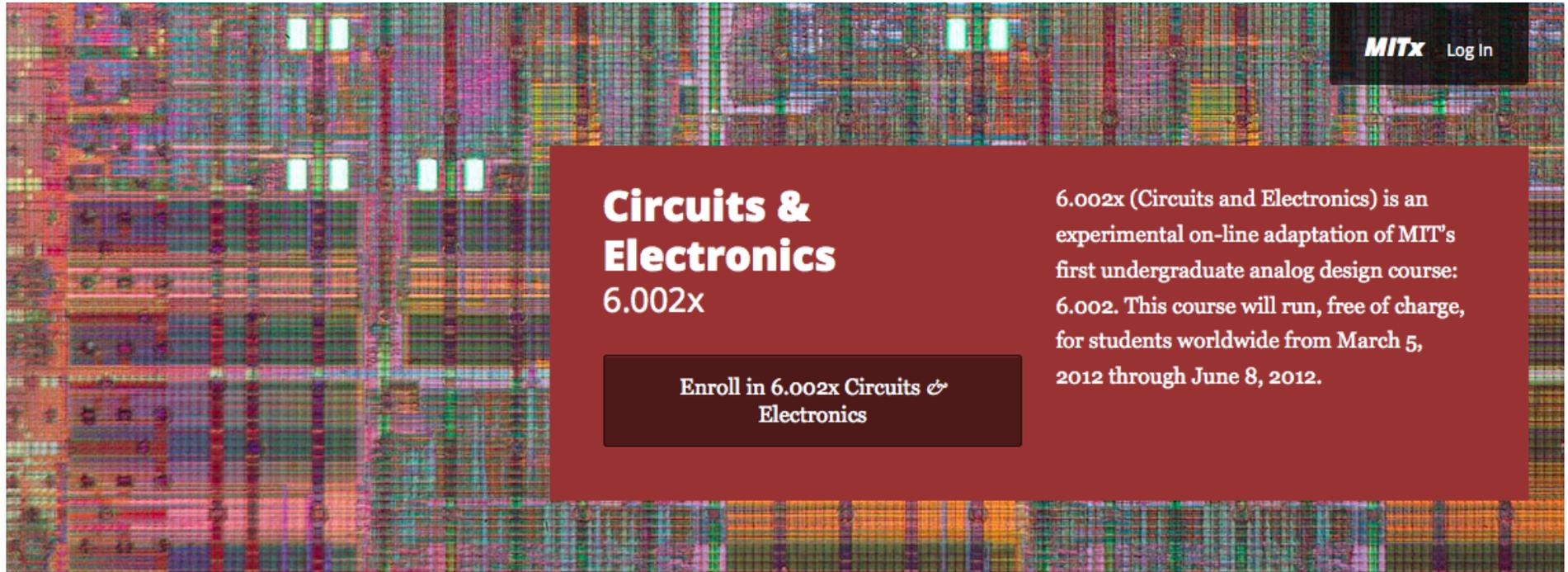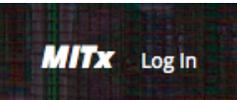
Circuits & Electronics
6.002x

Enroll in 6.002x Circuits & Electronics

6.002x (Circuits and Electronics) is an experimental on-line adaptation of MIT's first undergraduate analog design course: 6.002. This course will run, free of charge, for students worldwide from March 5, 2012 through June 8, 2012.

About 6.002x

6.002x (Circuits and Electronics) is designed to serve as a first course in an undergraduate electrical engineering (EE), or electrical engineering and computer science (EECS) curriculum. At MIT, 6.002 is in the core of department subjects required for all undergraduates in EECS.

The course introduces engineering in the context of the lumped circuit abstraction.

6.002x on *MITx*

If you successfully complete the course, you will receive an electronic certificate of accomplishment from *MITx*. This certificate will indicate that you earned it from *MITx's* pilot course. In this prototype version, *MITx* will not require that you be tested in a testing center or otherwise have your identity certified in order to receive this certificate.

The course uses the textbook Foundations of

ABOUT THE COURSE STAFF

Anant Agarwal

Director of MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) and a professor of the Electrical Engineering and Computer Science department at MIT. His research focus is in parallel computer architectures and cloud software systems, and he is a founder of several

MITx · **Circuits and Electronics**

Courseware | **Course Info** | **Textbook** | **Discussion** | **Wiki** | **Profile**

Courseware Index

S1V12: Lumped Element Abstraction
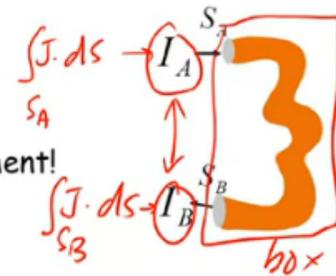
SPEAKER 1: OK, so let me give you the trick.

How do we become unstuck?
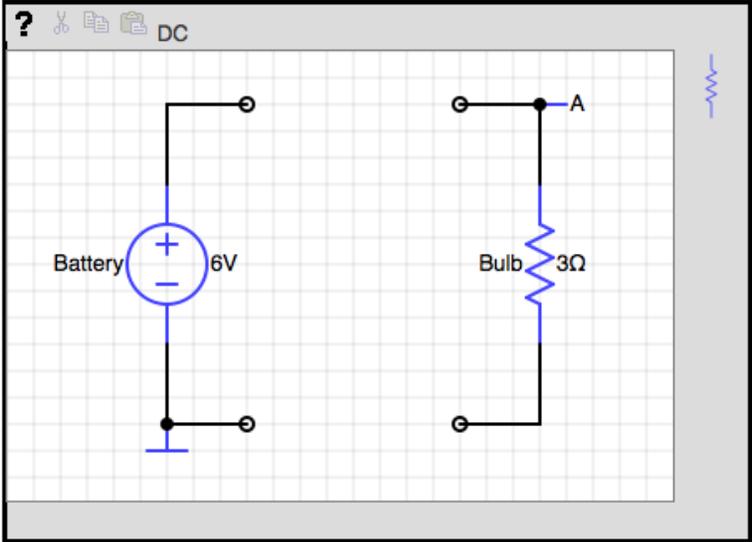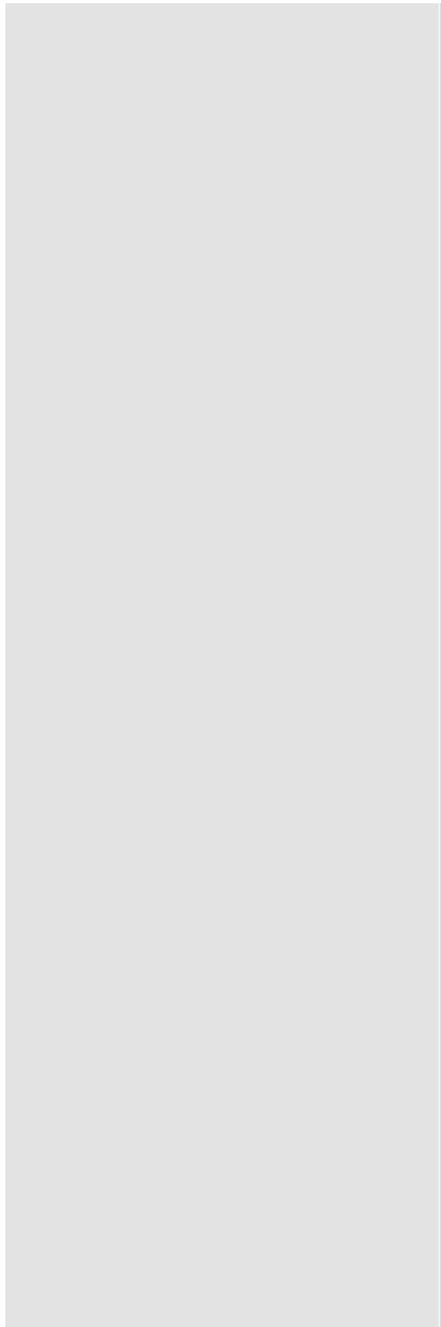
So the real trick is that, remember, we are engineers.

We are not required to study exactly what is.
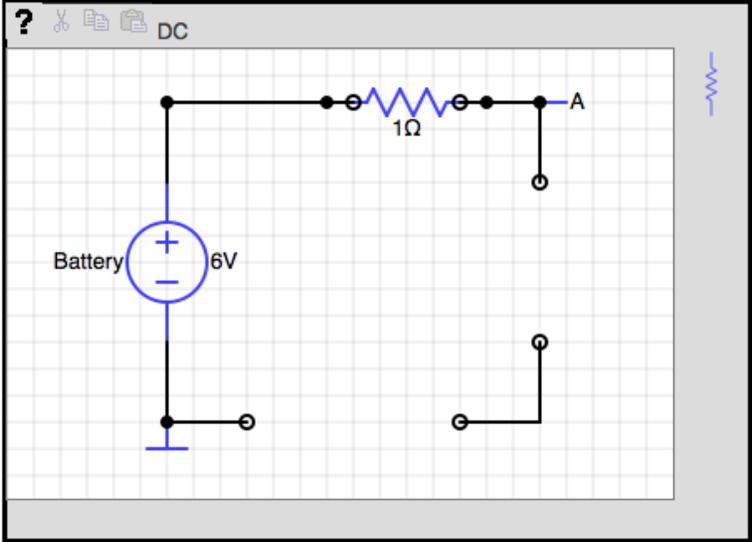
Our goal is to build interesting systems.

We are allowed to make changes to the playground.

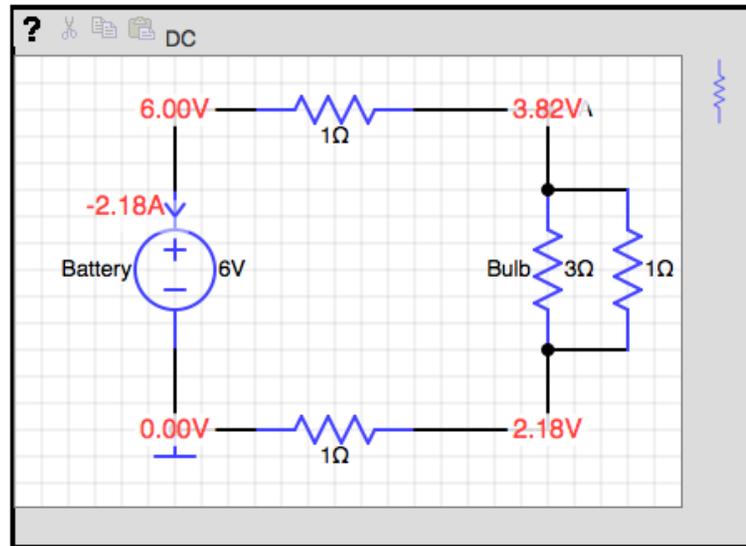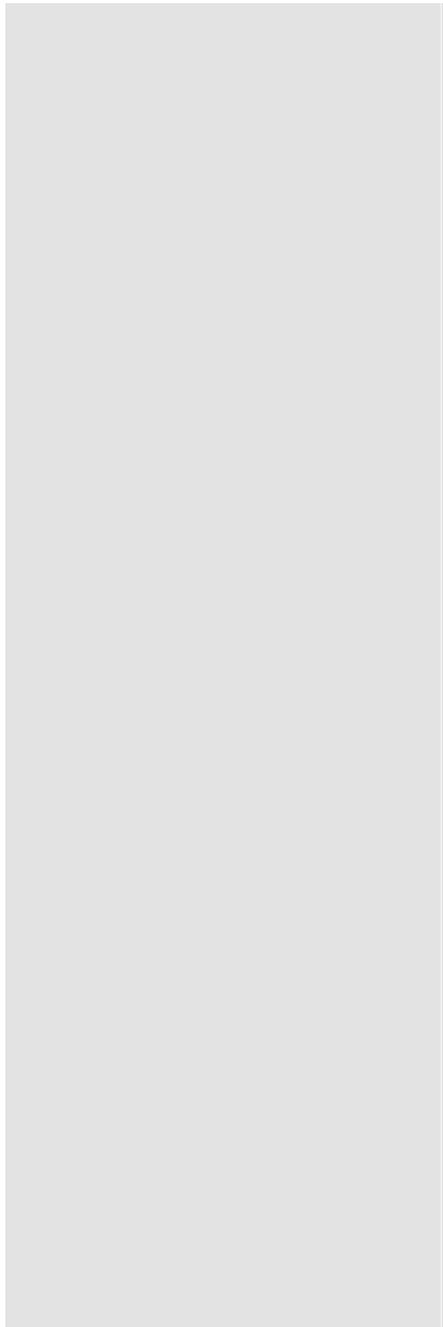the golf course, we, as engineers,

0:00 / 7:16   Speed   0.75x **1.0x** 1.25x 1.50x   cc on
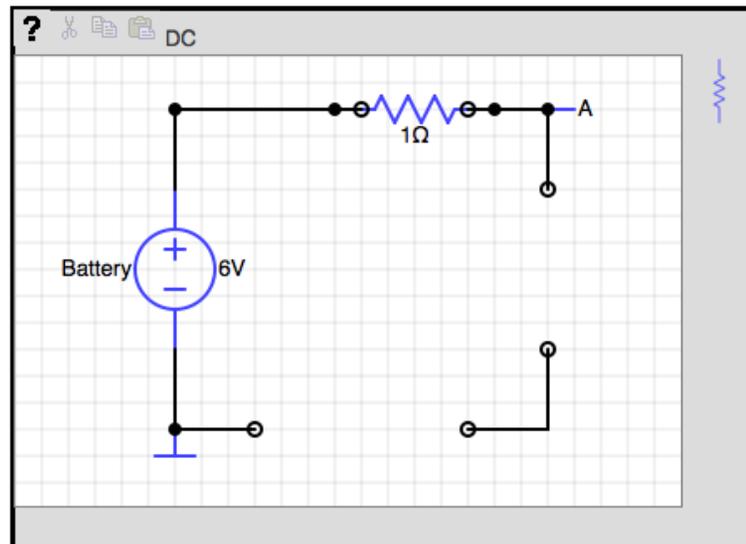
More information given in the text.

Schematic model when bulb is disconnected:

❌

Schematic model when bulb is disconnected:

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