

# APP-SO-LUTELY

REVIEWS OF MATHEMATICS AND BIOLOGY APPS FOR USE BY  
MATHEMATICS AND SCIENCE TEACHERS

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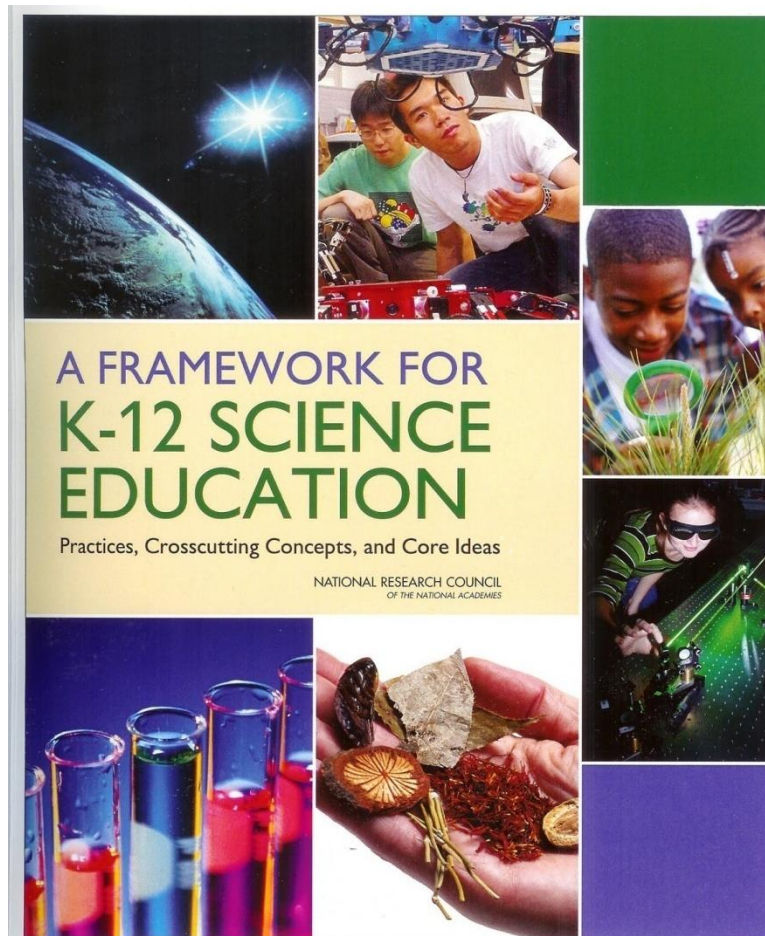
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# National Science Standards

- A Framework for K-12 Science Education



# Background Of The Study

- ❑ Availability of technology supports the move towards STEM integration
- ❑ Simulation and research in science lab experiences difficult to accomplish before.
- ❑ Invaluable in individual as well as shared experience in the classroom
- ❑ Mathematical practices of modeling and structure realized through classroom applications
- ❑ Other?

# The iPad

- Added a new dimension to teaching especially in mathematics and science
- Seamlessly integrated within teaching methodologies
- Personalization of learning
- Flipped classrooms enabled by use of iPad
- Most App reviews suggested as TOP APPS provide no criteria

# Constructivist Teaching

- Can generate Interactive/self directed strategies
- Adds creative and visual methods for constructing knowledge
- Utilizes students previous knowledge of technology
- Highly Motivational and useful in all content areas especially in mathematics and science
- Good for special needs students in all content areas
  - English Language Learners
  - Learning disabled students
  - Gifted learners
  - At risk learners

# Hand-Held Technology

## Improve literacy

- Many apps can be used for individual instruction in reading for all levels of student abilities
- Students who have difficulty in reading can work individually to practice in areas where individual needs have been identified

## Facilitate collaboration

- Ideal for collaborative projects in all content areas
- Stimulates individual as well as collaborative methods of instruction
- Ease of communication

## Keep instructor up-to-date on content knowledge



# Hand Held Technology

## Specifically in Mathematics and Science

- Students already excel in the use of the latest technology
- Students/teachers need direction towards App usage in mathematics and science
- Differentiation of instruction to meet the needs of all learners
- Lab activities virtual for students who miss the opportunity due to absence or personal beliefs
- Technology is highly motivating



# Why and How This Research

- Why? No method for review of chosen Apps
- How? Determined a Mathematics/Biology topic list
- Assigned topics to researchers
- Type in topic exactly then review the first 10 free in English/none game Apps

# Evaluation Protocol/Example

## Evaluation Form Used To Write The Review

### *Information on Initial Screen*

1-Topic Word: <b>Amino Acids</b>	
2-Found or Not Found: <b>Found</b>	
3- App Name: <b>BioChem Euchre Deck</b>	
4- Seller: <b>Center for Mobile Education and Research</b>	
5- Category: <b>Education</b>	
6- Updated: <b>Feb 15,2012</b>	
7-Requires: <b>Compatible with iPhone, iPod Touch, and iPad. Requies iOS 3.0 or later</b>	
8-Ratings and reviews: <b>4+ Review</b>	

### *Evaluation of App Site*

1-Contains links that lead to further information. <b>Button that click to other amino acids</b>	
2-Links are active: <b>Yes</b>	
3-App is interactive: <b>Yes</b>	
4-Navigation is easy: <b>Yes</b>	
5-Reliable content information: <b>Yes</b>	
6-Contains popups: <b>No</b>	
7-Review containing no more than 250 words: <b>App is geared toward the memorization of the molecular structure of Amino Acids. The user is able to scroll through all amino acids and view their chemical structure as well as structural group. User can then test their knowledge of the chemical structure by identifying either the amino acids full name, first three letters, first letter, or class.</b>	

# Math topics/App name

Algebraic Expressions/ [Algebra Genie](#)

Circles/ [Circle Geometry](#)

Complex Numbers/ [Simply Complex](#)

Functions/ [Function Mystery](#)

Mathematics/ [MathBoard](#)

Polynomial/ [Algebra, Matrices & Polynomials](#)

Probability & Statistics/ [SAT Math: Data Analysis](#)

Reasoning with Equations and Inequalities/ [Mathspace](#)

Trigonometry/ [Overseas Family School](#)



# Trigonometry App

## Trig Wizard App



- **Opening**
- **Widget**
- **Tutorials**
- **Examples**
- **Solutions**

# Trig Wizard: Widget



# Trig Wizard: Tutorials

iPad 9:48 AM 99%

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Widget Tutorials Examples About

Content	Type	Description
 Student Introduction	Video	Introduction to unit circle; Links to the scientific calculator; Sine, cosine & tangent axes; Sine Cos & Tan as projections to the axes; Positive & negative angles; Inverse trig functions; Right-angled Triangles
 Application of Trigonometry to right-angled triangles. SOH, CAH, TOA	Video	Using trigonometry with right-angled triangles; Development of SOH, CAH, TOA from unit circle
 Additional Features I - Trigonometric Identities	Video	Use of widget to graphically develop & explain some key trig identities: $\sin \theta = \sin(180^\circ - \theta)$ ; $\cos \theta = \cos(360^\circ - \theta)$ , $\tan \theta = \tan(\theta \pm 180^\circ)$ , $\sin \theta = \cos(90^\circ - \theta)$ and the Pythagorean identity $\sin^2 \theta + \cos^2 \theta = 1$
 Additional Features II - Trigonometric Inequations, Cartesian and Polar Coordinates	Video	Use of widget to graphically demonstrate solution of Trigonometric Inequations, also Cartesian Coordinates and Polar Coordinates







Recommendation : Student 'Introduction' and 'Application of Trigonometry ...' video Tutorials before viewing Examples

# Trig Wizard: Examples

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Widget Tutorials **Examples** About

Content	Type	Description
 Finding an Angle using Trigonometry	Video	Using trigonometry to find an unknown angle in a right-angled triangle, given two sides. Also, find third side by Pythagoras or further trigonometry.
 Finding a Side using Trigonometry	Video	Using trigonometry to find an unknown side in a right-angled triangle, given one side and one angle. Also, find a second side by Pythagoras or further trigonometry.
 Trigonometry Application: Measuring Things From Afar	Video	Applying trigonometry: For a building, find the distance away from a second building and its height, given only the height of the first building and the angles (from the top of the first building) of elevation and depression to the top & bottom respectively, of the second building.
 Tangent Examples	Examples	Angle examples, side examples and application examples.
 Sine Examples	Examples	Angle examples, side examples and application examples.
 Cosine Examples	Examples	Angle examples, side examples and application examples.
 Additional Applications	Examples	Mixed applications containing multiple steps, mixed & angles.
 Investigations	Investigations	Mixed applications containing multiple steps, mixed & angles.

Recommendation : Student 'Introduction' and 'Application of Trigonometry ...' Video Tutorials before viewing Examples

# Trig Wizard: Examples

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Widget Tutorials **Examples** About

## Sine Examples [Show solution](#)

In triangle ABC, side AB = 17cm and side AC = 41cm.  
Calculate the size of the angle at C.



Finding Angles

1 2 3

Finding Sides

1 2 3

Application

1 2



# Trig Wizard: Examples with Solution

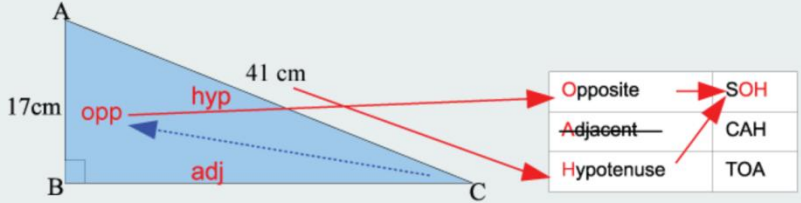
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Widget Tutorials **Examples** About

## Sine Examples Hide solution

In triangle ABC, side AB = 17cm and side AC = 41cm.  
Calculate the size of the angle at C.



Opposite	→	SOH
Adjacent	→	CAH
Hypotenuse	→	TOA

**WORKING**  
From the angle at C, label the three sides as opposite, adjacent or hypotenuse.

**Note** that the **opposite side** and the **hypotenuse** are known. From the table, this means we use Sine (SOH).

$$\begin{aligned}\sin C &= \frac{\text{opp}}{\text{hyp}} \\ &= \frac{17}{41} \\ \Rightarrow C &= \sin^{-1} \frac{17}{41} \\ &= 24.49^\circ \text{ (2dp)}\end{aligned}$$

The size of the angle at C is 24.5° (1dp)

### Finding Angles

1 2 3

### Finding Sides

1 2 3

### Application

1 2

# Biology Topics/App name (*Partial List*)

Homeostasis/ [Diseases 3Dme](#)

Matter/ [States of Matter](#)

Microscopes/ [Smart Microscope Lite](#)

Molecular Evolution/ [TimeTree HD](#)

Mutations/ [DinoaryHD](#)

Natural Selection/ [Khan Biology](#)

Nervous System/ [IsdCoordination2](#)

Organelles/ [Cell Explorer: The Animal Cell \(Free\)](#)

pH/ [pH Life](#)



# Learn About Genetics

About ⓘ

Resources ⋮



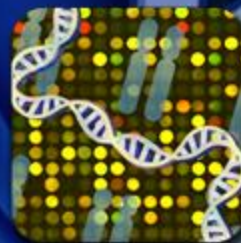
Genes and Inheritance



Population Genetics



Recessive Genetic Diseases



Genetic Screening

## Inheritance Calculators



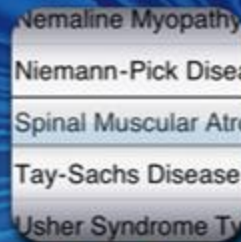
Genetic Traits



Genetics Diseases



Blank Punnett Square



Jewish Genetic Diseases

## Map of Genetic Diseases



# Gene Screen



Home

Reset

# Map of Genetic Diseases

By region

By disease

Tap the map or list to select the regions where your ancestors came from to see which genetic diseases are more common in those regions.



North America

Central/South America

Northwestern Europe

Mediterranean

Eastern Europe

Africa

Western and Southern Asia

Eastern Asia

Southeastern Asia

Australia/New Zealand

Home

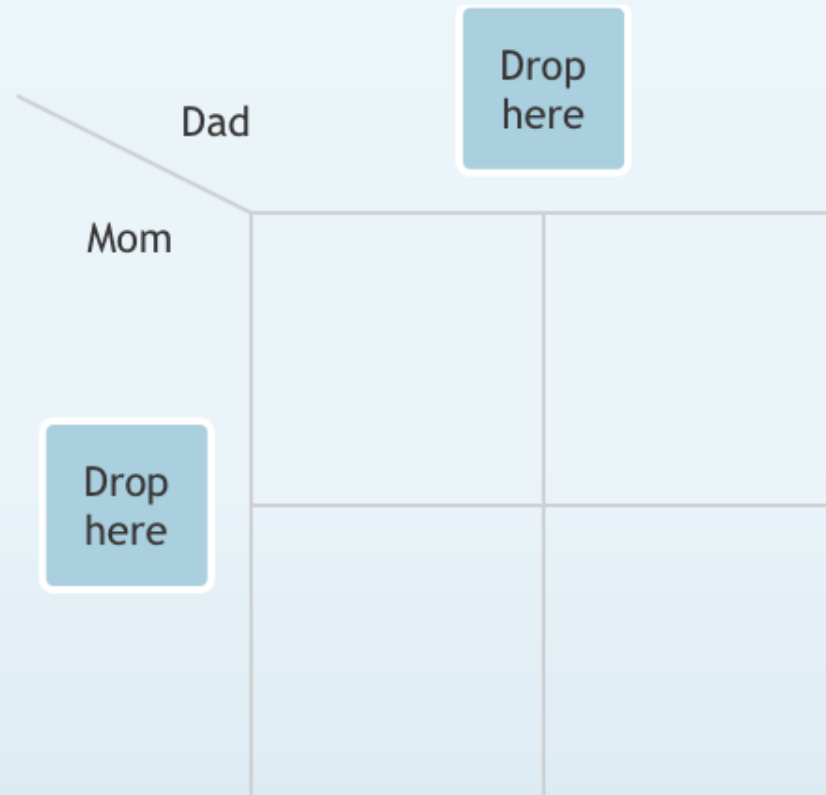
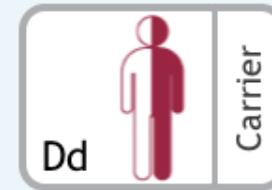
## Genetic Diseases

Reset

What is the chance a child will have a recessive genetic disease?

Drag and drop an icon from the top for the mother and father, representing the gene combinations that determine a recessive genetic disease.

Tap MATE and see all possible gene combinations for offspring based on the parents' genes.



Mate

# Barriers and Challenges To Use of Technology In Classrooms

- ❑ Attitudes and beliefs
- ❑ Professional development needed
- ❑ Reconsidering assessments
- ❑ Lack of iPads in the classroom
- ❑ Lack technology personnel to maintain equipment
- ❑ Resources/insufficient hardware and software
- ❑ Time and money

# The Future

- Apple labs with student directed-learning.
- Teacher acting more as a facilitator with less lecture more hands-on.



# Your Opinions??????

