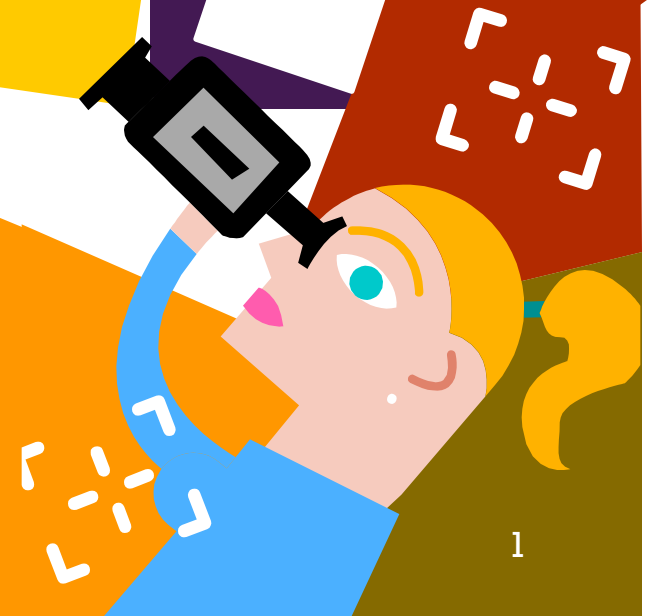
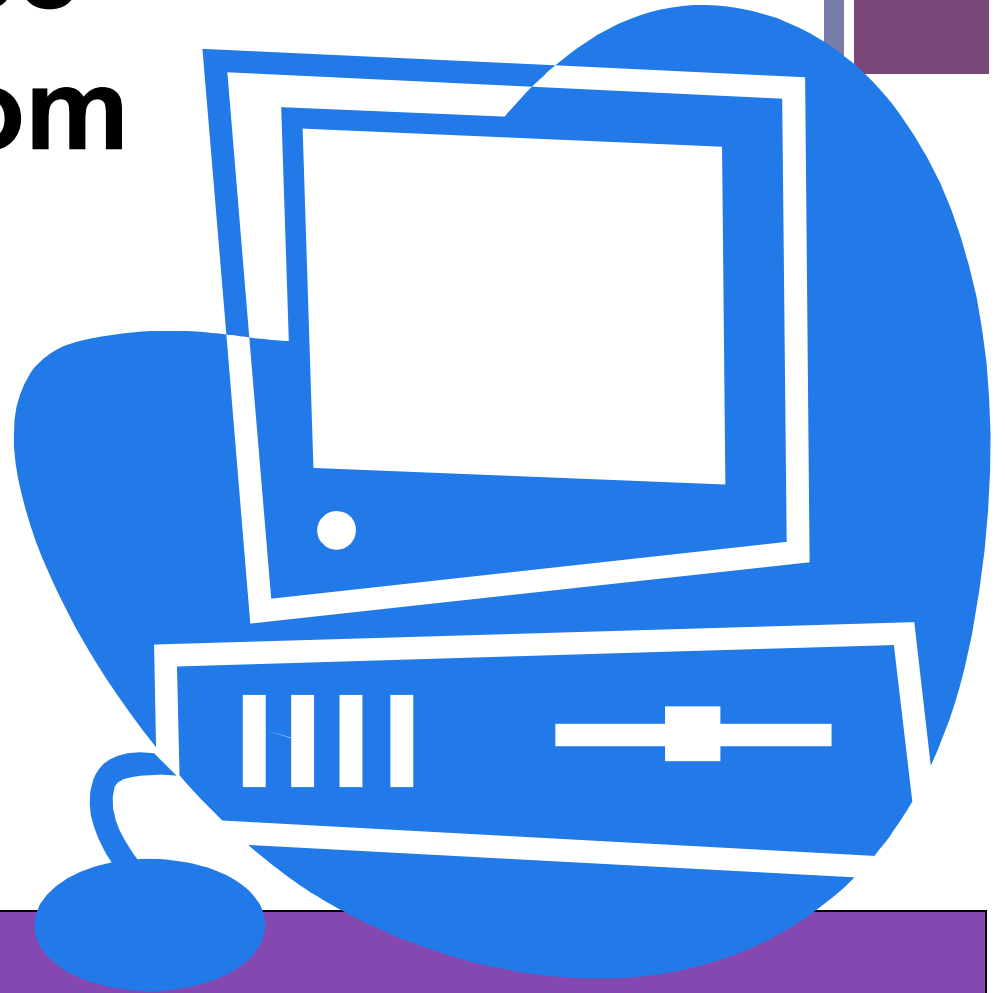


# Technology: A Critical Tool for the 21<sup>st</sup> Century

Jann H. Leppien, Ph.D.  
University of Great Falls  
[jleppien@mt.net](mailto:jleppien@mt.net)



**Technology use  
in the classroom  
has  
progressed  
through 3  
distinct  
stages.**



# Automated Print



# Automated Print Production Tool





Automated  
Print  
Production  
Tool

**Data driven  
virtual  
learning**



# Elements of High Quality Curriculum & Instruction to Consider When Selecting Technology Resources



- ❑ fresh and surprising
- ❑ seems real (is real) to the student
- ❑ coherent (organized, unified, sensible) to the student
- ❑ rich, deals with profound ideas (concept-based)
- ❑ stretches the student (rigorous)
- ❑ calls on students to use what they learn in interesting and important ways
- ❑ involves the student in setting goals for their learning and assessing progress toward those goals

# High Quality Curriculum & Instruction

7

- ☐ clearly focused on essential understandings and skills of the discipline that a professional would value (authentic)
- ☐ mentally and affectively engaging to the learner
- ☐ joyful-or at least satisfying
- ☐ provides guided choices
- ☐ allows meaningful collaboration
- ☐ focuses on products that matter to students
- ☐ connects with students' lives and world



# + Differentiated Instruction

*is a model of instruction that revolves around the belief that students learn in many different ways.*

# Differentiation Elements

## STUDENT TRAITS:

- **Readiness**
- **Interest**
- **Learning Profile**
- **Affect**

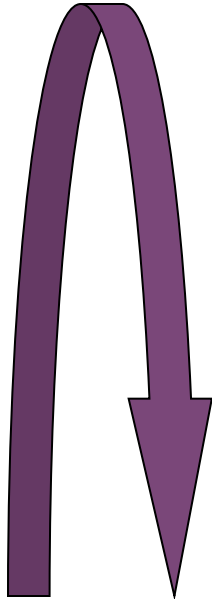
## CLASSROOM ELEMENTS:

- **Content**
- **Process**
- **Product**
- **Learning Environment**

# + What's the Point?

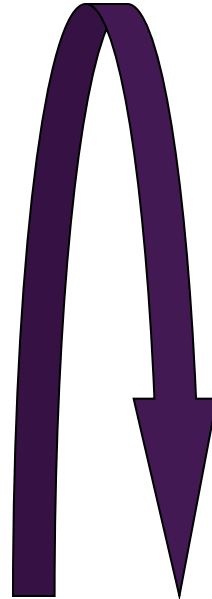
10

**Readiness**



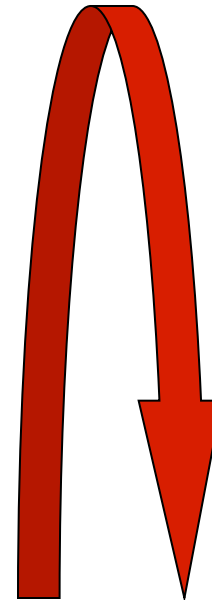
**Growth**

**Interest**



**Motivation**

**Learning  
Profile**



**Efficiency**



When students enjoy tasks, they are intrinsically motivated to do well. Both interests and personal relevance produce intrinsic value for a student. **Interest is one of the best predictors of achievement across a variety of domains.**

(Siegle, Rubenstein, Pollard, & Romey, 2010)



# Differentiated Instruction

- Providing materials and tasks at varied levels of difficulty with varying degrees of scaffolding, through multiple instructional groups.
- Encouraging student success by varying ways in which students work: alone or collaboratively, in auditory or visual modes, or through practical or creative means.

(Tomlinson, 2000)

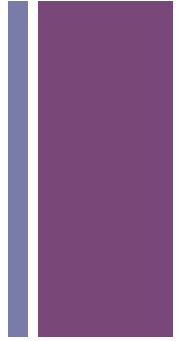


**+ A differentiated classroom  
provides multiple options for:**

**Content...**taking in information

**Process...**making sense of information

**Product...**expressing what student understands



+ What  
What

14

do we change to meet student needs?

**Technology presents**

**(a) Extensive sources for access to more advanced content and how it is represented, as well as communication with experts in the disciplines;**

**(b) Contexts for developing and applying the processes of critical and creative thinking skills to increase engagement; and**

**(c) Tools for constructing and sharing sophisticated products or means of expression.**

Key Ideas	Student Activity	Technology Embedded
The curriculum is rich and deals with profound ideas (concept-based).		
<b>The curriculum</b> stretches the student (rigorous).		
The curriculum is mentally and affectively engaging to the learner.		
<b>The curriculum</b> connects with students' lives and world.		



...our goal is to allow students to construct knowledge by providing them with opportunities to gather information, organize it in meaningful ways, and present it to others. In this way, the student is actively engaged with the technology and uses it as a productive tool.





## Making Meaning

What do the features look like in practice?



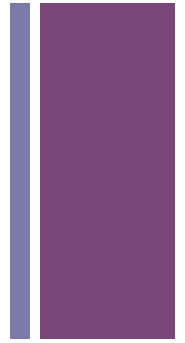
**AudioBooks, E-Text  
Research Skills  
Literacy Tools  
Math Tools  
Science Resources  
Social Studies Resources  
Study Skills Tools  
Graphic Organizers  
Text-to-Speech**



**Technology can erase the student / teacher  
barrier and create communities of learners.**

**Technology empowers students to  
function as professionals.**

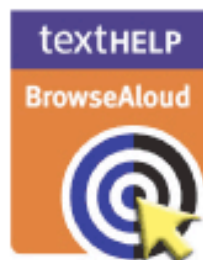
- + When considering how to differentiate we might consider providing...



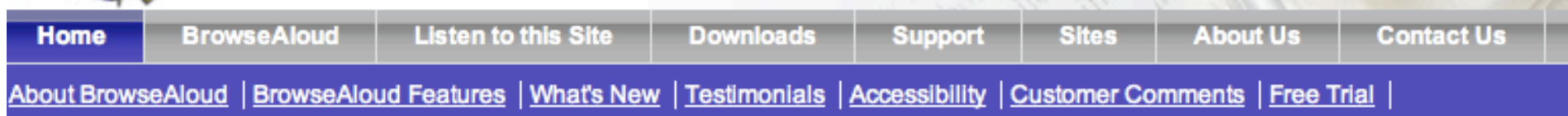
## Multiple Means of Representation

- Students differ in the ways they perceive and comprehend the information presented to them.
- Some may simply grasp information better through visual or auditory means than through printed text.



[USA \(English\) \(Change\)](#)

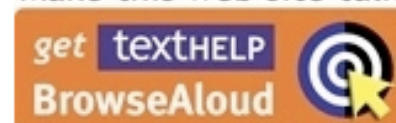
[http://www.browsealoud.com/page.asp?pg\\_id=80094](http://www.browsealoud.com/page.asp?pg_id=80094)



Change text size [A](#) [A](#) [A](#)

Make this web site talk

## New Release BrowseAloud... Making Websites Talk



**BrowseAloud reads web pages aloud** for people who find it difficult to read online. Reading large amounts of text on screen can be difficult for those with literacy and visual impairments.

More than 45 million people in the United States have literacy problems. By subscribing to BrowseAloud for your website, you will greatly increase the number of people who can access the content on your site.





<http://www.livescribe.com/en-us/>

Record everything you hear,  
write and draw. Tap your  
notes to play back your  
recordings. Save and share  
interactive notes to your  
computer, iPad™ or iPhone.™

Tap it. Get it. *Gift It* >

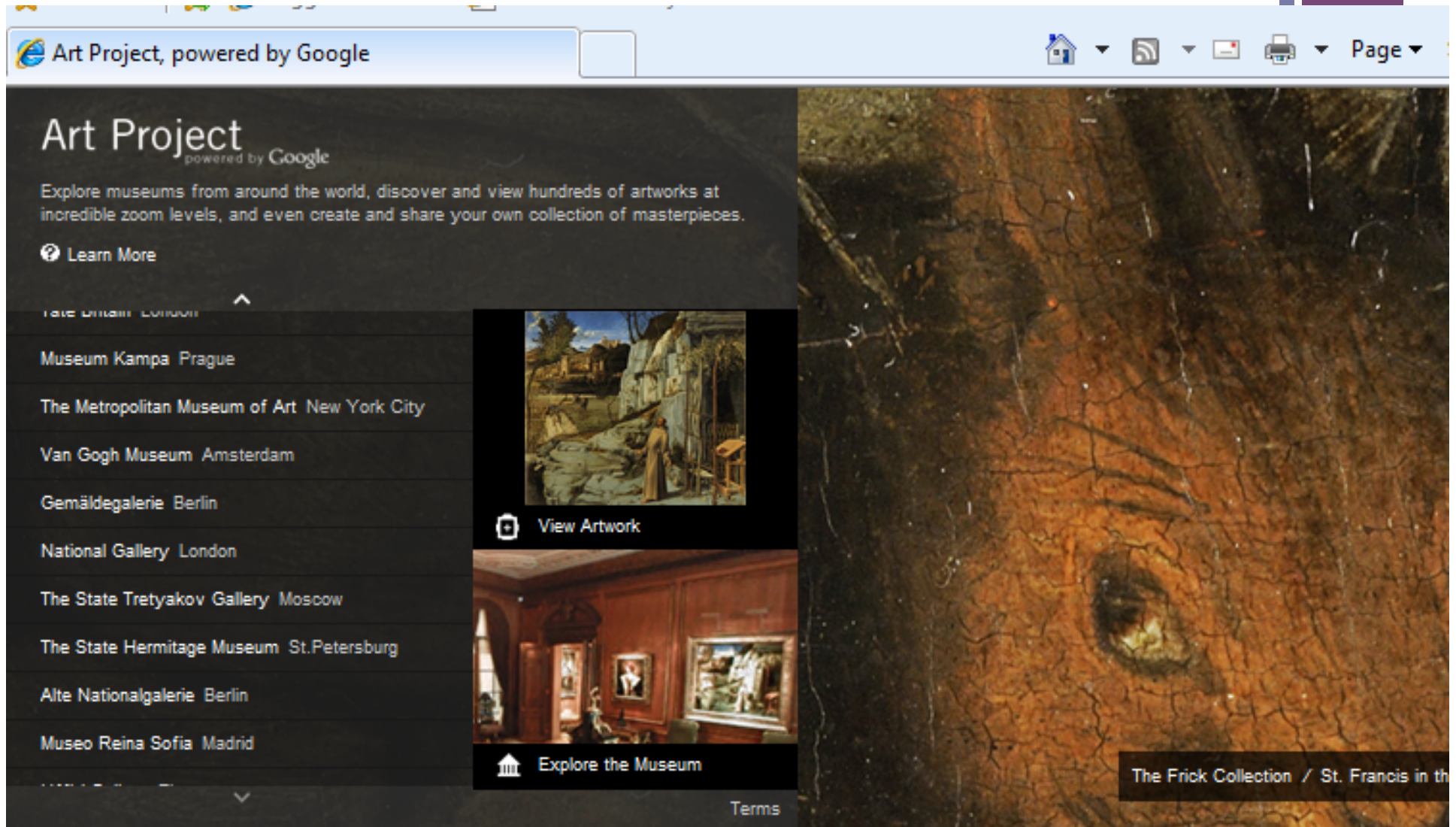




**Bring the  
world into  
your  
classroom  
...Google Earth is only  
the beginning**



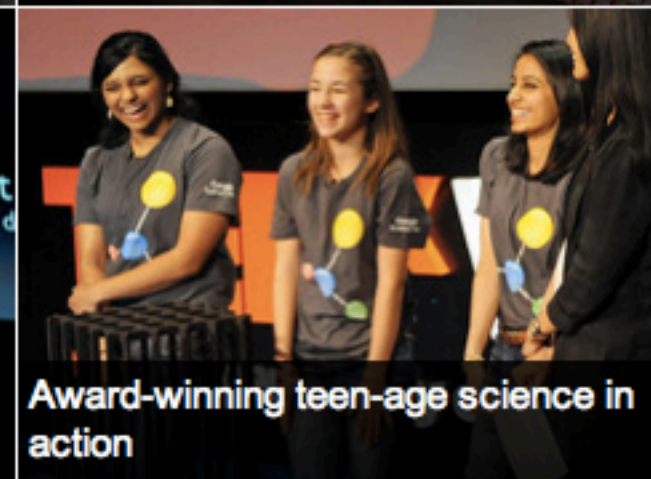
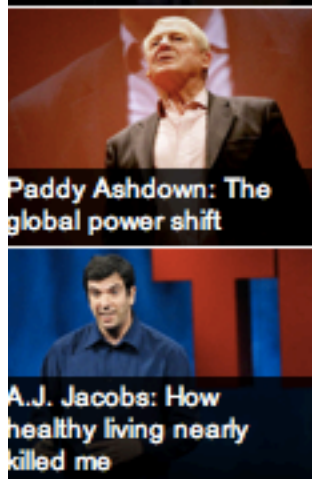
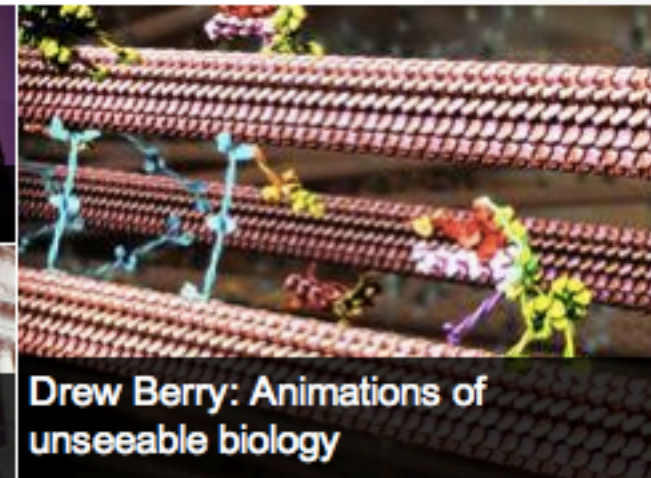
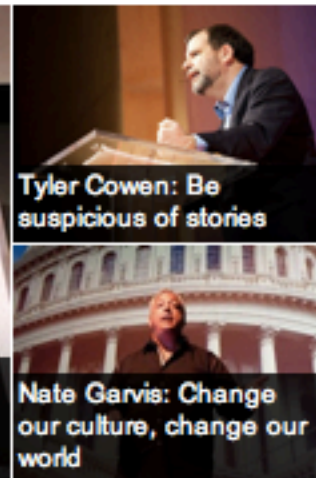






**TED** Ideas worth spreading

[www.ted.com](http://www.ted.com)



# + Converting Files



Email address

.....

Login | Register

[Home](#) | [Manage Files](#) | [Conversion Types](#) | [Tools](#) | [Blog](#) | [FAQ](#) | [Signup](#)



Have you ever wanted to  
convert files without the need  
to download software ?

<http://www.zamzar.com/>

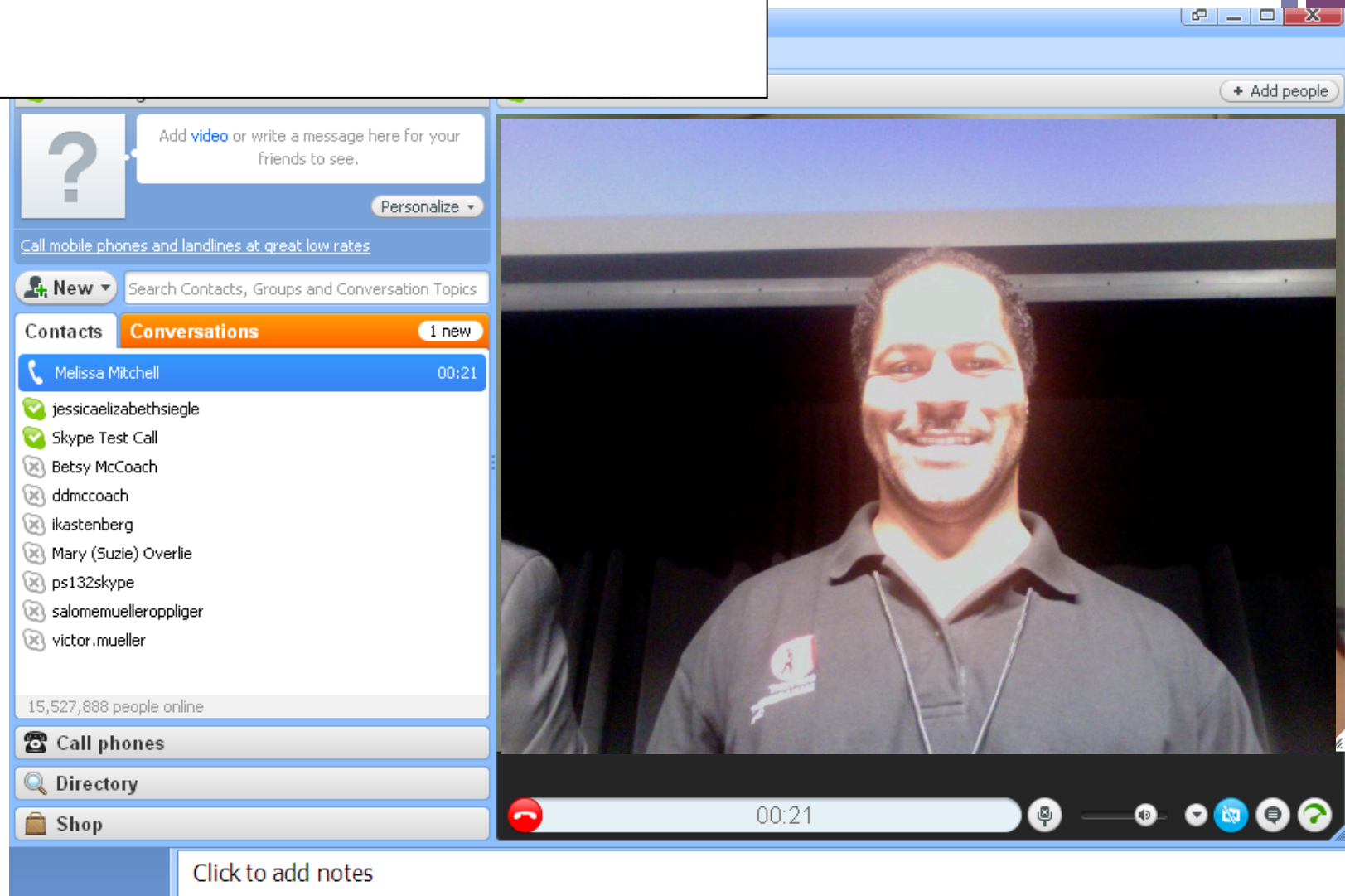


<http://www.savevid.com/>





[www.skype.com](http://www.skype.com)





[www.tokbox.com](http://www.tokbox.com)

**TokBox - Free Video Chat and Video ...**

**tokbox**™

**Free Video**

**Kristina Paul's chat** 1:41 Invite

**Feedback**

TokBox, Inc. © 2010

**Audio/Video**

Guest User 838454978

# + Easily Publish Content in Accessible Formats—SCOOP.IT



<http://www.scoop.it/>

Example:

<http://www.scoop.it/t/edtech-tools/p/177839361/free-video-chat-api-opentok>



# www.ustream.tv

29



## + Multiple Means of Representation

### ■ Format

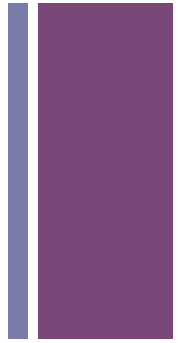
<http://fur.ly/37d3>

### ■ Text-to-Speech

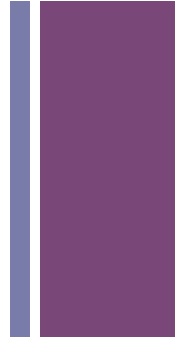
<http://www.fur.ly./37d5>

### ■ Language and Symbol

<http://fur.ly/37d6>



# + Multiple Means of Representation



## ■ Structure

<http://fur.ly/37d9>

## ■ Decoding Text/Notation

<http://fur.ly/37dc>

## ■ Digital Text

<http://fur.ly/37de>

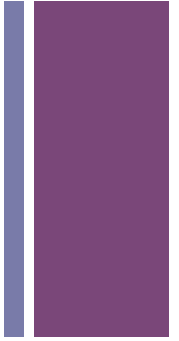
## + Multiple Means of Representation

### ■ Concepts

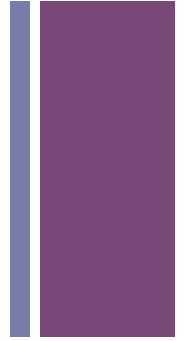
<http://fur.ly/37df>

### ■ Comprehension

<http://fur.ly/37di>



# + What is *Digital Text*?



Text stored as strings of characters.

- If you can select and change the font of text on the computer screen, it's digital text
- Many books and historical documents have been converted to digital format, for access via computer.

# Digital = flexible & versatile



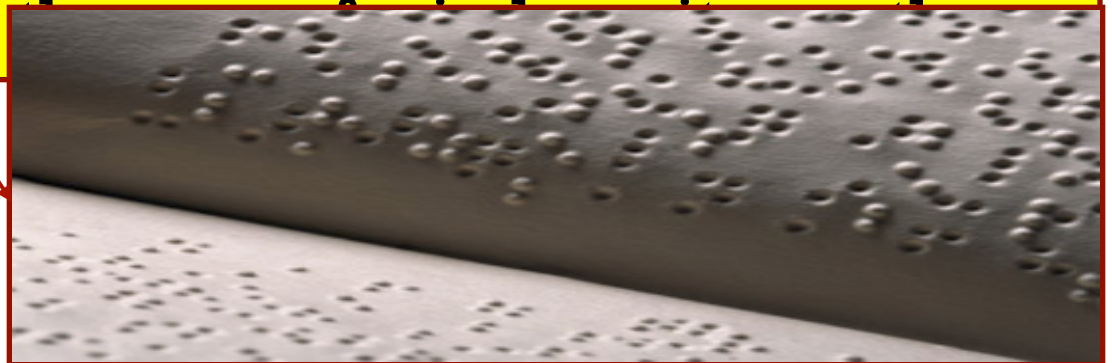
Images from CAST

## **Tale of Two Cities**

*...It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of*

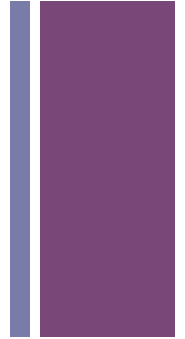
## **Tale of Two Cities**

**...It was the best of times, it was the worst of times, it was**





## Free *Digital Text*

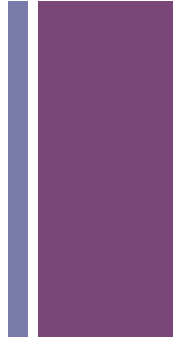


- The flexibility of digital or electronic text makes it a great option for customizing text to the needs of different learners.
- Digital text can be
  - Searched,
  - Rearranged
  - Read aloud by a computer
  - Customized for individual learners



## Free *Digital Text*

- Dickens
- Robert Frost
- Mark Twain
- Edgar Allan Poe
- Rosa Parks
- Star Spangled Banner
- Bill of Rights
- The Tell-Tale Heart
- Heidi
- Oliver Twist
- Tom Sawyer
- Little Women
- Kidnapped
- The Silver Balloon
- Dragonwings
- Mary Poppins





# + How-to find *Digital Text*

## Free Books Online

- Internet Public Library

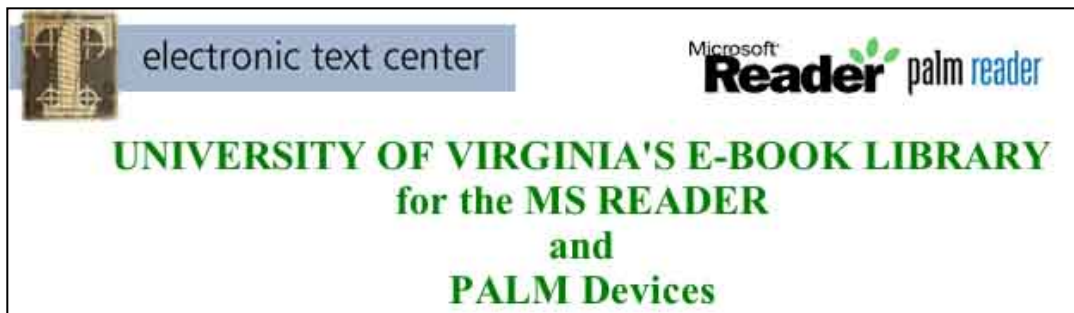
<http://www.ipl.org>

- Project Gutenberg

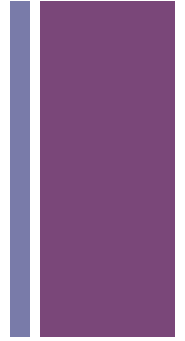
<http://promo.net/pg/>

- University of Virginia's e-Book Library

<http://etext.lib.virginia.edu/ebooks/ebooklist.html>



# + Benetech's BookShare

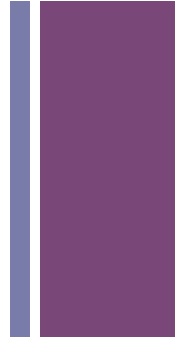


- Inexpensive books online
- Over 12,000 titles

<http://www.bookshare.org>

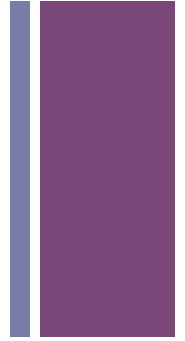
- |                   |                               |
|-------------------|-------------------------------|
| •The Black Pearl  | •Sarah, Plain and Tall        |
| •Johnny Tremain   | •The Mouse and the Motorcycle |
| •Caddie Woodlawn  | •Ribs                         |
| •Tuck Everlasting | •Island of the Blue Dolphins  |
| •Strider          | •Old Yeller                   |
| •Dear Mr. Henshaw | •Dragonsong                   |

# + *Digital Text Adaptations*



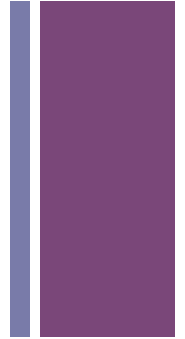
- Visual display can be varied - larger, etc.
- Auditory display - good for pre-reading
- Allows embedding learning supports in content
  - Pre-reading background, definitions
  - Summary
  - Key questions
- Allows students to copy/paste, or otherwise manipulate the text, to indicate comprehension

## + What is *Talking Text*?



- Words on the screen are read by the computer on command
- In some cases, the words need to be highlighted first
- Allows reading of individual words or phrases
- Works with word processors, websites, and more
- Often called text-to-speech

# + What does research say about *Talking Text*?



- Developing reading comprehension is a complex skill
- If a great deal of effort goes to sounding out words, energy for comprehension is reduced
- Talking text can provide one more tool for supporting comprehension for some students

(Rose & Dalton, 2002)

# + What does practice show about *Talking Text*?

- Many students improve editing and proofreading if they can hear their work.
- Hearing one's own words is rewarding and motivating.

*Hint: Hearing multiple computers with Talking Text is disturbing; you WILL need headphones.*

# + Talking Web Sites

## ■ Merriam Webster OnLine

<http://www.merriam-webster.com>



Main Entry: <sup>1</sup>**com·pan·ion** 🔊

Pronunciation: k&m- 'pan-y&n

Function: *noun*

Etymology: Middle English *compainoun*, from Old French *compagnon*, from Late Latin *companion-*, *companiono*, from Latin *com-* + *panis* bread, food -- more at [FOOD](#)

**1** : one that accompanies another : [COMRADE](#), [ASSOCIATE](#);  
*also* : one that keeps [company](#) with another

**2** *obsolete* : [RASCAL](#)

**3 a** : one that is closely connected with something similar **b** :  
one employed to live with and serve another



# W

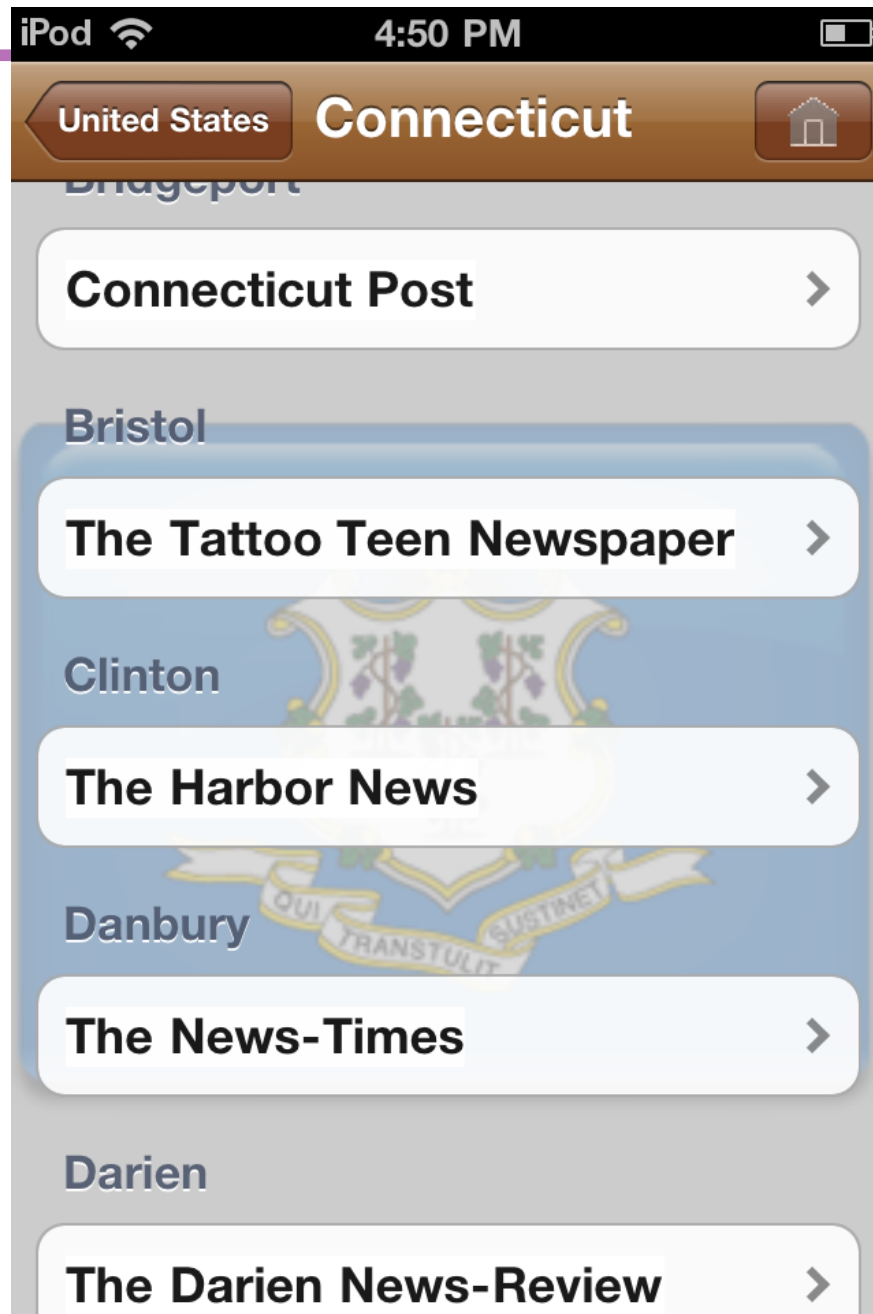
hy

## ELECTRONIC BOOKS



Variety of Titles  
Synthesized Voices  
Classic in the Public Domain  
Limited Space Requirement  
Highlighting and Notes  
Dictionary  
Searchable  
Self-Publishing





...lots of  
nonprint  
print...



[www.manybooks.net](http://www.manybooks.net)

46



## MANYBOOKS.NET

THE BEST EBOOKS AT THE BEST PRICE: *FREE!*

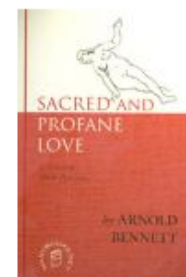
Browse through the [most popular](#) titles, [recommendations](#), or [recent reviews](#) from our visitors. Perhaps you'll find something interesting in the [special collections](#). There are more than 28,000 eBooks available here and they're all *free!*

If you still can't decide what to read you might want to [browse through some covers](#) to see what strikes your fancy.



[Recent Additions](#) to the library, with genre filter.

### SPOTLIGHT



- 
- ADVANCED SEARCH
- AUTHORS
- TITLES
- GENRES
- LANGUAGES
- NEW TITLES
- RECOMMENDED
- HELP
- LOGIN | REGISTER
- RSS FEEDS
- DONATIONS
- CONTACT US
- ABOUT THIS SITE

### BOOKS OF THE WEEK



#### THE LAUGHING CAVALIER

THE STORY OF THE  
ANCESTOR OF THE  
SCARLET PIMPERNEL

BARONESS EMMUSKA  
ORCZY

Whoever loves a fight, first and last, will like



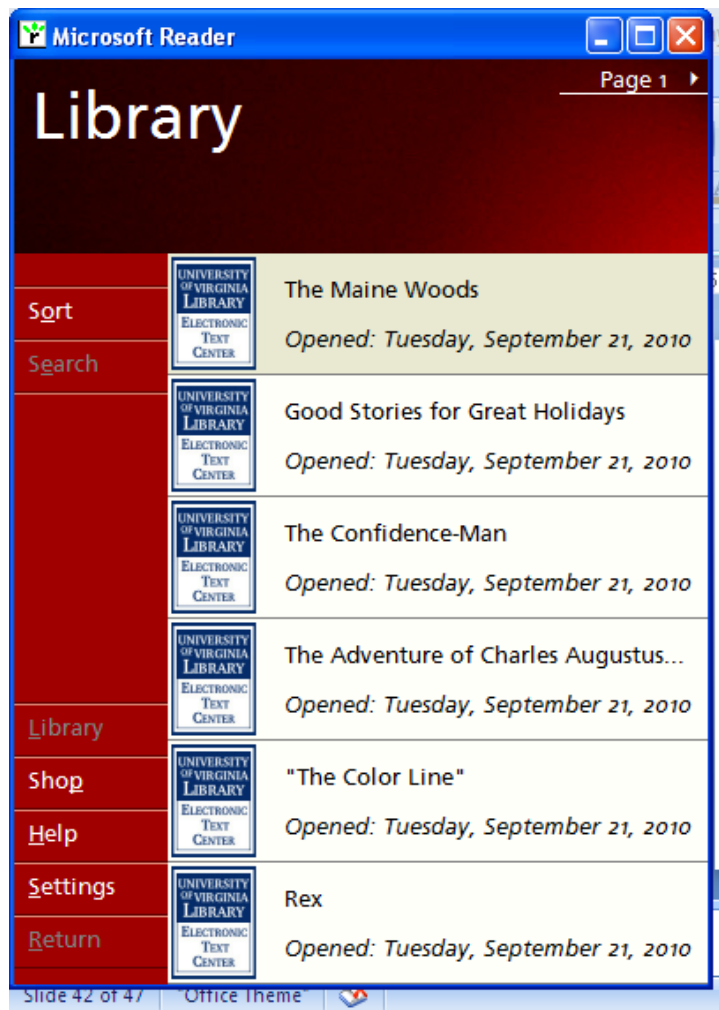
#### DOGLAND

WILL SHETTERLY

The Nix family has arrived.  
And Latchahie County will  
never be the same.

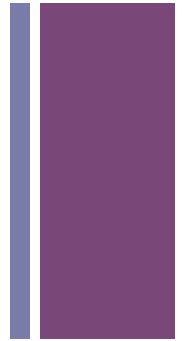
In an effort at improving  
his family's lot, the Nixes have moved to rural  
Florida to open Dogland: a combination zoo.

+ <http://www.microsoft.com/reader/default.aspx>





- + When considering how to differentiate we might consider providing...



## Multiple Means of Engagement

- Students differ markedly in the ways in which they can be engaged or motivated to learn.
- Some students are highly engaged by spontaneity and novelty while others are disengaged, even frightened, by those aspects, preferring strict routine.

## + Multiple Means of Engagement

### ■ Math Resources

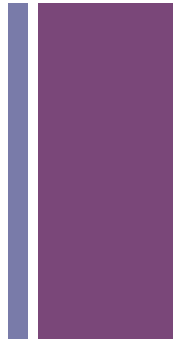
<http://www.fur.ly./37fm>

### ■ Science

<http://fur.ly/37ft>

### ■ History Resources

<http://fur.ly/37fq>



## + Multiple Means of Engagement

### ■ Search Engines

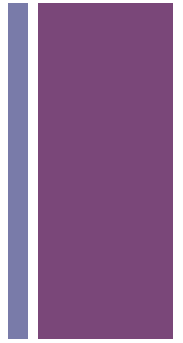
<http://www.fur.ly./37g0>

### ■ Webquests

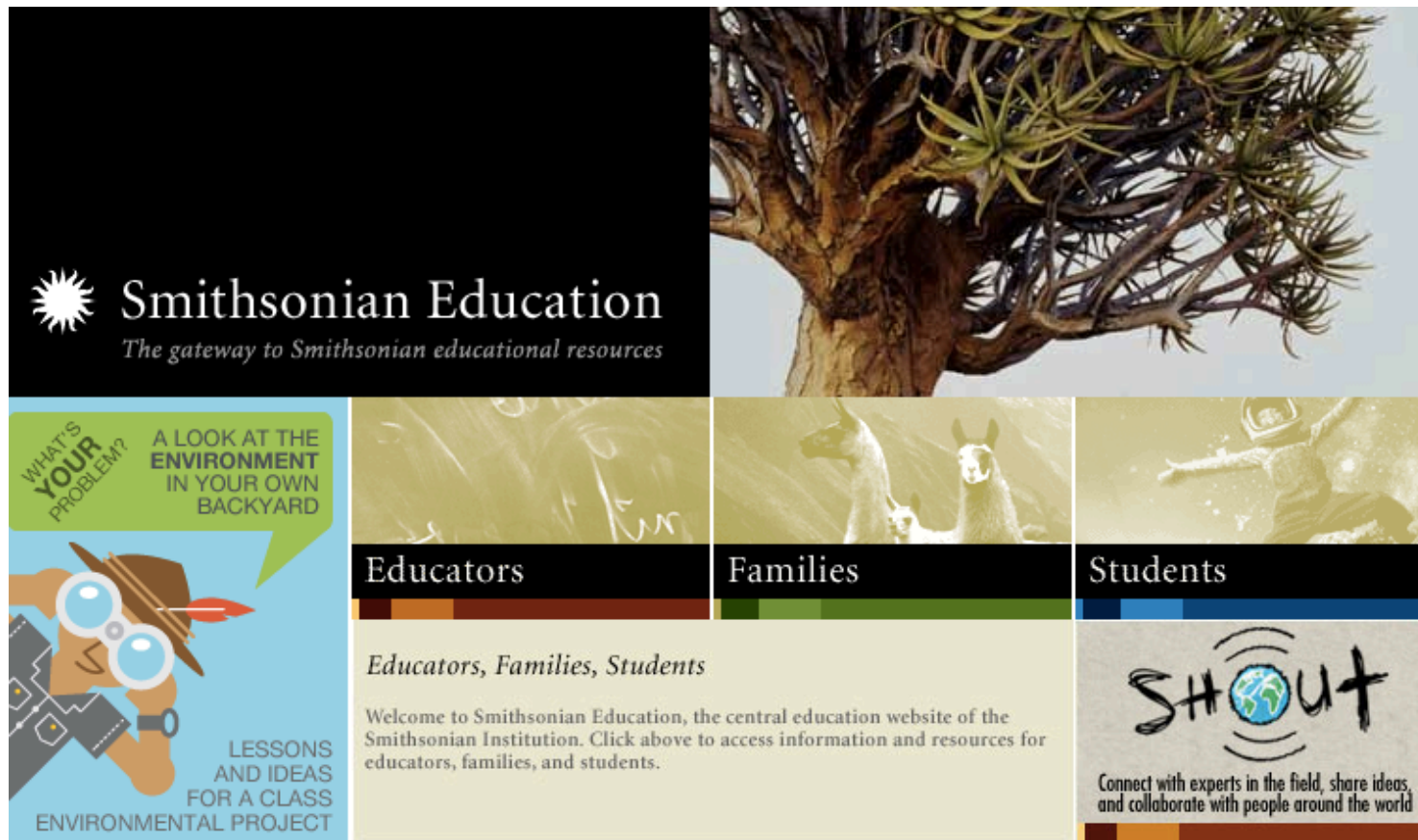
<http://fur.ly/37fp>

### ■ Other

<http://fur.ly/37fs>



# + Access to Rich Content



<http://www.smithsonianeducation.org/>



# + Access to Rich Content

Free Science Fair Project Ideas, Answers, & Tools for Serious Students

Log In | Join ScienceBuddies! It's Free!

**SCIENCE BUDDIES**

Home Project Ideas Project Guide Ask an Expert Blog Teachers Parents Students Science Careers My Science Buddies More

Home > Science Fair Project Ideas, Answers, & Tools

Google™ Custom Search Search

Home

## Student Resources



- [Topic Selection Wizard](#): Looking for a science fair project? The Topic Selection Wizard will recommend a science fair project idea that is just right for you.
- [Project Ideas Directory](#): Browse science fair Project Ideas in over 30 areas of science.
- [Science Fair Project Guide](#): A step by step guide to help you do a science fair project.
- [Ask an Expert](#): Our online bulletin board staffed by volunteer scientists and top high school students ready to answer your science fair project questions.
- [Advanced Science Competitions](#): Tips and techniques to prepare for an advanced science competition such as ISEF or Intel STS.

## Project Kits Now Available!



Science Buddies is now offering [project kits](#) for some of our most popular Project Ideas. Pick a project and order all of your supplies with the click of a button!

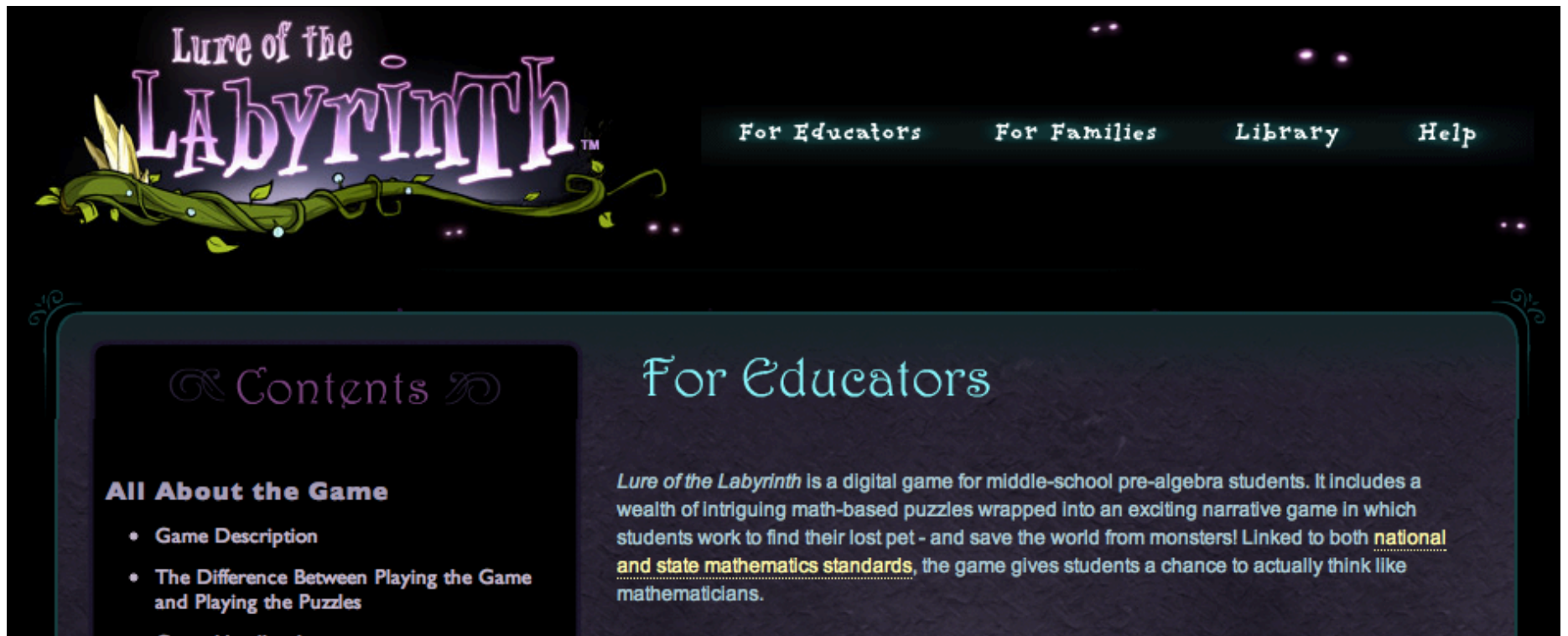
- FREE ground shipping in the continental US
- 10% of proceeds help support Science Buddies

## About Science Buddies

- [Academic Outreach Partnerships](#)
- [Newsroom](#)
- [Success Stories](#)
- [Volunteer Information](#)

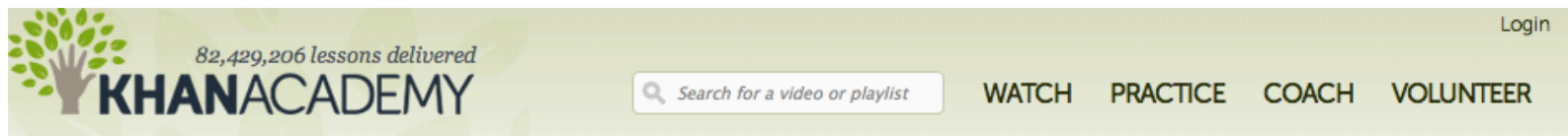
<http://www.sciencebuddies.org/>

# + Access to Rich Content



<http://labyrinth.thinkport.org/www/educators.php>

# + Access to Rich Content



82,429,206 lessons delivered

**KHANACADEMY**

Search for a video or playlist

WATCH PRACTICE COACH VOLUNTEER

Login

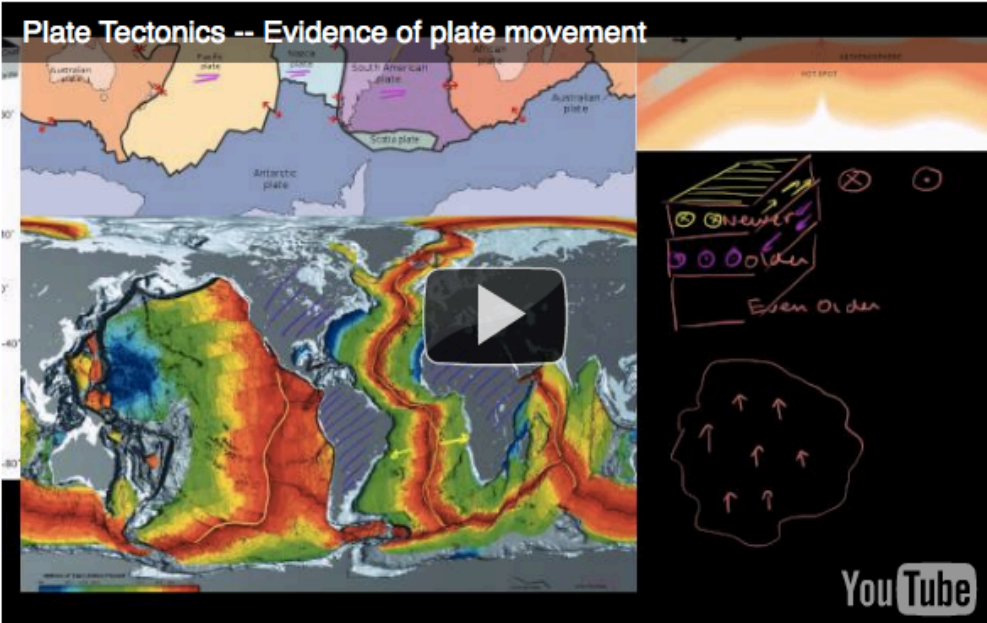
  


Plate Tectonics -- Evidence of plate movement

Watch. Practice.

Learn almost anything for free

With a library of over 2,600 videos covering everything from arithmetic to physics, finance, and history and thousands of practice exercises, we're on a mission to help you learn almost anything for free, when you want, at your own pace.

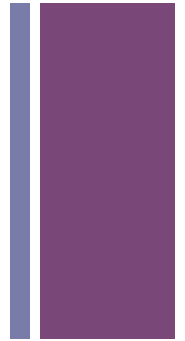
Watch a video

Practice with an exercise

Like 1M Send Tweet 1,987 +1

<http://www.khanacademy.org/>

- + When considering how to differentiate we might consider providing...



## Multiple Means of Expression

- Students differ in the ways that they can navigate a learning environment and express what they know.
- Some may be able to express themselves well in writing text but not oral speech, and vice versa.

## + Multiple Means of Expression

### ■ Communication

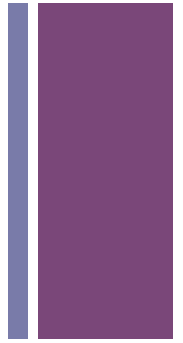
<http://fur.ly/37dj>

### ■ Composition and Problem Solving

<http://fur.ly/37dk>

### ■ Goal Setting

<http://fur.ly/37dl>





Expand  
student  
product  
options...



...paper and pencil aren't  
the only game in town...



<http://www.musicmasterworks.com>

The screenshot shows a web browser window displaying the homepage of Aspire Software's Music MasterWorks MIDI music editor. The browser's address bar shows the URL <http://www.musicmasterworks.com/index.htm>. The website has a dark blue header with the text "Aspire Software" in yellow. Below the header is a navigation menu with links: Home, Products, Support, Music, and Links. The main content area features a large graphic of a golden sphere with musical notes and the text "Music MasterWorks" on it. To the right of the graphic, there is text describing the software: "Music MasterWorks MIDI music editor makes it easy to create great MIDI music with an intuitive point and click interface. Edit and print sheet music or piano scores." Below this, it says "See our educational discounts. Great gift idea for your student!" and "Now with voice-to-note capability! Just sing a tune into your PC microphone and see it transformed into notes! Even get a singing lesson!" There are two order links: "Order Music MasterWorks \$25" and "Order In-Tune Multi-Instrument Tuner \$15". At the bottom left, there is a "New!" badge and a "GOLD Award" trophy. At the bottom right, there is a text box asking "Have a musical instrument you need to tune? Try our new product:" followed by a link to "Download In-Tune Multi-Instrument Tuner v1.6<". The browser's taskbar at the bottom shows various icons and the system clock indicating 4:18 PM.

Address <http://www.musicmasterworks.com/index.htm>

## Aspire Software

Home Products Support Music Links



Music MasterWorks MIDI program - [download here](#)

Music MasterWorks MIDI music editor makes it easy to create great MIDI music with an intuitive point and click interface. Edit and print [sheet music or piano scores](#).

See our [educational discounts](#). Great gift idea for your student!

Now with [voice-to-note](#) capability! Just sing a tune into your PC microphone and see it transformed into notes! Even get a [singing lesson](#)!

[Order Music MasterWorks \\$25](#)

[Order In-Tune Multi-Instrument Tuner \\$15](#)

**New!**

See how easy making your own music can be! Try out Music MasterWorks MIDI editor **FREE** for 1 month:

[->Click here to download Music MasterWorks v3.6<--](#)  
For Windows 95/98/ME/2000/XP. Easy to install and use!

["It's simply amazing. All with a drag and drop, clickable interface."](#)

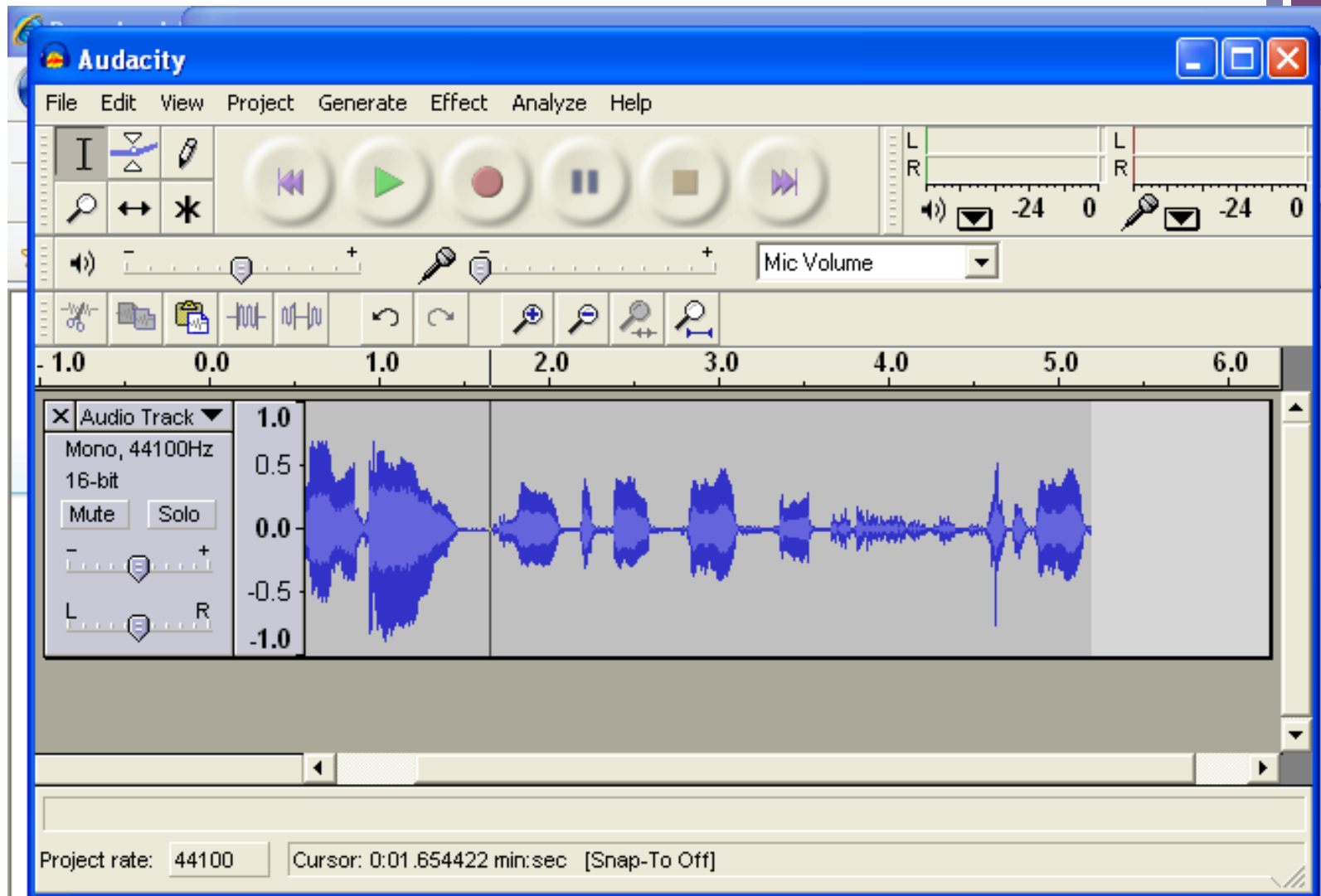
Have a musical instrument you need to tune? Try our new product:

 [->Download In-Tune Multi-Instrument Tuner v1.6<--](#)

Start Cache Palm ... Eudor... 3 1/2 Fl... Micros... <http://...> [Music...](#) [Myths...](#) [Prese...](#) Internet 4:18 PM

+

<http://audacity.sourceforge.net/>





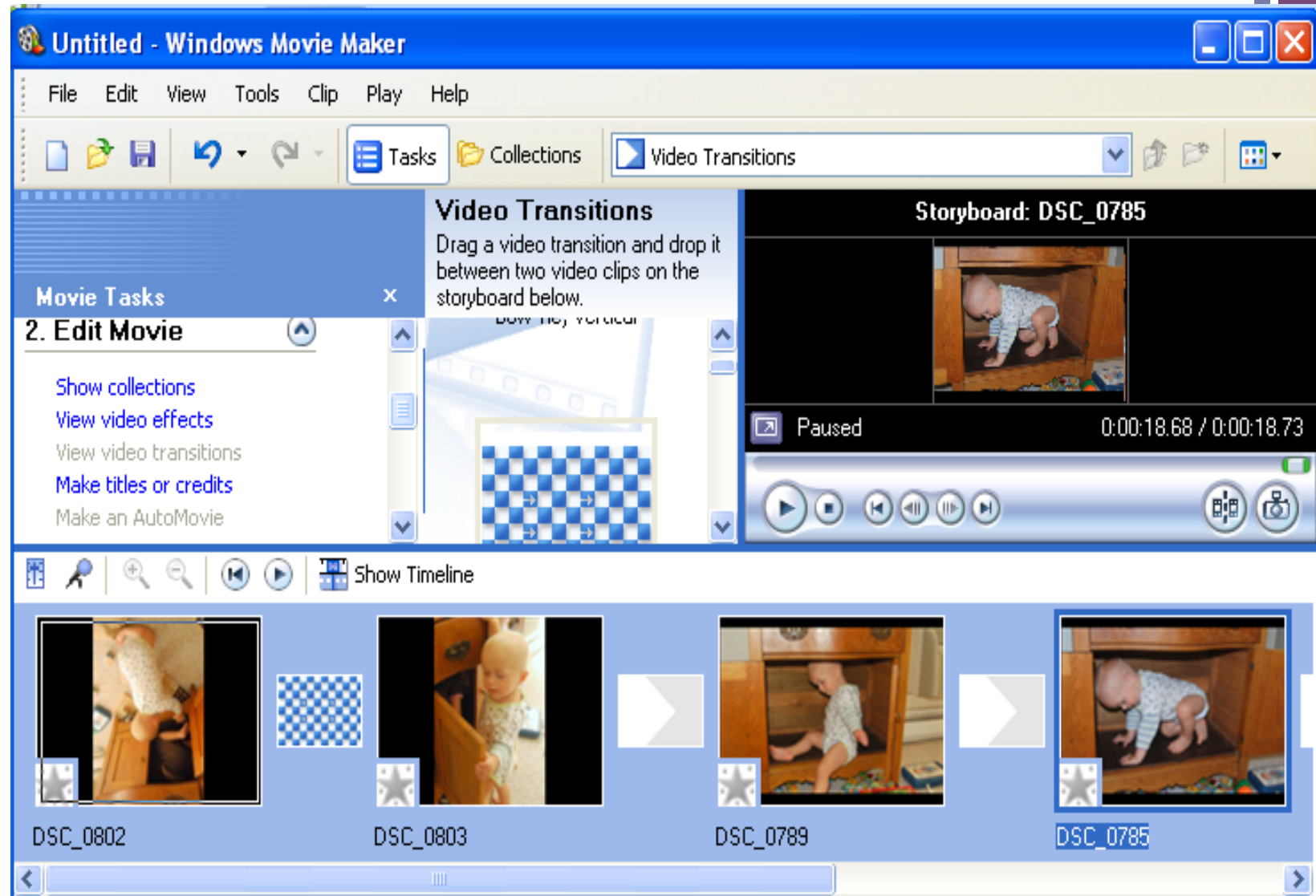
+

<http://www.pixlr.com>



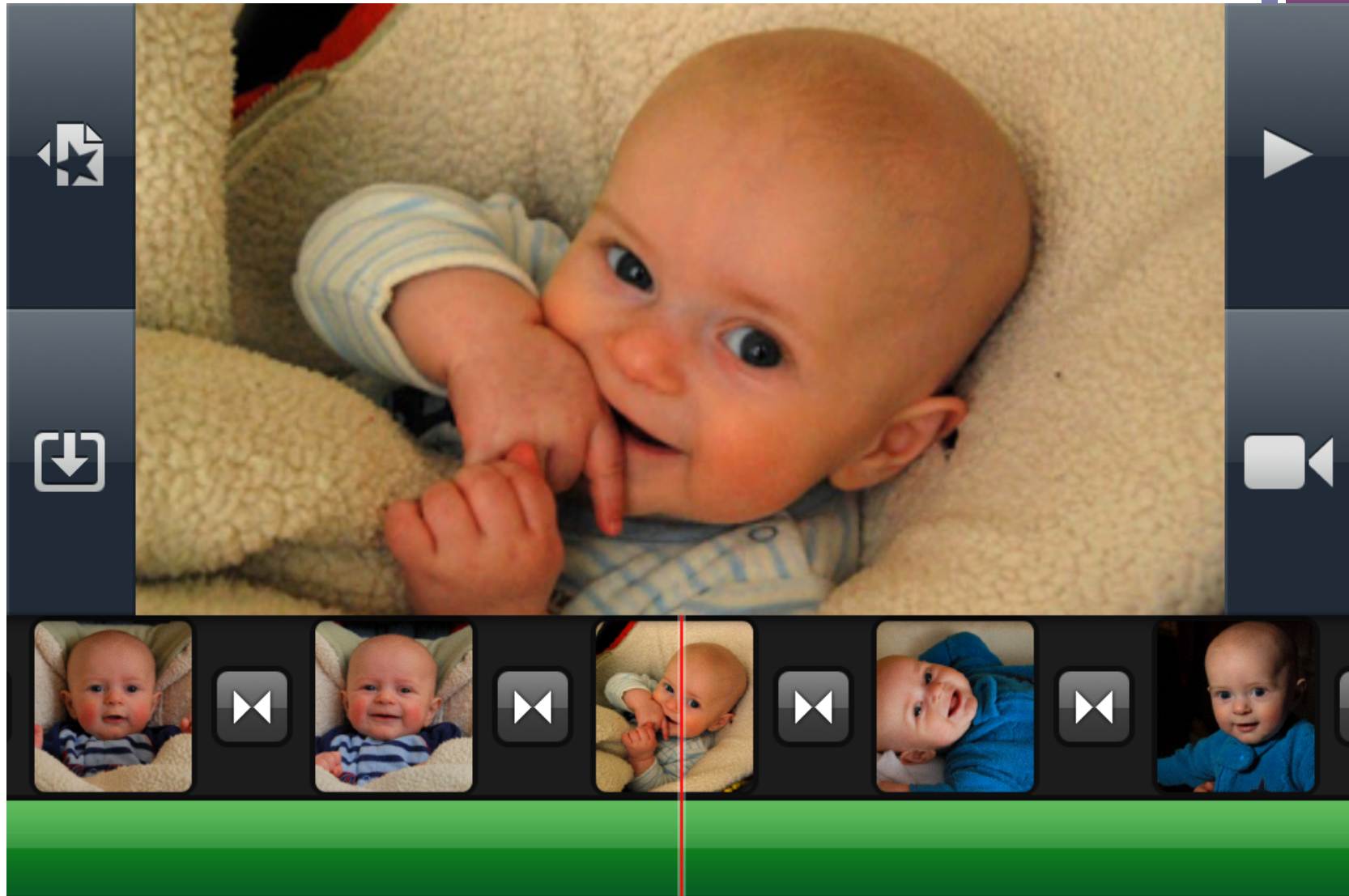


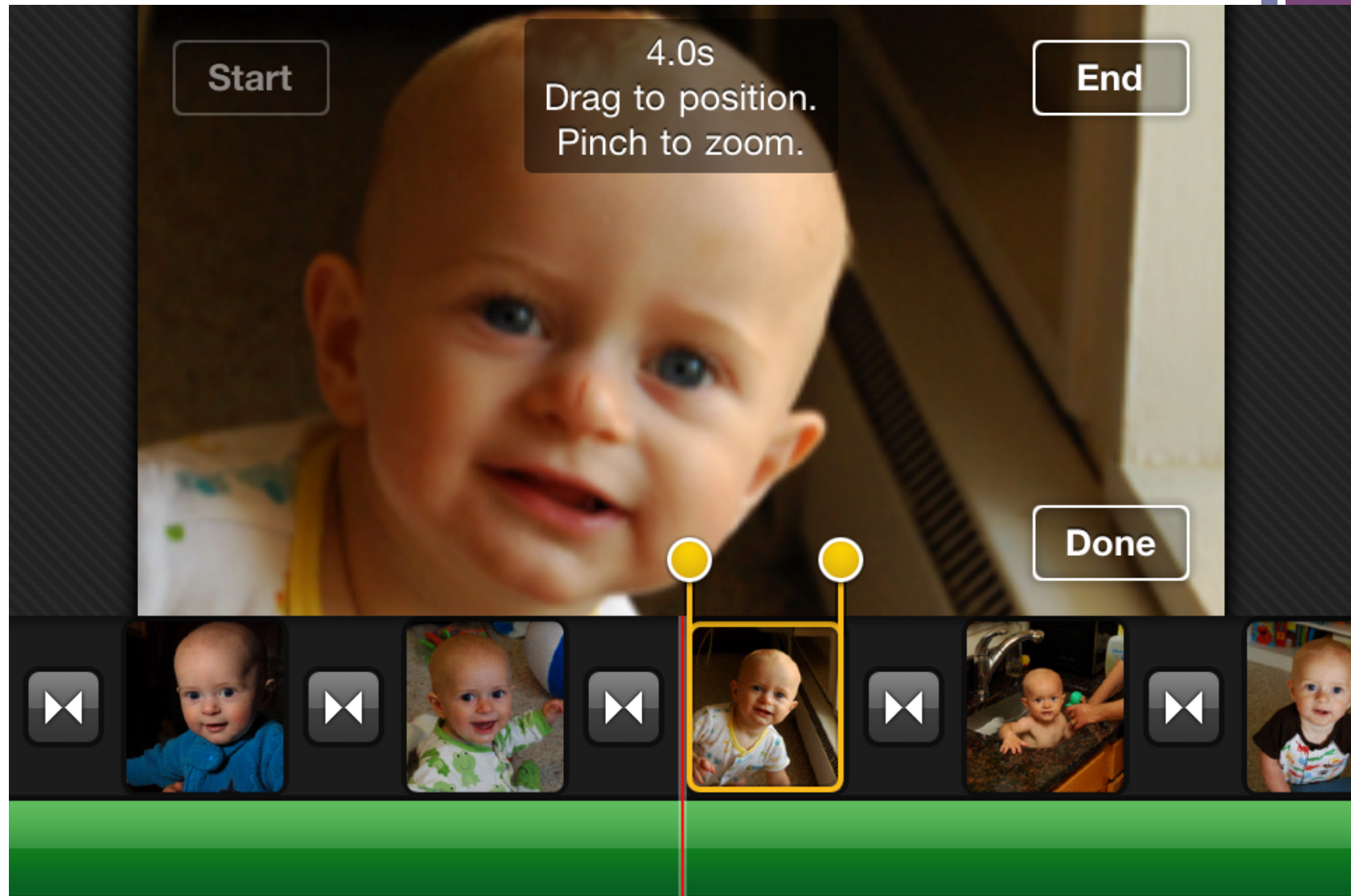
## Edit movies with Windows Movie Maker



## + Edit movies with Apple's itouch

63









<http://www.samanimation.com/>

65





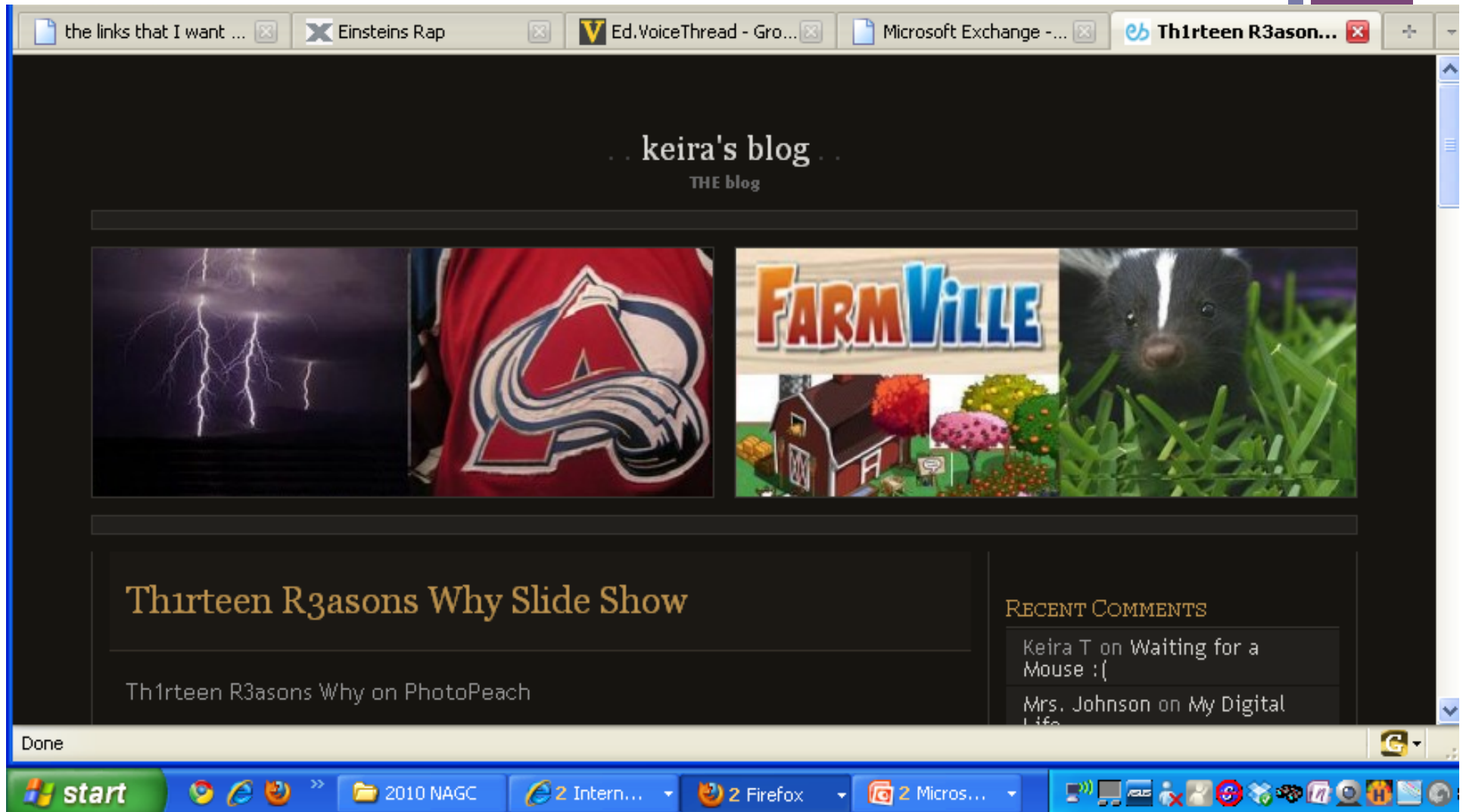
+  
[http://animoto.com/play/  
n33GGqJBS0waB6S2hxbYJw?  
utm\\_content=challenger](http://animoto.com/play/n33GGqJBS0waB6S2hxbYJw?utm_content=challenger)





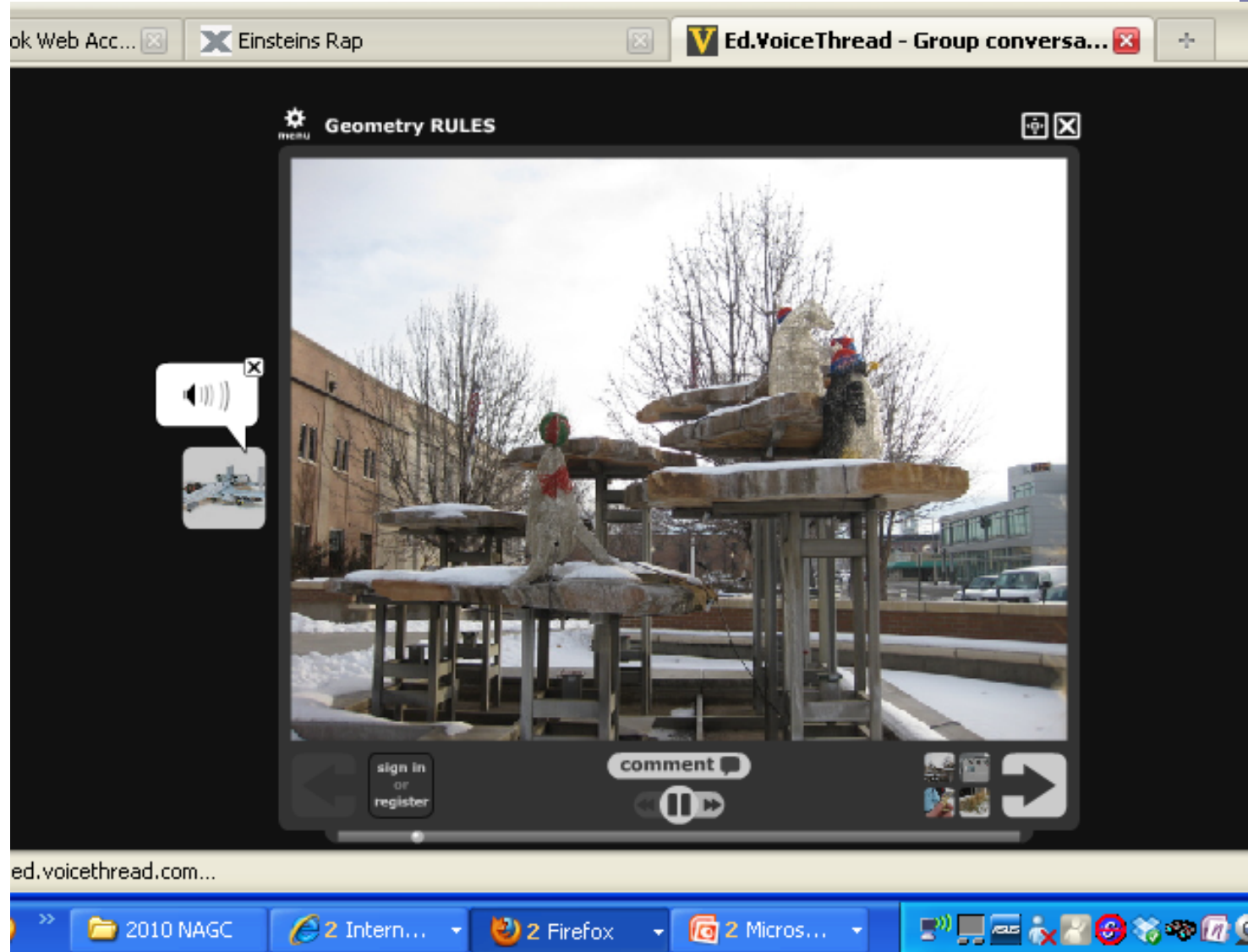
<http://emskeira.edublogs.org/2010/04/27/th1rteen-r3asons-why-slide-show/>

68





+ <http://mesakids.ed.voicethread.com/?#q.b894105.i4764926>



+  
<http://www.xtranormal.com/watch/6400659/>

Favorites X Einsteins Rap

Follow us on Facebook & Twitter!

CREATE ACCOUNT — SIGN IN — CHANGE LANGUAGE

Connect with Facebook

xtranormal PROJECTS CREATED: 9,326,280

MAKE MOVIES WATCH MOVIES DESKTOP WEB

EINSTEINS RAP

CREATED BY JOHNWIMAN  
 DATE CREATED APRIL 13, 2010  
 LENGTH 1 MIN 37 SECS  
 VIEWS 1,742

SEND IT

REMIX

G General Audiences

johnwiman  
 2010-04-13 13:49:33

Whatch Einstein Rap about relativity.

Added: 7 months ago Duration: 1 min 37 secs

URL <http://www.xtranormal.com/watch/6400659>

Embed <object width="480" height="390"><param

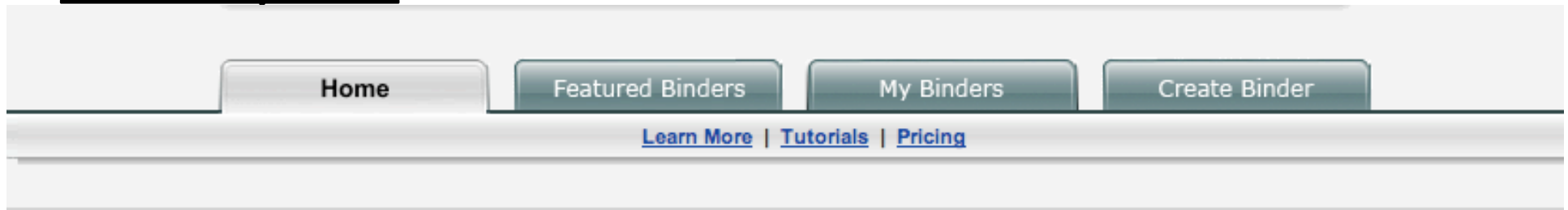
Done

2010 NAGC 2 Intern... 2 Firefox 2 Micros...



[http://livebinders.com/play/play\\_or\\_edit?id=41455](http://livebinders.com/play/play_or_edit?id=41455)

Access Key: Jann

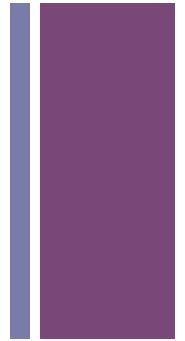


LiveBinders is your 3-ring binder for the Web

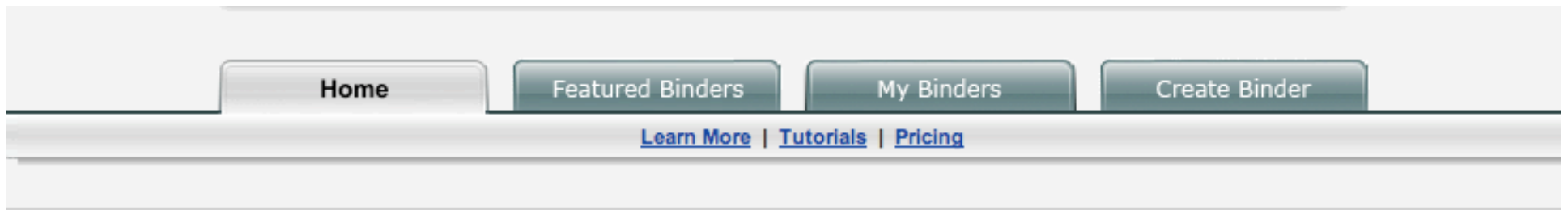
- Collect your resources
- Organize them neatly and easily
- Present them with pride

Best of all, it's **free!**





<http://livebinders.com/edit?id=50325>



LiveBinders is your 3-ring binder for the Web

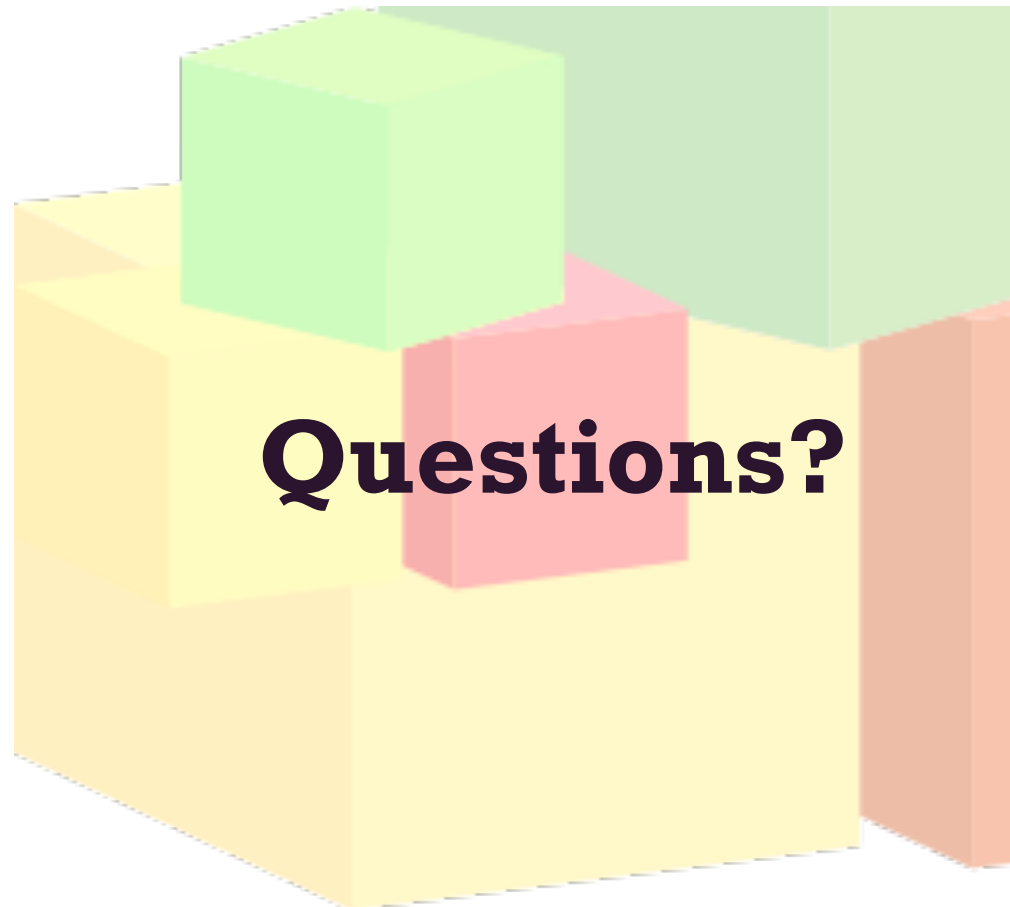
- Collect your resources
- Organize them neatly and easily
- Present them with pride

Best of all, it's **free!**





In the 21<sup>st</sup> Century, using technology to enhance student learning is no longer optional...it is essential for preparing learned citizens.



# Other resources

List of sites to use for differentiation	<a href="http://www.tizmos.com/jleppien">http://www.tizmos.com/jleppien</a>
Learning Centers to Enhance Your Work in Differentiation	<a href="https://sites.google.com/site/differentiationlearningcenters/">https://sites.google.com/site/differentiationlearningcenters/</a>