

Teaching Evolution Through “Other Voices” in Video Multimedia and Video Tutorials

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Reasons for Distribution of GSA Presentation by PDF document:

- PDF document file is much smaller size for distribution compared to the PowerPoint presentation file for downloading
- PDF document should be readable on almost all computers with Adobe Acrobat Reader
- PDF document shows text of presentation – faster to read than hearing narration, and text can be reviewed in ways that narration cannot
- PDF document contains links to media files stored online – media files do not need to be embedded in document. That does mean, however, that to play the media files, a live connection to the web is required

Instructions for playing media files as links in this document:

To play each video, click the link to play in a new browser tab.

Bill Nye video:

<https://www.youtube.com/watch?v=dXdUTJqI7u8>

Did Bill Nye’s video engage you? Was your gaze and attention drawn to the video as an attractor in a way not present with text? That’s what I’ve learned as I’ve used more and more video multimedia in my teaching.

Please report any broken links for failures to play to me at: sbrande@uab.edu

VIDEO GALLERY
MINERALS
IDENTIFICATION OF MINERALS
IGNEOUS ROCKS & PROCESSES
WEATHERING & SOIL
DESERTS & WIND
SEDIMENTARY ROCK
METAMORPHIC ROCKS
GEOLOGIC TIME
RIVERS & STREAMS
GROUNDWATER
SHORELINES
MASS WASTING
EARTHQUAKES
PLATE TECTONICS
SOLAR SYSTEM
TEACHING EVOLUTION

Teaching Evolution with Video

Biological evolution is a scientific theory of great significance, on par with others that explain the broadest ways of nature. Although our scientific understanding of biological evolution has enabled mankind to develop vaccines against disease-causing organisms, construct modern medicine, and engineer partially synthetic bacterial genomes, the theory remains controversial in many K-12 public schools in the USA.

In the classroom, the teacher's role is to facilitate a personal conversation with students about the science of evolution. Teaching evolution from many different viewpoints learned from many different viewpoints on the web, particularly through YouTube, enables a more comprehensive understanding of biological evolution from many different sources. Student exposure to different points of view is one way to capture student attention, raise questions, and help students reach individual students through specific touchpoints.

The sample of videos here presents different voices on evolution that teach scientific ideas, convey individual understandings, and raise issues ripe for discussion and exploration.

Filter & Search

My Snips

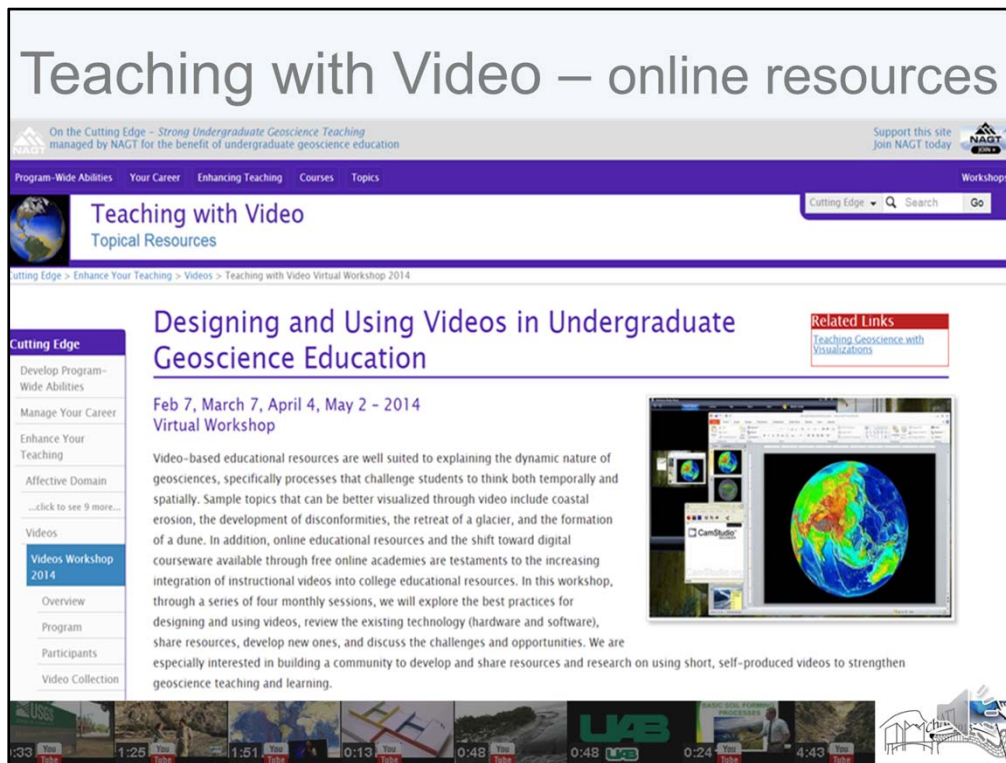
Keywords: evolution

Clear All Filters

39 snips found

Links to videos with evolution and teaching examples are posted on my website, accessible here:

<http://ezsnips.squarespace.com/teachingevolutiongallery/>



There's been an increasing interest in video multimedia in teaching. Last year I was a participant and presenter in the NAGT workshop on Teaching with Video organized by Dave McConnell of NCState and Katryn Wiese of CCSF. The workshop sparked my activity as I learned more about the value of teaching with multimedia video.

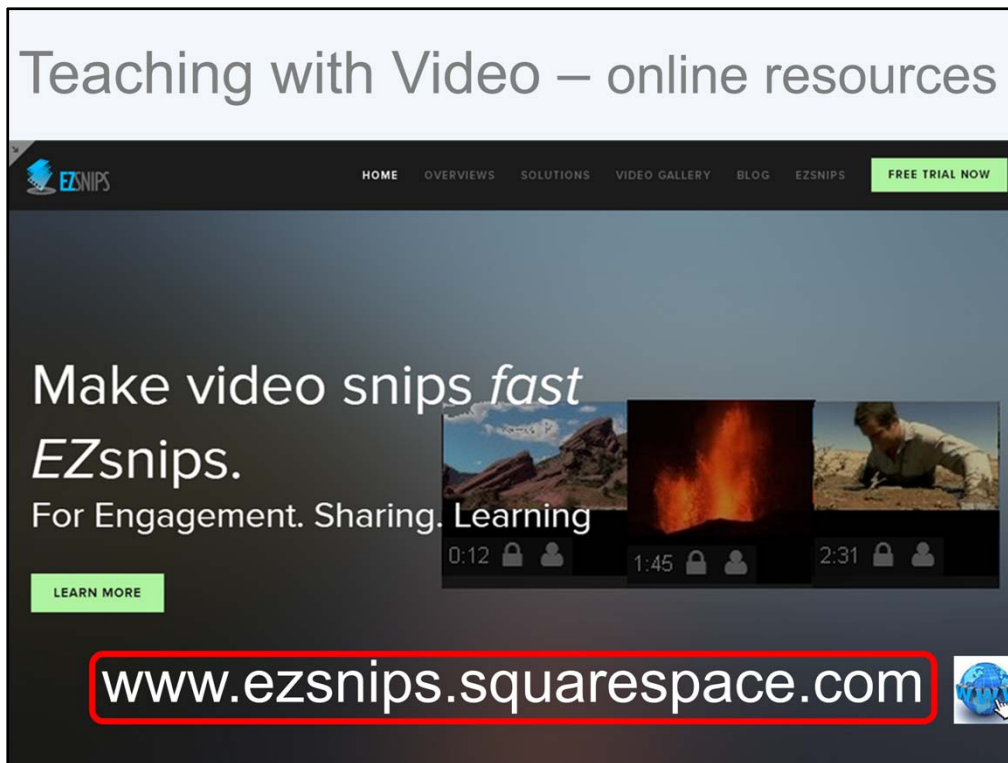
The NAGT website now has much information about the workshop, including examples and activities.

The entry to the NAGT workshop is here:

<http://serc.carleton.edu/NAGTWorkshops/video/index.html>

A portion of my contribution to the video workshop is here:

<http://serc.carleton.edu/NAGTWorkshops/video/activities/98575.html>



I built a website with extensive resources on teaching introductory geoscience with video. Evolution included. Explore it for many examples I've posted. I use these in my introductory geology course, along with examples of video tutorials designed to turn a passive viewing experience for students into an active learning one.

Click for access:

<http://ezsnips.squarespace.com/>



We know from studies in multimedia learning that video is a powerful medium that helps students to 1) engage, 2) organize, and 3) integrate new information with what they already know (or believe).

With video, we can bring other voices into the classroom – voices who speak with authority, or who make us cringe, or argue, or even change our views.

There are, of course, many “voices for evolution”. Perhaps the best compilation in print is the volume issued by the National Center for Science Education, currently in the third edition.
www.ncse.com/voices

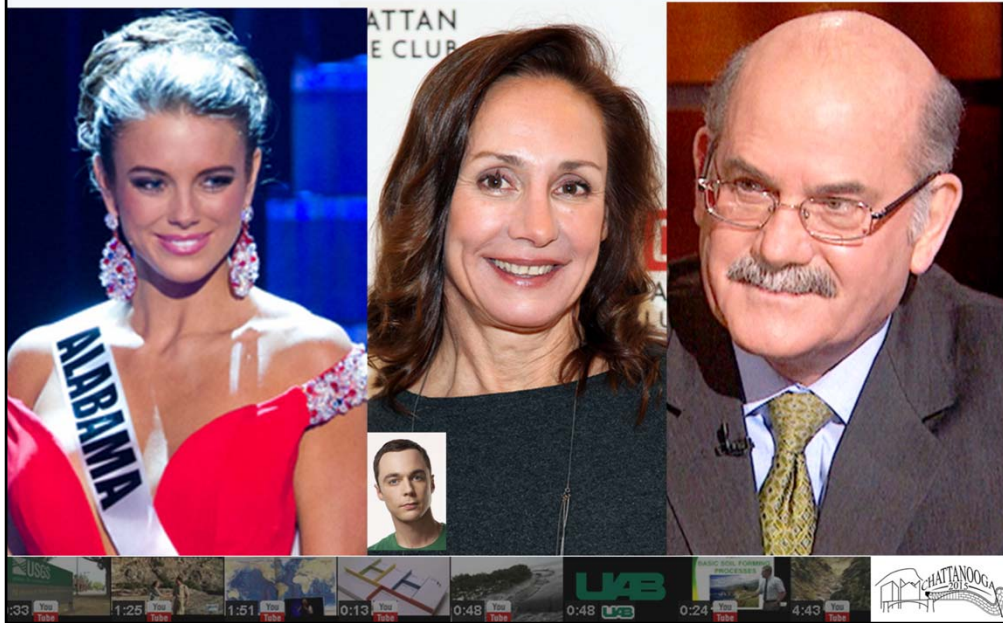
The NCSE has a great deal of video online as well. Though much of their video is of entire talks or presentations tens of minutes to an hour or so long. Not at all suitable for quick shots in the classroom.

NCSE multimedia resources may be found here:
www.ncse.com/multimedia

I’ve spent a significant amount of time searching YouTube for high quality video suitable for teaching. I’ve provided links on my SquareSpace website, and I’ll show a few of those today.
<http://ezsnips.squarespace.com/>

http://ncse.com/files/images/voices_for_evolution_cover.img_assist_custom.jpg

[Other] Voices for anti-Evolution



I want to introduce you to the 2011 Miss Alabama winner, Madelaine Mitchell, and other contestants. Also, Laurie Metcalf, actor who played Sheldon's mom on The Big Bang Theory. And "Don" McLeroy, a dentist and Republican former member of the Texas State Board of Education (SBOE).

Let's see what they have to say about teaching evolution in the K-12 public school system.

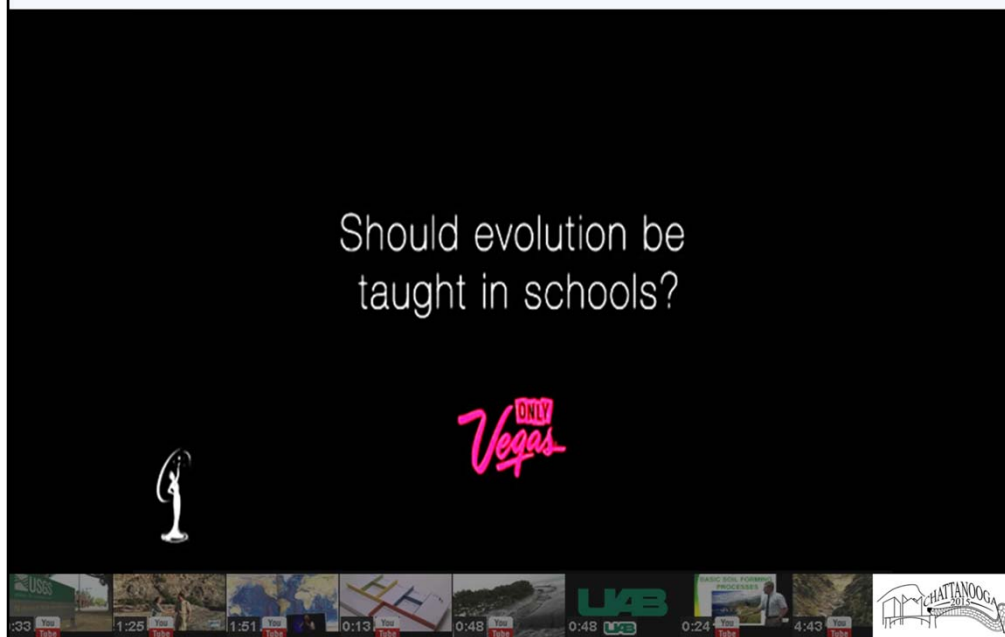
Image credits:

<https://thenypost.files.wordpress.com/2013/12/lauriemetcalf.jpg>

<http://diversitynewsmagazine.com/wp-content/uploads/2011/06/Miss-USA-2011-Final-41.jpg>

http://colbertnation.mtvnimages.com/images/shows/colbert_report/videos/season8/08090/cr_08090_05_16x9.jpg

Miss USA - 2011



So what's evolution got to do with a beauty pageant?

In the 2011 Miss USA competition, question #2 was this. Let's see how Miss Alabama and a few other contestants answered this particular question.

www.ezsnips.com/9JkO6tLxDT_lo

The entire set of interviews may be viewed here.

www.youtube.com/watch?v=UkBmhMOR2A0

Why are these statements illuminating to us? Because these contestants are very much like many of our general studies students. They are 18-26, unmarried, and from across the US.

AFTERWARDS: Suppose you gave your students this question - how would they answer this question? Do you have a good idea of the diversity of their responses?

By the way, Miss California became Miss USA 2011; Miss TN was 1st runnerup; and Miss AL was 2nd runnerup.

Voices – Texas State Board of Ed.



Texas and California are major consumers of textbooks in the K-12 public school system, and in these states the most important state legislative battles are fought and propagated elsewhere.

Anti-evolutionists on school boards often argue by citing experts out of context.

The next 2 minutes of video provide insight into these political battles.

Here's one example.

www.ezsniips.com/VNPWmgqS6alsB

Voices – Stephen Jay Gould



McLeroy cites Stephen Jay Gould and his theory of stasis, as being anti-evolutionary. But we know that's not the case.

Let's see what Gould says about stasis, and then decide whether or not McLeroy has correctly used Gould's opinions.

www.ezsniips.com/uDOgBAIS1SHow

AFTERWARDS: This pair of videos, of McLeroy and Gould, would make an active learning opportunity for students, from the lower levels of Bloom's taxonomy to higher ones, if appropriate viewing instructions and questions were composed.

Ask students to identify positions, describe arguments, and evaluate the arguments they hear presented. These guided viewing instructions then become the vehicle for turning the passive viewing experience into an active one.

How can this pair of videos be used in the classroom? How can the power of video help students to climb the hierarchy of cognitive skills?

Ask students to do some lower level thinking - identify positions, describe arguments made. Then some higher level thinking by evaluating the validity of these two positions.

Nothing too big and complicated. A 5 minute writing exercise based on less than 3 minutes of video.



During lecture I could show some slides and describe fossils when I talk about evidence for adaptation and evolution.

Or, I could show a professionally produced interview with an expert like DeSilva. Let's watch. www.ezsnips.com/733oeWNTPuxd6

Numerous science organizations, like the AAAS, have produced professional quality short videos, and evolution is a common topic. Their videos can provide the same, or better content than me. And the short videos provide during lecture a cognitive break as well.

AFTERWARDS:

This video has value in a number of ways. It provides student a cognitive break from my lecturing. It provides a broader context to the particulars I present in lecture. And it is content-rich – DeSilva shows the bones and explains the biomechanics. I can't do that.

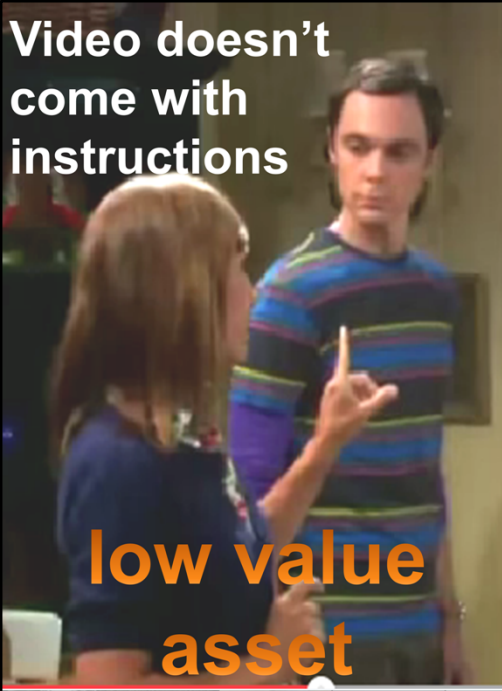
Video Tutorial – Evolution



We shouldn't forget the power of popular culture. Especially that of college-aged students, like The Big Bang Theory. This TV show might seem like an unlikely candidate for presentation in my introductory class. However, it has great potential for a student activity.

The writers have brilliantly identify evolution as a controversial subject and condensed this complex issue to just a few tight lines of dialogue.

www.ezsnips.com/FMuIPh_C1KdI



GeoScience Evolution & The Big Bang Theory Video Tutorial

Subject(s) of video(s): teaching evolution

Purpose(s) of video(s): observe, describe

YouTube video: http://ezsnips.com/FMULPh_C1IKdI

The teaching of evolution in K-12 public schools is controversial in many US states. In this snip from the popular TV show "The Big Bang Theory", Sheldon and his mother express different views about the teaching of evolution. Watch and listen carefully, and then answer the following questions.

<p>After Sheldon's friends say they're going to take Sheldon home, Sheldon replies that he's going to "speed"</p>	<p>Sheldon's mother tells Sheldon to "...watch his mouth" because "everyone's entitled to his own opinion"</p>
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0:33 1:25 1:51 0:13 0:48

0:48 0:24 4:43

My personal opinion is that most classroom video by itself is of relatively low value by itself, because video doesn't come with instructions.

So I'm creating what I call "video tutorials", a short handout of guided viewing instructions, and with questions that demand student engagement and analysis. I create my video tutorials with Bloom's taxonomy in mind, underlying the tutorial's arrangement, organization, and goals.

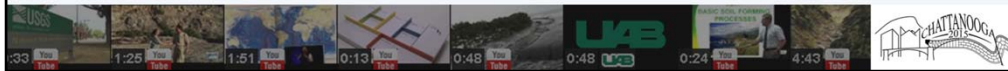
You can access the video and the video tutorial here.

<http://ezsnips.squarespace.com/teachingevolutionwithtutorial/>

Video + Tutorial = High Value Asset

Is the theory of evolution...

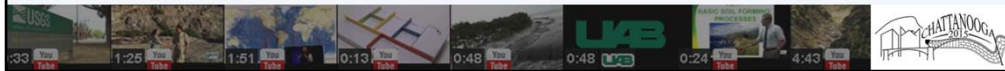
- a) FACT
- b) OPINION
- c) both FACT and OPINION
- d) neither FACT nor OPINION



Here's one of the multiple choice questions I asked. A simple question. The answers can be revealing of student perceptions, pre-existing opinions, and prior knowledge.

Video Tutorial – Evolution: Fact? Opinion? Engagement / Understanding / Argument

Explain your choice. As part of your answer, you will need to define as best you can what you mean by FACT and what you mean by OPINION.



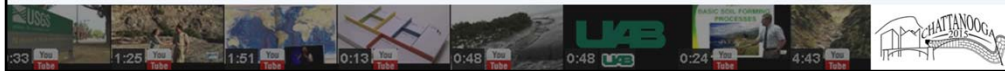
And following the multiple choice question, I left a space for students to write a short explanation.

Video Tutorial – Evolution: Fact? Opinion?

*SHOW OF HANDS: best choice among
a), b), c), d)*

Is the theory of evolution...

- a) FACT
- b) OPINION
- c) both FACT and OPINION
- d) neither FACT nor OPINION



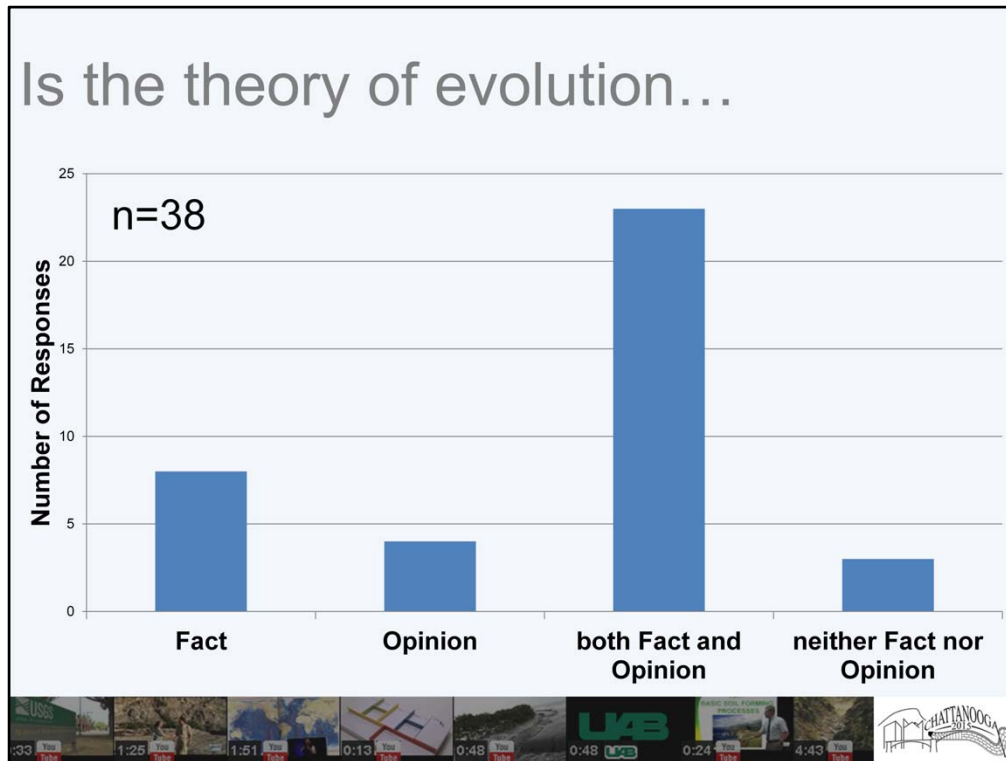
So let's have a simple show of hands here. We're an undergraduate class which has just watch the clip.

OK. You all have your own understanding of the meanings of FACT and OPINION.

Make your choice and raise your hand when I call out the letter.

- a) The theory of evolution is FACT
- b) The theory of evolution is OPINION
- c) The theory of evolution is both FACT and OPINION
- d) The theory of evolution is NEITHER FACT nor OPINION

Ok. Good. Let's see some student responses.



I created this new video tutorial and presented it to my 2 sections of physical geology as I reviewed the geologic time scale.

Here is the distribution of student responses. Interesting.

A fact is something that can be proven, and with the fossil record, evolution can be proven.

An opinion is a belief in something that cannot be proven. For example, "Avatar, the movie, is overrated" is an opinion because it cannot be proven.

Is the theory of evolution...

- a) FACT
- b) OPINION
- c) both FACT and OPINION
- d) neither FACT nor OPINION

A fact is something that can be proven, and with the fossil record, evolution can be proven.

An opinion is a belief in something that cannot be proven. For example, "Avatar, the movie, is overrated" is an opinion because it cannot be proven.

And some representative responses. To this student, the theory of evolution is FACT. Fact means "proven". Good answer.

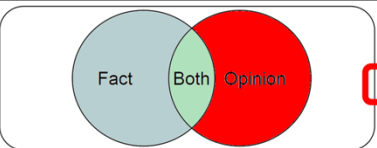
The student also understands OPINION as something THAT CANNOT BE PROVEN.

So FACTS are TRUE, but OPINIONS are UNPROVEN. Hmmmmm.

That's not true for opinions. Opinions are just what you believe. Of course you can believe something that is proven true – like gravity. Like evolution.

Can't OPINIONS also be TRUE?

- I believe that it is an opinion because facts must provide solid evidence to be proven. Also, because it is a theory and a theory is not a fact.



Is the theory of evolution...

- a) FACT
- b) OPINION**
- c) both FACT and OPINION
- d) neither FACT nor OPINION

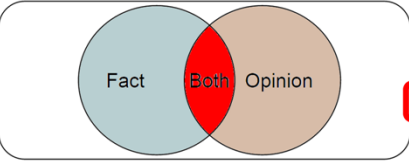
“I believe that is an opinion because facts must provide solid evidence to be proven. Also, because it is a theory and a theory is not a fact.”

USGS 1:25 1:51 0:13 0:48 0:48 0:24 4:43 CHATTANOOGA

This student understands the theory of evolution as OPINION, because the theory of evolution is not proven, so evolution is NOT a FACT.

This understanding is in error. Gravity is a theory. And gravity is a fact. You may know of one of Stephen Jay Gould's Natural History columns titled "Evolution as Fact and Theory". Evolution is a scientific theory. And evolution as a theory is proven. It's true.

"I'm a creationist so like the video you could say fact and I could say that's your opinion"



Is the theory of evolution...

- a) FACT
- b) OPINION
- c) both FACT and OPINION
- d) neither FACT nor OPINION

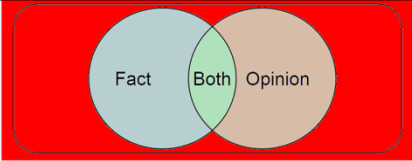
"I'm a creationist so like the video you could say fact and I could say that's your opinion"

USC 1:33 1:25 1:51 0:13 0:48 0:48 0:24 4:43 CHATTANOOGA

This student understands the theory of evolution as both FACT and OPINION, with the implication (because of the self-identification as "creationist") that evolution is certainly an opinion, but it has not been proven true.

This answer is in error. Evolution has been proven true. Yes – evolution is also a fact (a), and one can certainly hold an opinion on evolution as a true theory (c).

"It isn't a fact or opinion. It is a theory that some ...believe could be [true]...There is evidence supporting that it is true, and there is evidence supporting that is isn't true"



Is the theory of evolution...

- a) FACT
- b) OPINION
- ~~c) both FACT and OPINION~~
- d) neither FACT nor OPINION

"It isn't a fact or opinion. It is a theory that some ...believe could be [true]...There is evidence supporting that it is true, and there is evidence supporting that is isn't true"

USC 1:33 1:25 1:51 0:13 0:48 0:48 0:24 4:43 CHATTANOOGA

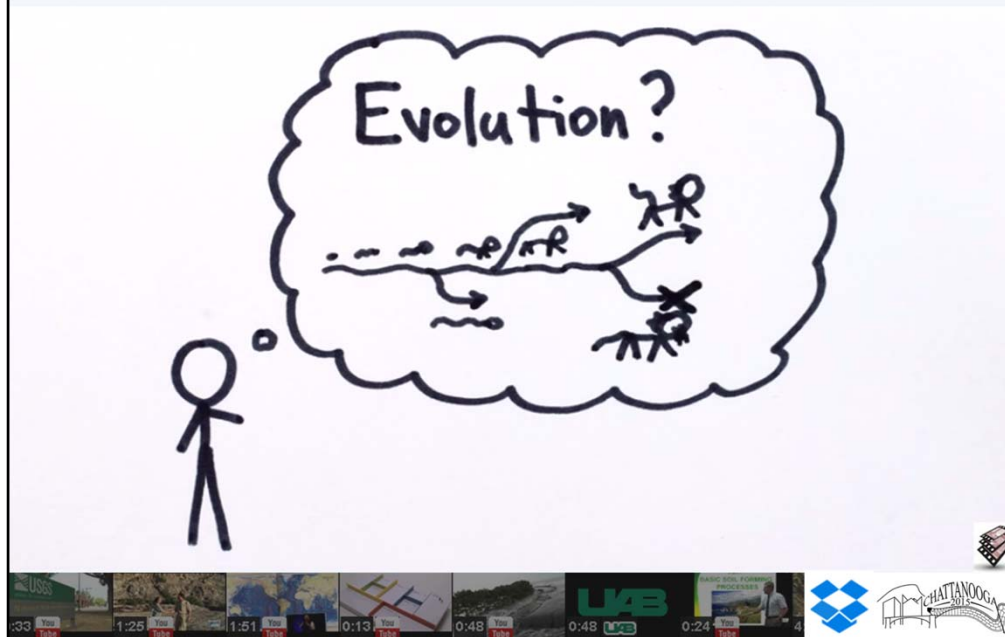
This student doesn't understand that the theory of evolution is a fact, even in the face of some evidence that requires modification to the theory. (Of course, it may also be the case that the student's understanding of evolution is faulty, and it is the student's understanding that needs modification).

So student responses to video voices are especially informative – but they also make teaching somewhat more difficult.

However, it seems to me that a better understanding of what students think they understand is a necessary starting point for teaching what we want them to understand.

That's why I'm now concentrating on creating video tutorials as critical components to accompany video in my teaching.

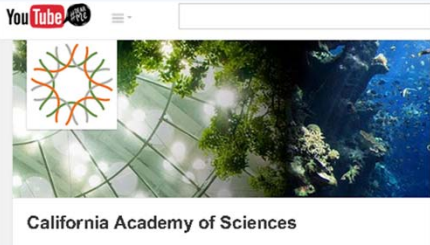
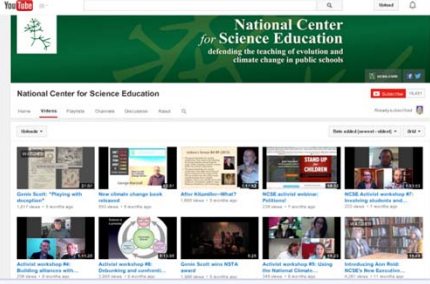
Broader Meanings of Evolution



I've discovered an entire genre of science video by talented animators. This one by Henry Reich provides a broader understanding of evolution that is especially visually engaging.

www.ezsnips.com/LBzXrtsWJZ7ko

YouTube Evolution Resources



Even more video resources on YouTube

www.ezsnips.squarespace.com

numbers of videos that relate to evolution. Museums, government agencies, university faculty, and many others post video of collections, interviews, field operations, and more. Each link will return results from a search of "evolution" from the YouTube channel. Browse the search results for videos of interest. Explore YouTube further for resources aligned to your needs.

- American Association for the Advancement of Science (AAAS)
- American Museum of Natural History
- BBC Earth
- California Academy of Science
- The Field Museum (Chicago)
- The Leakey Foundation
- New Scientist
- The Royal Institution (London)
- Smithsonian Institution
- University of California Television
- Yale Peabody Museum


I've been searching YouTube for some time now, and I've located a number of legitimate channels that carry evolution-related videos.

I've constructed a web page with these resources on my website that you can freely access. Here is the link.

<http://ezsnips.squarespace.com/teachingevolutiongallery/>

Values of video in teaching

low value asset



Instructor

- background
- extensions
- assessment

Student

- engagement
- content
- argument

GeoScience Evolution & The Big Bang Theory Video Tutorial


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After Sheldon's friends say they're going to take Sheldon home, Sheldon replies that he's going to "...spend the rest of my life here...". Which state?

Sheldon's mother tells Sheldon to "...watch his mouth" because "everyone's entitled to his own opinion. Sheldon replies that ... a) evolution isn't fact,

high value asset



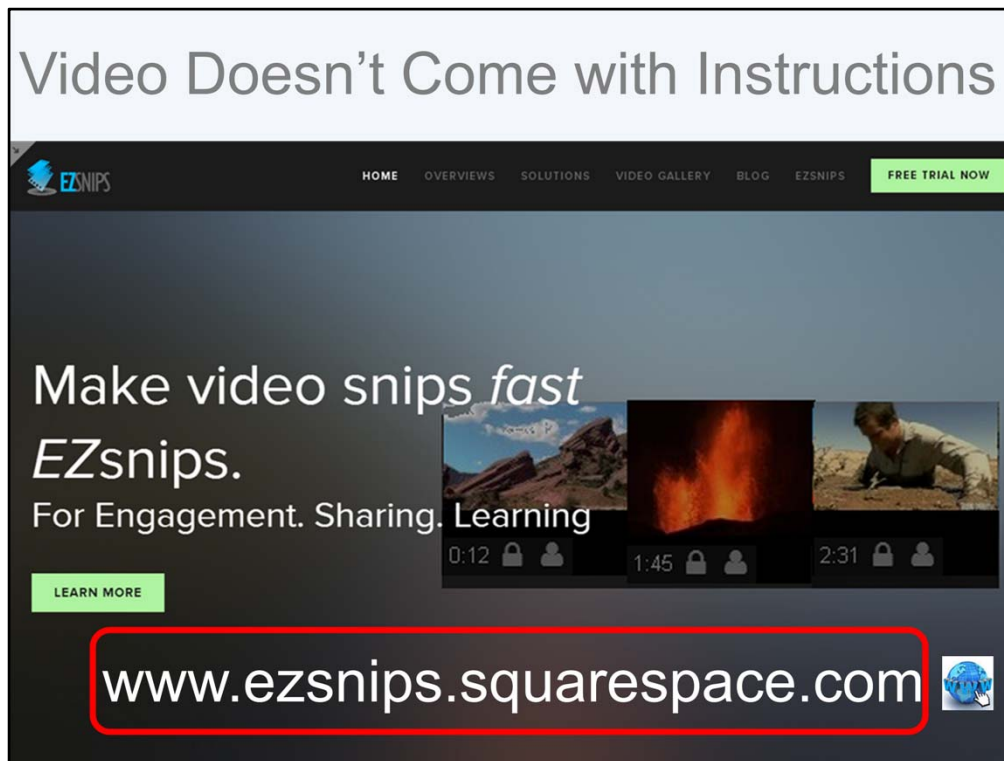
From my recent experiments, I've convinced myself that video has significant value for both me as a teacher, and students I teach.

Video

- is engaging,
- provides valuable content that can replace some lecture time, and
- raises questions and issues for discussion and assessment.

Here's another evolution video from which a video tutorial may be easily constructed.

http://ezsnips.com/5s4eHoXac_deA

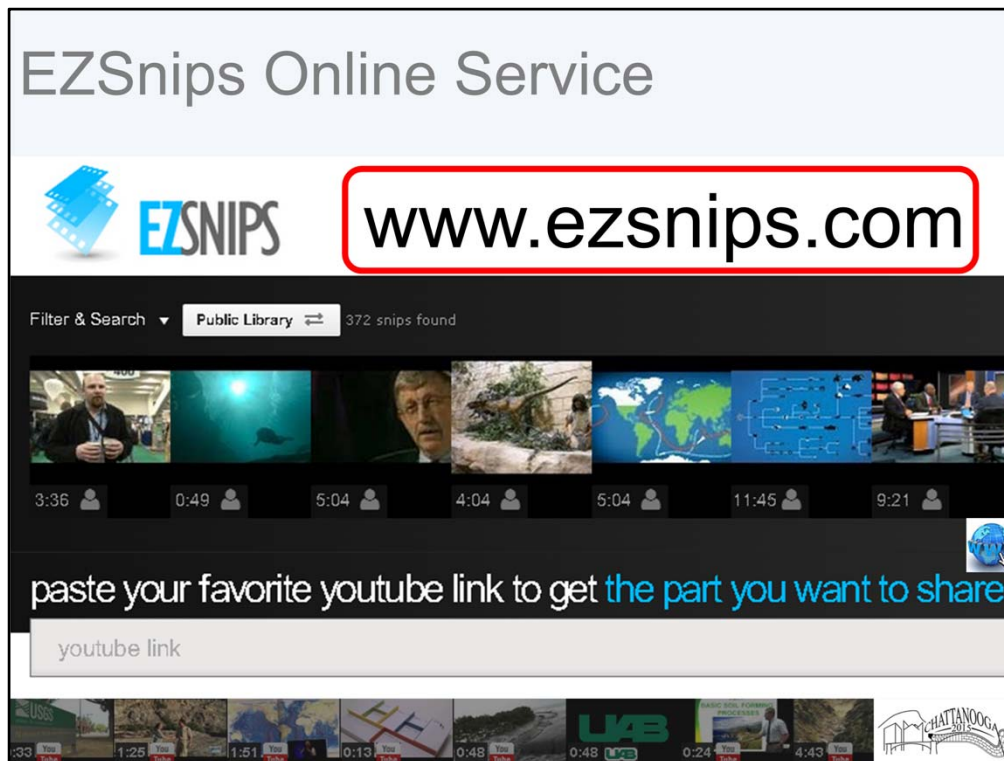


I've built a site that compiles much more information about my thoughts on using video in the classroom.

<http://ezsnips.squarespace.com/>

If you're interested in more information, head over to www.ezsnips.squarespace.com and browse the various menus. I've just added some new material to the teaching evolution with video section.

<http://ezsnips.squarespace.com/teachingevolutiongallery/>



The technology needed to download, edit, and produce video for PowerPoint was (and still is) daunting to many teachers. I know, because I devoted a year to that painful experience.

So a colleague and I have created some technology to make it vastly easier to make video snips from YouTube videos, and we've put the experimental service online.

I use it now full time in my teaching, and I used it to play almost all the video snips during this talk.

Once you find a YouTube video that you want a small piece of, you can use EZSnips to create a link to play the snip in less than 2 minutes. The link can then be used in a browser, PowerPoint, or anywhere a web link goes.

If you're interested in trying out EZSnips, read about it on our Squarespace site and watch a couple of introductory videos there. Here's the menu.

<http://ezsnips.squarespace.com/howezsnipscanhelpyou/>

Then sign up for an account that's free while we're in beta.

<http://ezsnips.squarespace.com/registernewaccount/>

Thanks you for your attention. And I'll be happy to take questions.