

# STEM Society Meeting, June 9, 2015

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## **1 About the STEM Society and the STEM Society Website**

STEM is an abbreviation for Science, Technology, Engineering and Mathematics. The acronym STEM is commonly associated with K-12 education, but our use of the term is only slightly bound to this meaning. There are over one hundred people on the mailing list, although a much smaller group attends any one meeting. We meet on the second Tuesday of each month at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The meetings are open to all. The start time is 6PM. We make presentations, have

discussions, and have demonstration experiments. These relate to Science, the History of Science, Mathematics, Engineering, Philosophy and Technology at all levels. The topics have ranged from a technical discussion of the mathematics of General Relativity to scientific experiments for young students.

These meeting notes contain links to many other documents, which may be viewed or downloaded by clicking the link. A partial list of documents can be reached by clicking the heading **Documents**. The meeting notes may also be viewed in an archive file (archive.pdf), which is in the list of documents. Many of the documents are PDF files. They may be viewed or downloaded to the computer by clicking, provided Adobe Reader, or another program capable of reading PDF files, is present. There are many more documents available at the site than are listed under **Documents** because the documents.htm file is not at all up to date. The last time I checked, about March 2014, there were about 350 document files on the site. We are in the process of creating better techniques for finding documents and authors. The first meeting of the STEM Society was in November of 2006. For several years we used the content management program called Joomla. It had a fancy looking interface, but was hard to use. It overran the space somehow at our internet provider Bluehost. So we now have a very simple HTML site. It is not so slick looking as Joomla, but is very easy to maintain and modify.

**The web site is:**

<http://www.stem2.org/>

**Direct to the documents list:**

<http://www.stem2.org/je/documents.htm>

**Direct to the archive file:**

<http://www.stem2.org/je/archive.pdf>

## **2 The June Meeting Announcement**

The June meeting of the STEM Society will take place on the second Tuesday of the month, June 9, 2015, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM.

Topics:

- (a) Tom Grant will present a talk on Paleontology and fossil hunting.
- (b) We encourage surprise extemporaneous talks, projects, and "show and tells."

### 3 Tom Grant: Paleontology

Here is Tom's slide presentation on Paleontology and the hunting of dinosaur fossils.

<http://www.stem2.org/je/PALEONTOLOGY1.pptx>

### 4 Jim Emery: Some Differential Equations of Mathematical Physics

Many of the partial differential equations of Physics can be solved by the separation of variables technique. This leads to ordinary differential equations, and often to various sets of orthogonal polynomials such as the Legendre functions.

We did not get to a discussion of this topic, but I had intended to discuss some subjects contained in various documents such as the following:

```
diffeq.tex:\title{Differential Equations}
hydrogenatom.tex:\title{The Hydrogen Atom}
fouran.tex:\title{Fourier Analysis}
fourier.tex:\title{Joseph Fourier}
laplace.tex:\title{An Introduction to Laplace's Equation in Physics}
quantum.tex:\title{Quantum Mechanics}
quantumsc.tex:\title{The Quantum Theory of Semiconductors}
```

For further investigation see the bibliographies of some of these documents.

Some of these are working rather than completed documents, and most should have a version on the stem2.org website. The documents can be viewed or downloaded using the pdf version, and searched for with the stem-docs script, or more crudely by searching the document list found on the website. For example to view or download the hydrogen atom document, use

`stem2.org/je/hydrogenatom.pdf`

## **5 Tom Grant: Power Point Document on Solar Leasing Presented January 2015**

stemsoc011315 Title: Stem Society Meeting, January 13, 2015

<http://www.stem2.org/je/stemsoc011315.pdf>

<http://www.stem2.org/je/solarleasingtgrant2015.pptx>

## **6 Steve Cummins: Locally Collected Rocks With Embedded Fossils**

Steve brought in several large rocks that he had collected locally. It would have been nice to have taken some pictures of them. Here is more information recently supplied by Steve:

Hi Jim, thank you for including my show and tell in the summary. Actually most of the paleological finds I had for show and tell came from the material that was removed from the ground area where a new school was being built.

This construction area was located between Metcalf and Antioch Road at about 145th St in Kansas, I'm not sure but that might be located in OPKS?

I think the age of these materials is in the 350 million year ago time frame perhaps even 400 million, but hey give or take 50 mil., whats a few million years differential between friends?

Geologically speaking, this part of the United States was a shallow inland sea and while I am not sure when in which particular epoch this inland sea bed was finally exposed to become a marsh and eventually dry land, but suffice to say it was probably 150 to 250 million years ago. This part of the midwest was an area that saw a lot of freshwater deposition and erosion during the ice ages. Terminal moraines characterize parts of the northern

boundary of Missouri, glacial till pushed ahead of the advancing glaciers was deposited everywhere north of the river, and when the glaciers finally retreated, they left debris from material ground into the ice sheets as it was pushed along, smearing material from the all the upper states into Canada as far down south as upper regions of Missouri. I think the Wisconsin Age period of glaciation occurred about 14,000 years ago, interestingly about the same time the west coast was seeing the first wave of immigrants descending into the north American Continent crossing the land bridge from Siberia into what is called Alaska today.

Anyway, all that glaciation in the upper Midwest and back east, created huge amounts of water, cascading downward towards what is now the Gulf of Mexico. This ice melt sent billions and billions of acre feet of water everywhere and anywhere lower in elevation, basically the entire Midwest region and probably the entire south eastern central states as well probably starting at the Blue Ridge Mountains, going westward to probably the middle of Kansas on down to the Gulf. This is a humongous amount of land mass affected by the last of the Ice Age glacial melt waters.

Anyway, the long and the short of it is this, so much of the upper land mass was carried to the Gulf by erosion that literally the last 300 million years accumulation was swept away, cleaned off the Midwest region, taking with it all the bones and other more recent, and really cool stuff to find, in the process.

All that's left for us to sift through now is the strata now exposed as surface material that is derived from parent materials from 300 to 400 million years ago, way, way before the age of the dinosaur.

That's why it is extremely rare to find an outcropping that is young enough to contain dinosaur fossils within it, here in the Midwest. Not impossible, but rare. All that "young" material is long gone and buried miles deep in the Gulf of Mexico..

That's why all you can find in the road cuts around I-435 and I-635 are the fossilized remains of crinoids, mussels, clams, seaweed beds, and tiny crustaceans like trilobites from long, long ago. Kind of not interesting compared to dinosaur bones don't you think?

Oh well, it is what it is.

Steve C.

Steve Cummins.