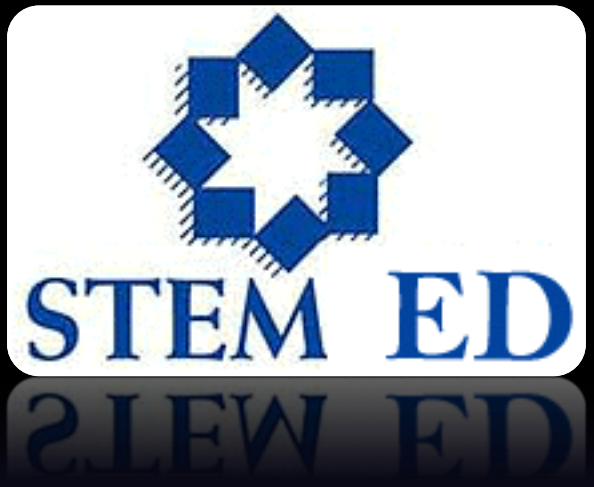
2015

Interdisciplinary Science Connections

Fred Venne
Amherst College



Science and Engineering Saturday Seminar Series

February 7, 2015

Beneski Museum of Natural History

Amherst College – Your host is Fred Venne

Interdisciplinary Science Connections

- 8:30 AM – Light Refreshments
- 9:00 AM – Program Begins –PAINO
  - -Welcome/Introductions etc
  - -Morning Warm Up
  - -Overview of the day
- 9:30 AM – Guided Visit –BMNH
- 10:20 AM – Break
- 10:30 AM – Lab/Field Guides (Intro) -PAINO
- 10:45 AM – Lab/Field Guide work -BMNH
- 11:45 AM – Small Groups Share -PAINO
- 12:10 – Visual Scanning/Observation Activity -BMNH
- 12:40 – Closing and Feedback
- 1PM – Next Session February 28. Introduction to Scratch Programming. John Heffernan,

A little morning math warm-up

- Pick a number between 1-5
  - 1
  - 2
  - 3
  - 4
  - 5

Now Multiply Your Number by 9

- 1 x 9 = 9
- 2 x 9 = 18
- 3 x 9 = 27
- 4 X 9 = 36
- 5 x 9 = 45
- 6 x 9 = 54

If your new number is 2 Digits Add them together.

- # + # = ?
- If your new number is one digit you will use that

Now Subtract 5 from your number

- 5 = ?

This is your final number

(Keep this in mind, don't share)

Now take your number and convert it to a letter.

- 1 = A
- 2 = B
- 3 = C
- 4 = D
- 5 = E
- 6 = F

NOW QUICKLY PICK A COUNTRY THAT BEGINS WITH THAT LETTER

- C O U N T R Y
- ___ ___ ___ ___ ___ ___ ___

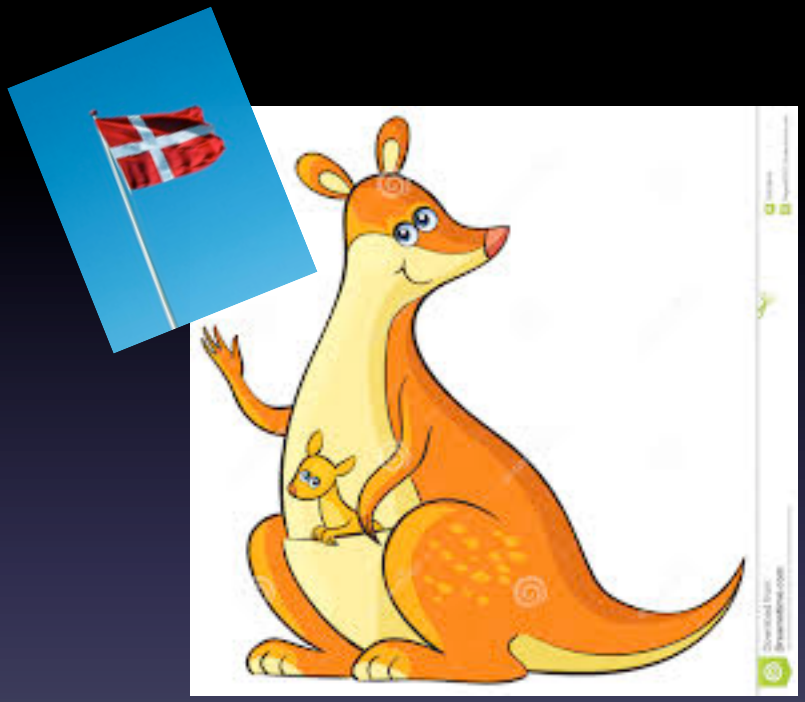
NOW TAKE THE LAST LETTER OF THAT COUNTRY AND THINK OF AN ANIMAL THAT STARTS WITH THAT LETTER.

- A N I M A L
- ___ ___ ___ ___ ___ ___ ___ ___

NOW THINK OF A COLOR THAT STARTS WITH THE LAST LETTER OF YOUR ANIMAL

- C O L O R
- _____ _____ _____ _____ _____ _____

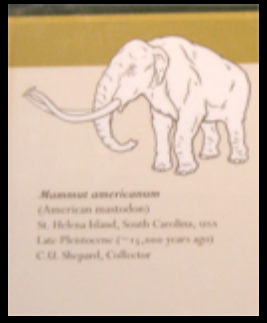
Were you of thinking…



The Beneski Museum of Natural History – in a warmer season…..

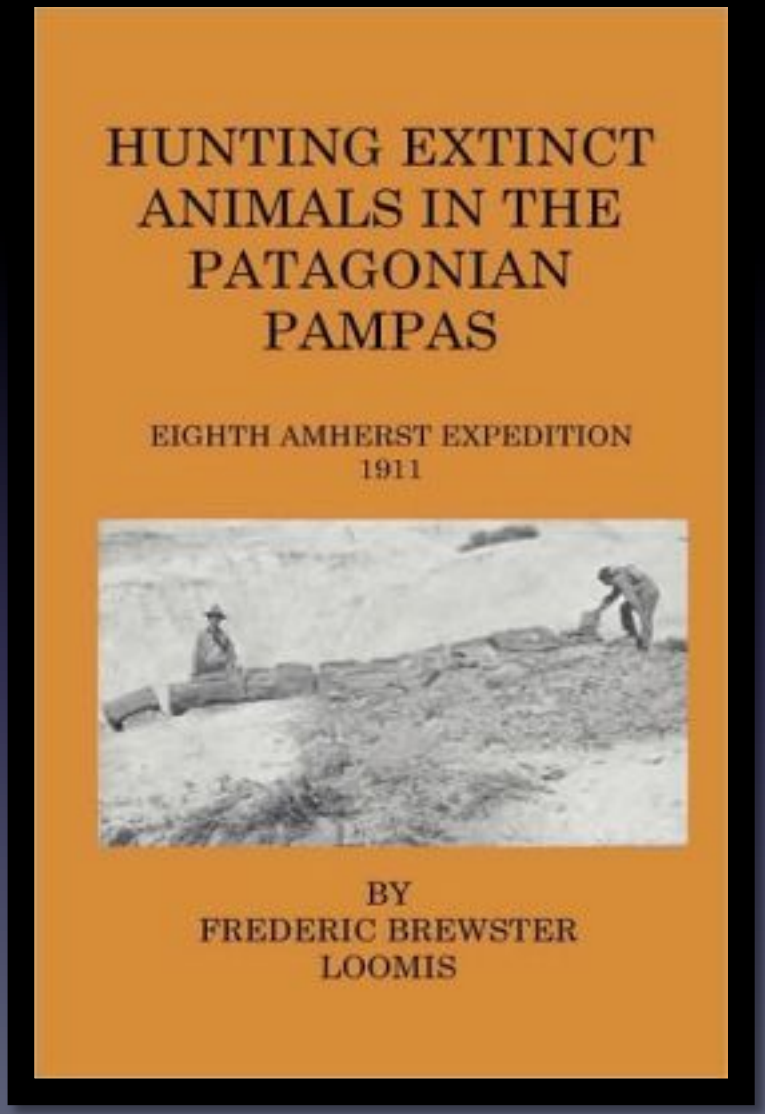
Charles Upham Shepard

- Amherst College Class of 1824
- Largest Mineral Collection
- Meteorite collection
- Mastodon



Mastodon– Found in South Carolina

Frederic Brewster Loomis

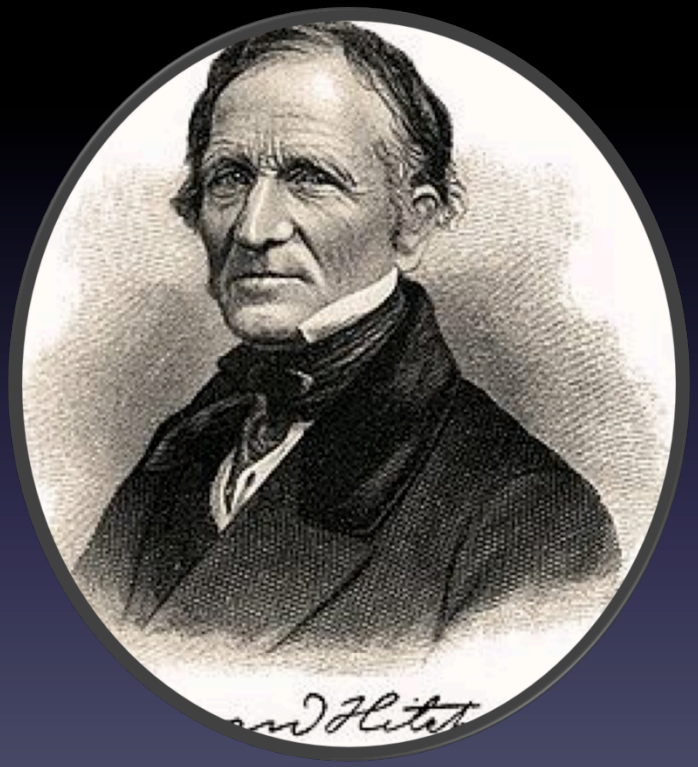


- Amherst College

  Class of 1896
- Professor 1903-37
- Vertebrates
  - Patagonia
  - Wyoming
  - Florida

Columbian Mammoth – Found in Florida

Edward Hitchcock



- Amherst College
  - Prof. 1825-45
  - Pres. 1845-54
- State Geologist
- Ichnology – Tracks & Traces
- Lake Hitchcock

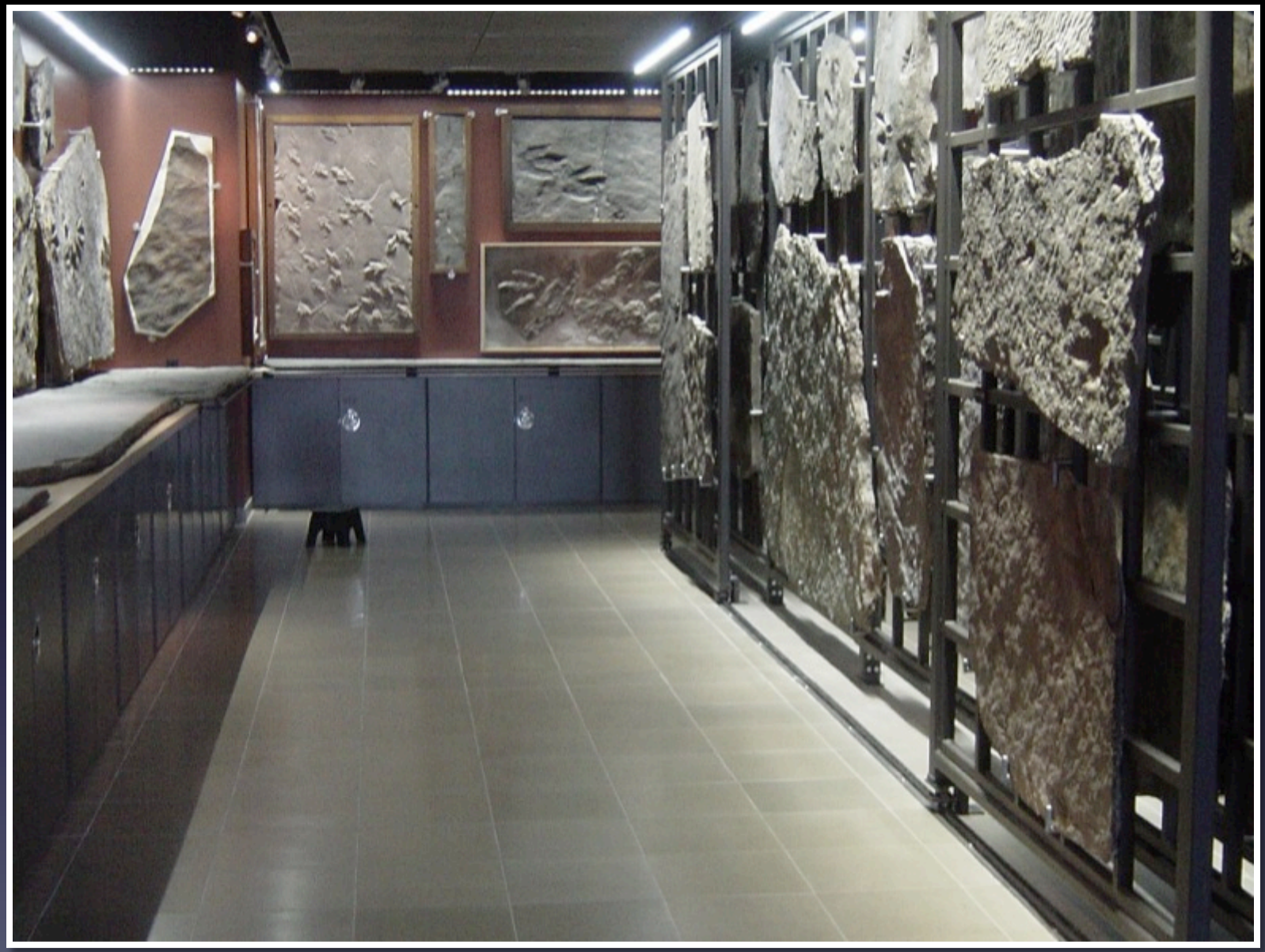
Greenfield Massachusetts – Bank Row

Sidewalks on Bank Row Today

Sidewalks of yesterday

Noah's Raven…

What do we see in the tracks and traces today?



Ted Beneski 78

- "This is an investment in Amherst College and the liberal arts education that exposes students to myriad academic disciplines and trains them how to think, analyze and solve problems across a broad array of subjects. We believe investments in this type of education will help us find the next generation of solutions in science, medicine, law and business and therefore serve to positively advance our global society."


BENESKI
MUSEUM
OF
NATURAL
HISTORY


ondrichthyans
Acanthodians
Osteichthyans


Carcharodon megalodon
Tertiary (~10 million years ago)
ACM 174
Carcharodon megalodon
Coosaw, South Carolina, USA
Miocene (~15 million years ago)
ACM 1236
Shark
Other than the teeth, the most common chondrichthyan fossils are their disc-like vertebral bodies, which are calcified and more likely
ACM 390
Hemipristis serra
Calvert Cliffs, Maryland, USA
Miocene (~15 million years ago)
ACM 7826
Isurus crassa
Chico, Patagonia Argentina
Miocene (~15 million years ago)
Amherst College Expedition of 1911
ACM 188
Lamna elegans
Barton Cliff, Hampshire, England
Eocene (~45 million years ago)
Galeocerdo contortus
Coosaw, South Carolina, USA
Miocene (~15 million years ago)
Shark teeth are probably the most common vertebrate fossils – one individual can drop thousands of teeth over its lifetime.
ACM 700
Hemipristis serra
Miocene (~15 million years ago)
ACM 1437
Galeocerdo sp.
Tertiary
Chondrichthyan teeth
The teeth seen in this drawer are from a variety of extinct sharks all of whom were predators.

John Middleton 77

- ""Leigh and I are always pleased to be able to support Amherst," said Middleton. "But this gift is especially meaningful to me personally, as it will reside in a museum named for our good friend Ted Beneski whose generosity made the museum possible.""

NEW TO THE MUSEUM – Dryosaurus altus (150 mya)

On to the Museum (9:30AM)

Break Time 10:20AM

Lab/Field Guide Introduction (10:30AM)

- Geologic History
  - (Ct. River Valley Focus)
- Visual Scanning and Observation (We will do this together)
  - Divergent Thinking
- Illustrating the past
  - Connecting visual arts, language arts and science
- Vertebrate Hunting
  - Finding primary source material – Data collection
- Lessons in Evolution
- Evolution and Speciation
- Postcards from the Past – Four Rivers
- Experiential program – McAuliffe School

Small Groups – Lab work in the Museum 10:45AM

- Geologic History
- Illustrating the past
- Vertebrate Hunting
- Lessons in Evolution
- Evolution and Speciation

Instructions:

1) 6 – 7 people will work with one of the field guides
2) We will have about 50 minutes to begin work in the Musuem
3) At 11:45 we will meet back in Paino lecture hall to share back

Field Guide Sharing (11:45AM

- 1) Take 5-10 minutes with your group to address the following questions.
  - What is your one takeaway from the activity?
  - What would activity and/or question would you add to the lab and why?

Please write the questions and answers on a piece of chart paper

Quick Break…

Visual Scanning/Observation Activity & Divergent thinking

12:10PM

- **Divergent thinking** occurs in a spontaneous, free-flowing, 'non-linear' manner.
  - Preschoolers do this best…
  - Convergent thinking begins taking over
  - Middle school divergent thinking is almost gone
  - We re-teach divergent thinking in high school and beyond..

Effects Nature has on the Earth – Using Primary Sources

- **Problem**: What can we learn about the effects of nature on the Earth using primary sources (A primary source is a document or a physical object which was written or created during the time under study. These sources were present during an experience or time period and offer an inside view of a particular event. Relics and artifacts, such as fossils are one kind of Primary Source)
- **Hypothesis:** By using a visual scanning technique, we should be able to see some effects of nature on Earth in some of the Primary Sources in the museum

Procedure:

Use the following visual scanning cues to identify the effects that nature has had on the earth. Look for and record the following characteristics of the source

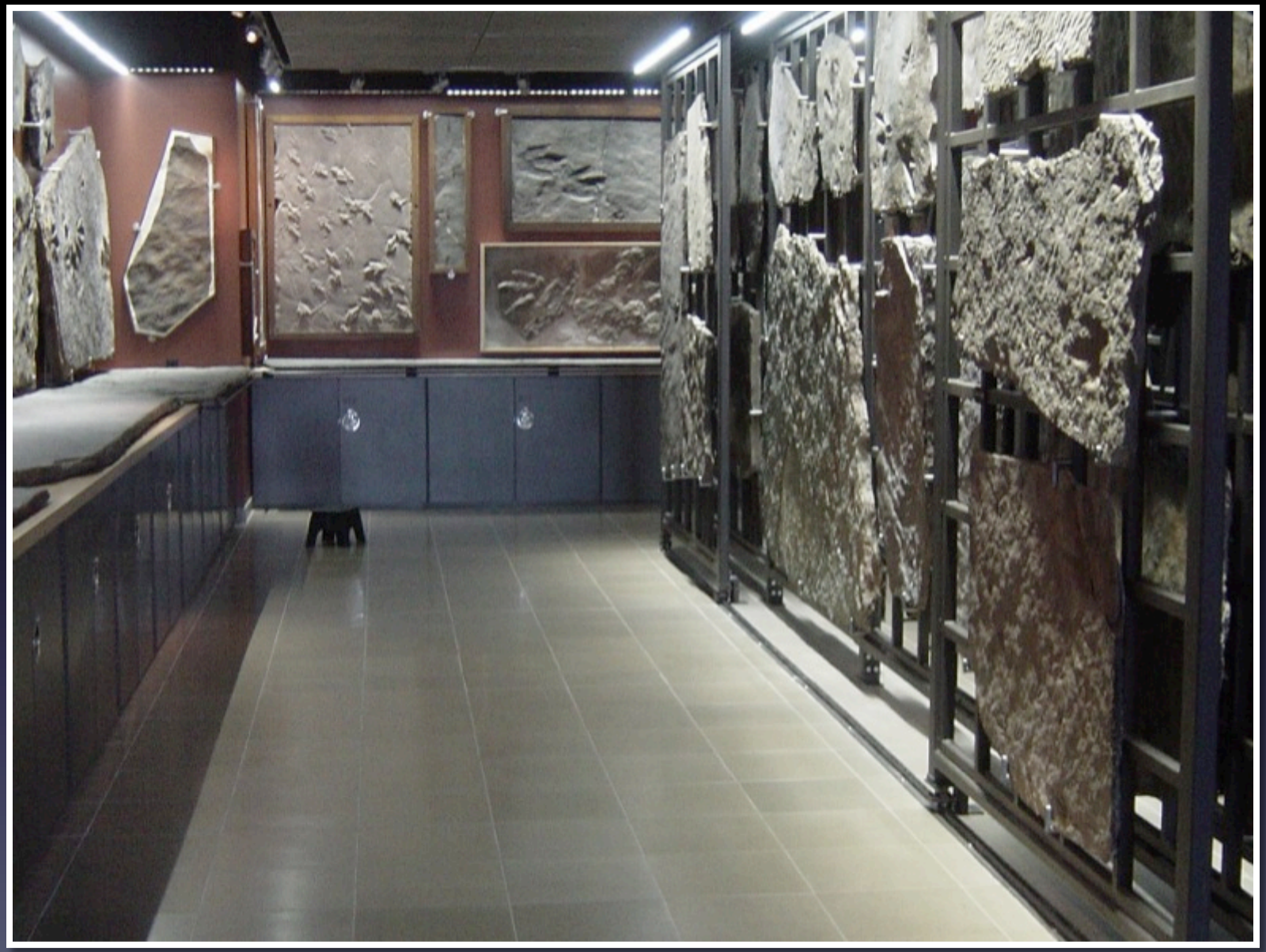
Qualitative

- Color
- Pattern
- Texture
- Depth
- Shape

Quantitative

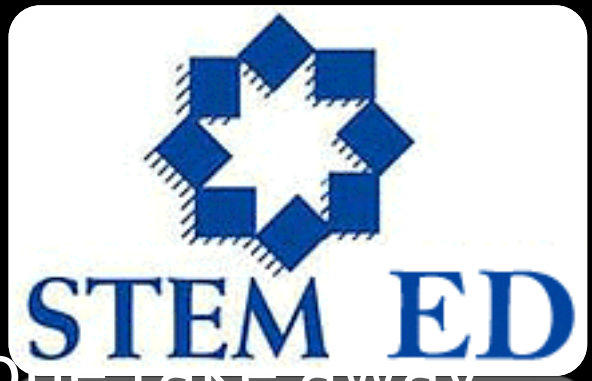
- Size (how big/long)
- Depth
- Number (how many)
- Proximity (how close is what you are noticing to something else?)

Record just what can actually be seen



To the Hitchcock Gallery – Bring our Visual Scanning/Observation Lab – Turn to the back…

Closing and Feedback 12:40ish



1) On a sticky note please write one take away from today.
2) Please complete the Seminar Evaluation.
3) Sticky notes on the chart paper and evaluations in the folder as you leave.
4) Fred Venne (avenne@amherst.edu)

Next session "Introduction to Scratch Programming" Feb 28 w/John Heffernan