CORE Kids

Program Overview, Metrics and Evaluations

2015-2016

Report Prepared by Peter Voice

COREKIDS 2015-2016 ANNUAL REPORT TABLE OF CONTENTS

The following report is a summary of the activities of the CoreKids program for the academic year 2015-2016. It provides metrics on the numbers of events and contacts that the CoreKids program worked with, as well as feedback from the teachers that hosted CoreKids events in their schools. Presentations given under the outreach initiatives of the CoreKids program, the Department of Geosciences at Western Michigan University, the Michigan Geological Repository for Research and Education and the Mcihigan Geological Survey are also present. The feedback evaluations from teachers are presented in the appendix at the end of this report.

Report prepared by Dr. Peter Voice

July 28, 2016

CoreKids Overview
And
2015-2016 Events List

CoreKids Program at the Michigan Geological Repository for Research and Education/Michigan Geological Survey

Prepared by Dr. Peter Voice, Director of K-12 Outreach, Michigan Geological Survey

Our Mission: To increase awareness and understanding of Earth, its processes and its natural resources among Michigan's students, teachers and citizenry. We utilize the unique geological resources of Western Michigan University Geoscience Department's Michigan Geological Repository for Research and Education (MGRRE). CoreKids educators carry earth science literacy, science literacy and citizenship messages from university faculty, our sponsors and our partners to the K-12 community and to the public. The program utilizes a mixture of presentations and hands-on activities to promote the understanding of earth science as well as to increase interest in the STEM (Science, Technology, Engineering and Math) fields especially the earth sciences among K-12 students. The majority of our contacts with southern Michigan students have been with higher grade level students who are making decisions about their future and we hope that we can influence some of these students into pursuing careers in the earth sciences. A basic tenet of the organization is to provide programming to schools and non-profit organizations without charge.

Our Current Funding: We thank the Michigan Section of the American Institute of Professional Geologists and the Kalamazoo Geological and Mineral Society for their generous funding support for CoreKids.

We are currently seeking additional funding to support the future activities of the CoreKids Program. We are working on a revision of the MGRRE Portal proposal and will be submitting it in the future to various grant-funding organizations and foundations.

Our Partnerships:

The Cranbrook Institute of Science

The Kalamazoo Geological and Mineral Society

The Michigan Department of Environmental Quality

The Michigan Aggregate Association

The Michigan Basin Geological Society

The Kalamazoo Air Zoo

The University of Michigan Museum of Natural History

The Michigan Mineralogical Society

The Branch County District Library

We also have the support and partnership of several Teachers associations: The Michigan Earth Science Teachers Association, the Michigan Science Teachers Association, the Michigan Alliance for Environmental and Outdoor Educators and the Metropolitan Detroit Science Teachers Association.

Future Proposals:

1. Develop a pilot MGS-MGRRE online education portal focused exclusively on Michigan energy issues. This portal would develop activities using authentic datasets to guide students through the process by which geologists go from exploration to oil and gas production. As part of portal development, we will engage professional Michigan geologists to work with teachers directly, both in the field and in the classroom. These could also lay the foundation for future mentoring relationships between sponsoring companies and participating schools.
2. Develop workshops and continuing education short courses for Michigan teachers. We would use the well cores and samples and production records at MGRRE and allow the teachers to lay their hands on the actual rocks that yield these natural resources such as oil, gas, minerals, metals, and groundwater. This would also allow us to build a stronger collaboration with local teachers associations (Michigan Earth Science Teachers Association, Michigan Science Teachers Association) and promote earth science clubs at their schools.
3. Develop additional classroom modules. Several teachers that we have worked with in the past are excited to learn that we now present new modules about natural hazards and shale energy. As a result they are inviting us into their classrooms for multiple events. A wider variety of modules will not only interest more teachers, they will invite us back for more events, and more teachers and students will gain a better understanding of our natural resources and the need to responsibly manage them.
4. Develop an Open House Event twice a year at the MGRRE Facility as a resource for local home school associations and youth groups. A series of hands-on activities are planned centered around Michigan Geology, Michigan Natural Resources, Energy and Fossils. We have already done a pilot version of this idea with the Kalamazoo Geological and Mineral Society and their youth group and it was very well received.
5. Create a traveling classroom to bring these modules to schools, educational meetings and conferences, parks, events, and neighborhood organizations where students and the public can participate in learning games and displays which show people of where natural resources come from, how they are used in their daily lives, and how important responsible management of these critical resources makes Michigan a better place to live in and an example for others to follow. The vehicle used for this endeavor would be labeled with the logo(s) of the financial backer.
6. Expand our impact by developing partnerships with other Michigan Universities and Colleges. We are currently building a partnership with Delta College to develop the first CoreKids Satellite. The primary CoreKids program would still be at Western Michigan University, but our satellites would be able to widen the geographic area that we could potentially reach. The current nature of the partnership would be to share physical resources such as module materials, rock and mineral samples, as well as contacts with area teachers in the region specified for the CoreKids Satellite.

CoreKids Events July 1, 2015 to June 30, 2016

(45 events – School visits, MGRRE tours and Larger Events with Allied Partners and 2 Conferences/Teachers Workshop)

July 9th – Kalamazoo Air Zoo – Campus visit

July 23rd – Branch Co Library events

August 6th – Presentation to the Big Rapids Rocks and Minerals Club

Sept.18th – Rouge River Festival, Cranbrook Institute of Science

Sept. 19th – Booth at WMU Department of Geosciences 50th anniversary event

Oct. 2nd – Kalamazoo Reformed Heritage Christian School – MGRRE Tour and Michigan Geologic History Module

Oct. 10th – MESTA Annual Conference

Oct. 13th Star Elementary, Plainwell – Bill Mitchell Borrowed Core Pumps

Oct. 17th – National Fossil Day Event at MSU Museum

Oct. 20th – MESTA Evening of Science, U of M Museum of Natural History

Oct. 23rd – Central Michigan Lapidary and Mineral Society Annual Show

Oct. 28th – Kentwood Public Schools – MI Fossils.

Oct. 30th – Old Redford Academy High School– Mi Geol. History Module

Oct. 30th – MGRRE Tour, CMU Petroleum Geology Class

Nov. 6th – Greater Heights Academy – Michigan Geol. History Module

Nov. 7th – MDSTA Annual Conference

Nov. 12th –Marshall Upper Elementary School – Mi Geol. History Module.

Nov. 13th – Marshall Upper Elementary School – Mi Geol. History Module

Nov. 18th – U of M Museum of Natural History

Nov. 19th – Handy Middle School – MI. Geol. History Module Nov. 20th – Handy Middle School – MI. Geol. History Module.

Nov. 23rd – Hudsonville Christian School – Groundwater Module

Nov. 24th – Hudsonville Christian School – Groundwater Module

Dec. 1st – Western Middle School visit – Mi Geol. History Module

Dec. 4th – Grosse Pointe North High School Mineral Mania Event– Economic Minerals.

Dec. 7th – Stanwood Middle School – MI Geol. History Module

Dec. 9th - Kalamazoo Country Day School – MGRRE tour.

Dec. 10th – Ballard Elementary School, Niles MI. MI. Geologic History Module

Dec. 30th – Kalamazoo Air Zoo Joint Event

Jan. 11th – Home School Group tour of MGRRE

Jan. 16th – Career Cruising Day – MLK event on Campus

Jan. 22nd – U of M Museum event – MI Geologic History Module

Jan. 27th – Scheduled School Visit, Gull Lake Middle School. Michigan Geologic History Module

Feb. 10th - Scheduled School Visit, Gull Lake Middle School. Michigan Geologic History Module

Feb. 24th – Mattawan Middle School – Michigan Geologic History Module

Feb. 26th – Mattawan Middle School – Michigan Geologic History Module

Feb. 27th – Michigan State University Sedimentology Class visit to MGRRE

March 8th – Gull Lake Middle School

March 11th – Gull Lake Middle School – Earthquake Module

March 9th – Washington Writers Academy

March 16th – University of Michigan Museum Event

April 26th – The Kazoo School – Hydrogeology Module

April 29th-May 1st – Kalamazoo Rock and Mineral Annual Show

April 30th – AAUW Tech Savvy Conference – booth at conference

May 7th – Kalamazoo Air Zoo make-up event

May 18th – U of M Museum of Natural History – Scheduled partnered event

June 6th – Moorsbridge Elementary – Michigan Geologic History Module

June 30th – Kalamazoo Nature Center – MGRRE tour + Museum

CoreKids Frequently Asked Questions

1. Which regions of the state of Michigan does CoreKids go to?

Due to budget constraints, we are currently only able to provide support to our larger events at Mineral Shows and Earth Day events.

2. What is the MGRRE facility?

MGRRE is the Michigan Geological Repository for Research and Education. It is the premier collection of Lower Peninsula Geologic data and archives half a million feet of core rock data. We are part of the Michigan Geological Survey.

3. How many students can your Educators work with during a school trip or MGRRE tour?

Our modules are designed for groups of 30 students. We bring into the classroom all materials that we use including mineral samples and hands-on activities. We encourage schools with multiple sections of the same grade level at each period to schedule more than 1 day of CoreKids visits – i.e. one day for each 6th grade teacher's sections.

At MGRRE we are limited to groups of 25-30 at a time. We have a classroom at the facility that we use for brief presentations and hands-on activities.

4. How can we book a CoreKids Event?

Contact Dr. Peter Voice (peter.voice@wmich.edu or 269-387-8696 or 269-387-5446) to schedule events. He will try to accommodate your group.

5. What modules do you take into the classroom?

We currently have six modules: Michigan Geologic History; Hydrogeology; Shale Energy and Hydraulic Fracking; Michigan Fossils, Natural Hazards and The Environment and Climate Change. The Natural Hazards module is designed as three submodules: Volcanoes; Earthquakes; and Impact Craters. Each module is designed for a 50 minute session and includes a brief presentation and hands-on activities. Michigan Department of Education Grade Level Content Standards have been described for each module and are available on request.

6. Can I schedule more than one CoreKids event for my school or group with different modules?

If we have room in our schedule, we will gladly visit your school or group multiple times during the year presenting different modules.

7. Is there a charge for CoreKids Events?

Our policy is to provide our content free of charge for school visits and MGRRE tours. For MGRRE tours, we cannot cover the cost of transportation to bring your group to the MGRRE facility. We do accept donations to support CoreKids activities.

8. What if my school has a snow day or other cancellation the day a CoreKids event is scheduled?

We will try our best to reschedule the CoreKids event.

CORE Kids

Letters of Support

CRANBROOK INSTITUTE OF SCIENCE

April 21, 2014

39221 Woodward Ave.
Mail Correspondence to:
P.O. Box 801
Bloomfield Hills
Michigan 48303.0801
Ph 248.645.3139
Fx 248.645.3050

To whom it may concern:

I am writing this letter in support of the CoreKids K-12 Earth Science Outreach Program. Cranbrook Institute of Science partners with them to provide outstanding learning experiences that supplement and extend learning beyond the classroom.

Coordinated through the Michigan Geological Repository for Research and Education (MGRRE), Core Kids brings an important collection of rocks to public viewing and understanding. Their collection includes thousands of bedrock samples not found anywhere else, and most unique to Michigan. It is truly a one-of a kind storehouse of valuable geological information.

CoreKids does an outstanding job of relating Earth Science concepts to kids and families with fun, engaging activities and demonstrations that use MGRRE samples. These are impactful and memorable experiences for children to widen their knowledge and perspective on how geology relates to our lives and economy.

I have personally witnessed the excellence in interpretation and materials through numerous events: including water festivals and museum fairs. They inspire thousands of students each year about Earth Science and Natural Resources management. This education plays a significant role in shaping the knowledge and understanding of future citizens to build a sustainable society. I look forward to many years of partnership with the CoreKids K-12 Earth Science Outreach Program. Please feel free to contact me if you have any questions. I can be reached by phone at 248-645-3223 or by email at lappel@cranbrook.edu.

Sincerely,

L. Appel

Lisa Appel
Watershed Education Coordinator
Cranbrook Institute of Science

CORE Kids

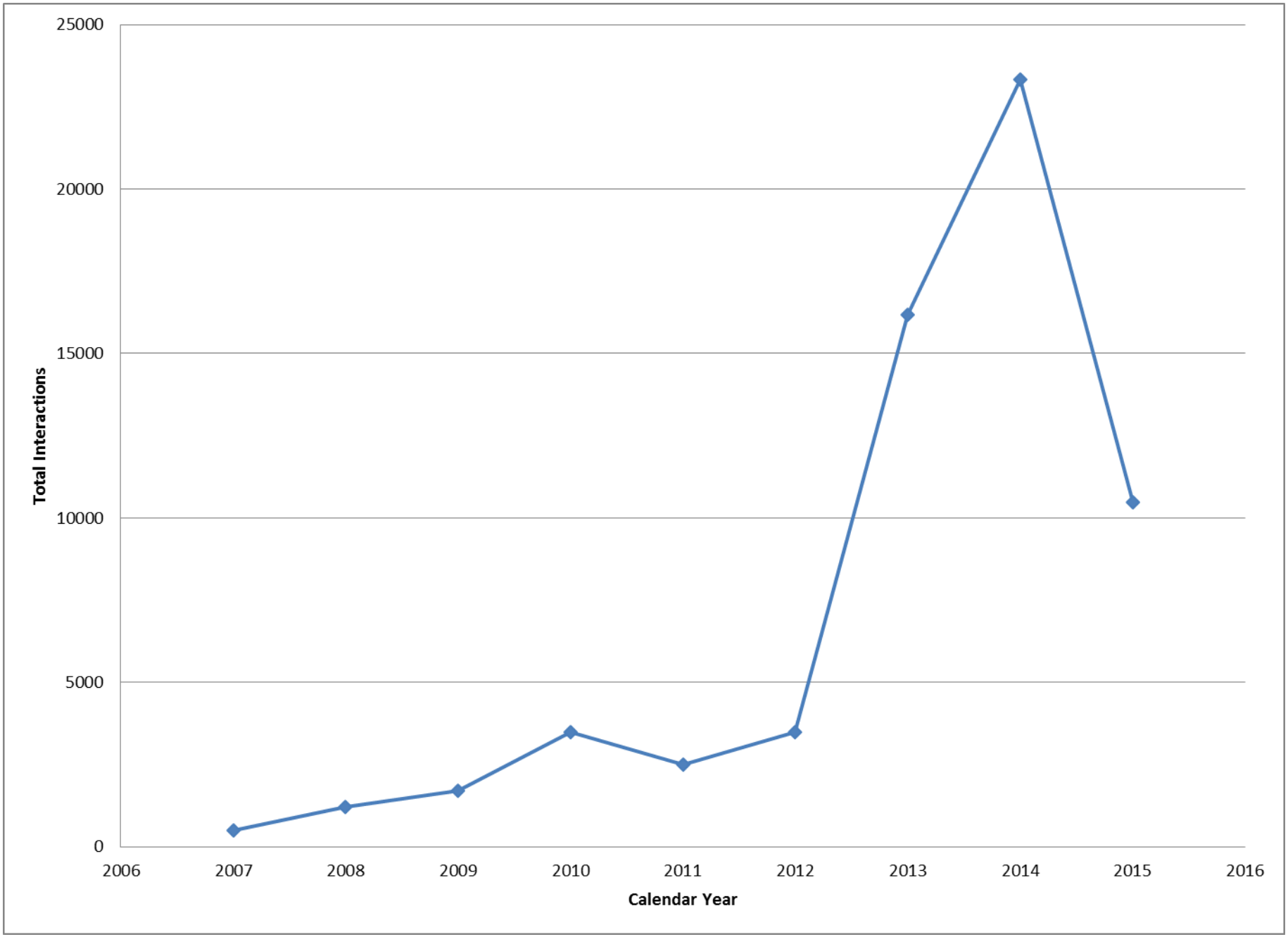
Program Metrics

Academic Year	Number of Contacts	Number of Conferences/Teachers Workshops	Number of Events (school visits and allied partner programming)
2013-2014	16,175	7	65
2014-2015	23,329	1	50
2015-2016	10,473	2	45

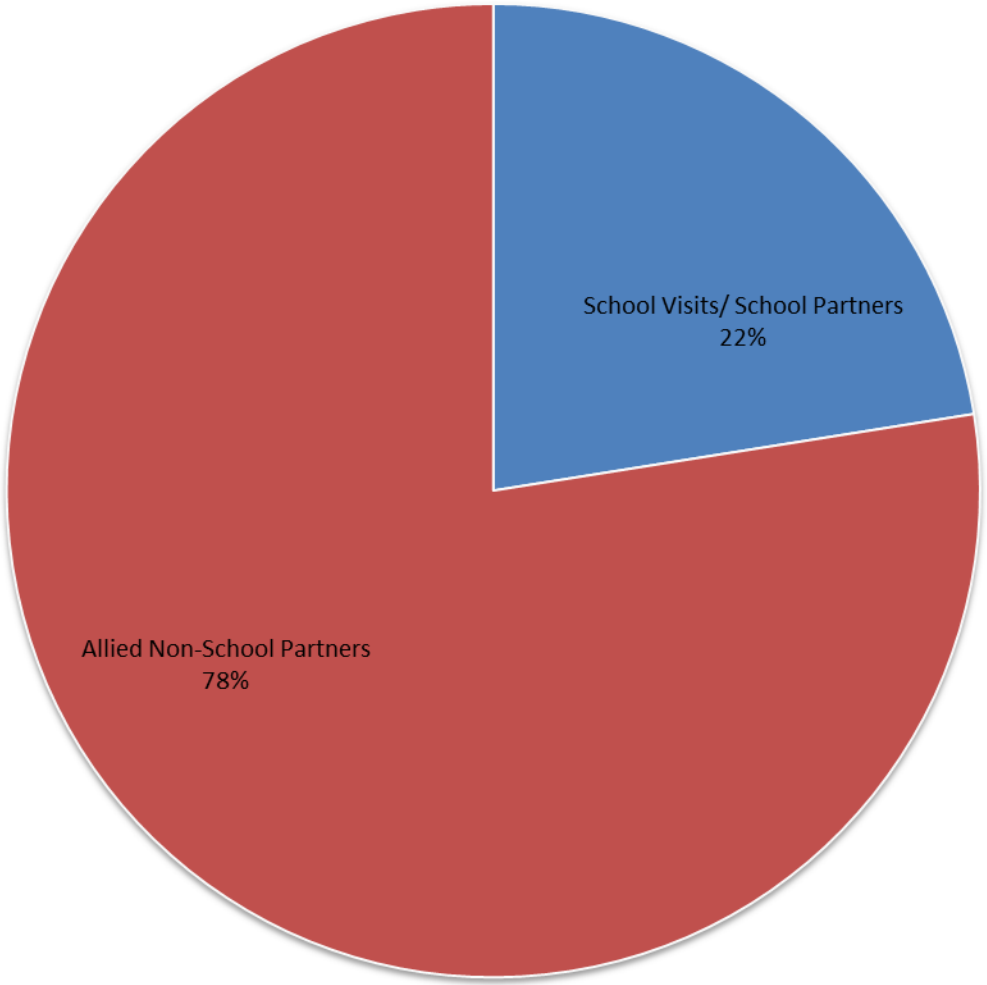
Distribution of Scheduled School Visits and MGRRE Tours

Current Totals (July 1, 2015 to June 30, 2016)

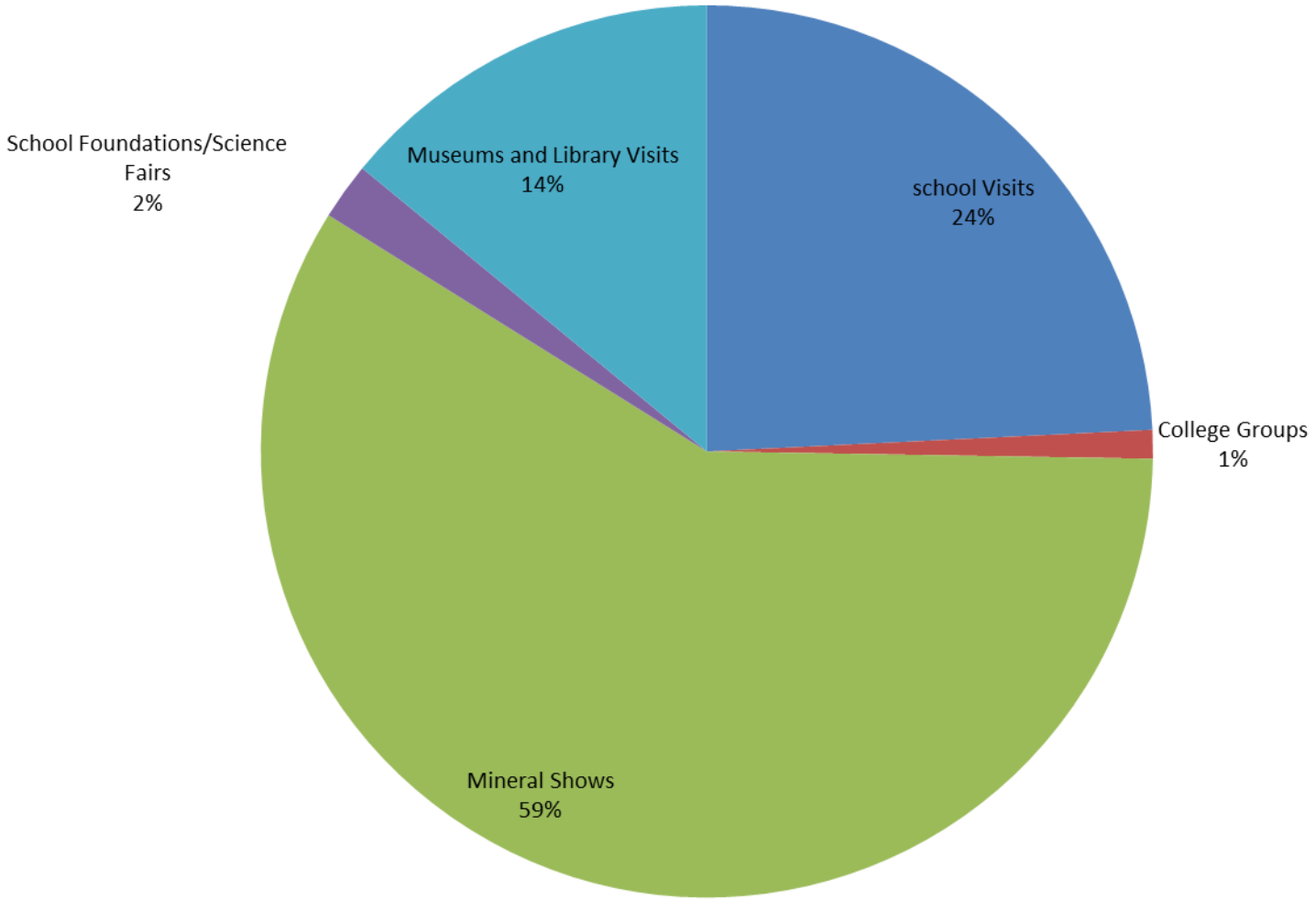
School events	2,348
Kalamazoo Air Zoo	59
Big Rapids Rock and Minerals Club	20
WMU Hydrogeology Field Camp	28
Branch Co. Library Program	70
Cranbrook Institute of Science Rouge River Festival	80
National Fossil Day, MSU Science Museum	400
MESTA Night at the Museum and MESTA Annual Conference (approximate values)	130
MDSTA Annual Conference	500
Central Michigan Mineral Show	837
College classes (CMU, MSU, WMU)	72
U of M Museum Events	725
Mineral Mania Event (Grosse Pointe North)	200
MLK Career Cruising Day	50
Tech Savvy Conference	36
KGMS Annual Show	4,824
Kalamazoo Nature Center Day Camp	28
Other	36
Total Actual:	**10,473**


25000
20000
15000
10000
5000
0
Total Interactions
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Calendar Year

Distribution of Contacts as a function of Event Type (July 1, 2015 to June 30, 2016)

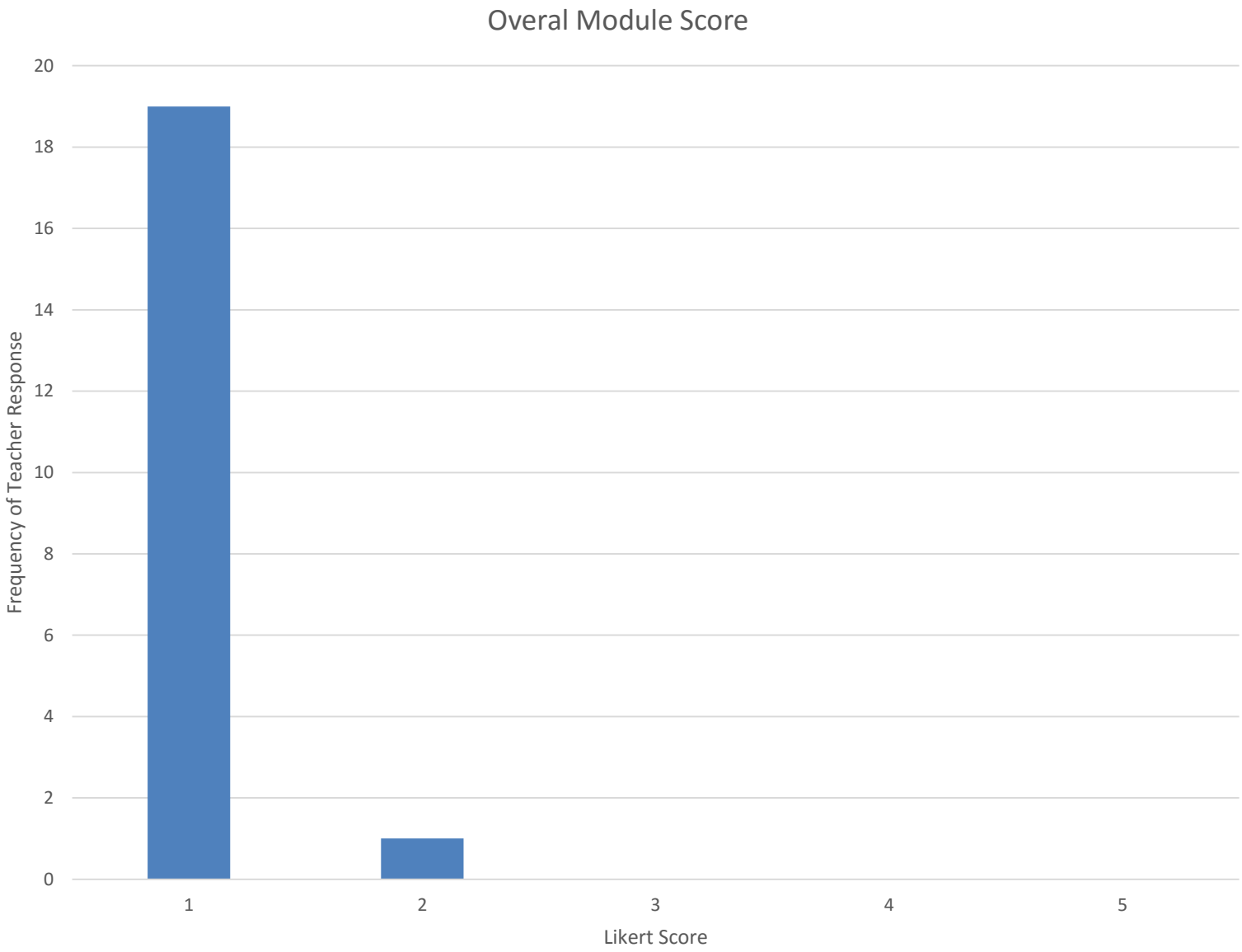


Distribution of Contacts as a function of Event Type (July 1, 2015-June 30, 2016)



CORE Kids

Evaluation Forms Metrics


Overal Module Score
Frequency of Teacher Response
20
18
16
14
12
10
8
6
4
2
0
1
2
3
4
5
Likert Score

All Modules: Metrics Summary Statistics

Question	Mode	Median	n
Q1	1	1	22
Q2	1	1	22
Q3	1	1	21
Q4	5	5	19*
Q5	1	1	21
Q6	1	1	21
Q7	1	1	21
Q8	1	1	22
Q9	1	1	22
Module Overall Score	1	1	20**

*This question was poorly worded and often was answered in a manner that contrasted sharply with all other feedback provided by the individual teacher.
**This question was separate from the other 9 questions and was not always filled in.

Presentations on the CoreKids program at Meetings

2015: Michigan Earth Science Teachers Association Field Conference

2016: North Central Geological Society of America Section Meeting

MESTA ANNUAL CONFERENCE PRESENTER FORM

MESTA 2015 Conference
10/10 (Saturday) Okemos High School, Okemos, MI

***Presenter #1*:**

Name: Peter Voice

Position/Title: Director of K-12 Outreach and Instructor

Home Address: **1102 Mount Royal Dr. 3-B Kalamazoo, MI 49009**

Home Phone: **269-387-8696**

E-Mail Address: **peter.voice@wmich.edu**

School Name & Address: **Michigan Geological Survey/Western Michigan University**

Presenter #2 **(if co-presenting)**

Name: **Heather Petcovic**

Position/Title: **Associate Professor**

Home Address: **5295 Stapleton Drive, Kalamazoo, MI 49009**

Home Phone: **269-277-1021**

E-Mail Address: **heather.petcovic@wmich.edu**

School Name & Address: Mallinson Institute for Science Education and Department of Geosciences, Western Michigan University

PRESENTATION TITLE:
A Demonstration Model of Hydraulic Fracturing: A Hands-on Analog to Fracturing Shale
Presentation Description (please word this as you wish it to appear in the conference program):

The Michigan Geological Survey and the Department of Geosciences at Western Michigan University has developed an analog model for hydraulic fracturing in a vertical well. Hydraulic fracturing has become a contentious socio-scientific issue in the past decade, even though it has been in use as a standard well-completion technique here in Michigan for over 60 years. The development of high-volume hydraulic fracturing and the increase in utilization of hydrocarbons from unconventional reservoirs has made this technique much more common. An inexpensive hands-on model that makes use of everyday materials

was developed to illustrate the process by which hydraulic fracturing is performed. The model serves as one component of a module (Shale Energy and Hydraulic Fracturing) from the WMU CoreKids program and has been used as a K-12 classroom demonstration. It is also used in a lesson on hydraulic fracturing in a college earth science content course for future elementary teachers.

We use an artificial stratigraphy to illustrate the layered nature of sedimentary rocks in a basin similar to the Michigan Basin. The lowermost layers of the model consist of cemented sand and gravel, and the uppermost consist of plastic and foam. A layer of agar gelatin occupies the middle layer of the model. Agar gelatin gels at room temperature and is sufficiently transparent to observe the fractures that develop during the hydraulic fracturing procedure. The non-agar layers are designed to be impermeable, illustrating that the fracturing medium only interacts with the target agar layer. A mixture of glycerin and colored sand is used as an analog to the hydraulic fracturing fluid. Well bores are created using plastic tubing and drinking straws. The glycerin acts as the injectant and carries the proppant (sand) into the agar layer. The hydraulic fracturing fluid is injected under pressure (with a syringe) into a pre-set well-bore into the agar layer. The hydraulic fracturing process develops wing-shaped fractures in the agar. These fractures form this morphology as the well-bore is designed to only allow the hydraulic fracturing fluid out into the agar through a set of vertically aligned perforations in the well casing.

One of the more interesting properties of the agar is that it can be removed from the model. After removal, the students can slice the agar along the fracture planes. The students can observe that the sand (proppant) lines the surface of the fracture. The proppant in current hydraulic fracturing practice is used to hold open the fractures that develop in the shale – otherwise the ductile nature of the shale will act to seal up the generated fractures. In using the mode in the classroom, we have found that children and adult students alike enjoy the (somewhat messy) hands-on aspect and gain an appreciation of the mechanics of hydraulic fracturing.

Appropriate Level(s): (check) Elementary **Middle School X** **High School X**

NGSS Performance Expectation(s): (http://www.nextgenscience.org/search-standards)

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

Audio/Visual Requests: Our resources are limited. If at all possible, please bring your own audio visual equipment (laptop, LCD projector, slide projector, extension cord, or overhead projector). If this is NOT possible, we will try to provide what you request. Check the items you will need.

TV/VCR OVERHEAD PROJECTOR SCREEN SLIDE PROJECTOR

Room Requirements (Check):

Black Out Shades **Demo Table**

Water x **Lab Table for Participants x**

Sinks x **Computer Lab w/ Internet Connection**

Other: _____

Enter any limit to the number of people you can accommodate: _____30_____

Sessions are scheduled to be 60 minutes long. If you would like more than one session, duplicate this form for each session.

If your presentation requires more time, please check here _____ to request a double-block (110 minutes).

A Demonstration Model of Hydraulic Fracturing: Hands-on Analog to Fracturing Shale

Peter Voice[1,2]; Heather Petcovic[1,3]

[1]Department of Geosciences, Western Michigan University

[2]Michigan Geological Repository for Research and Education, Michigan Geological Survey, Western Michigan University

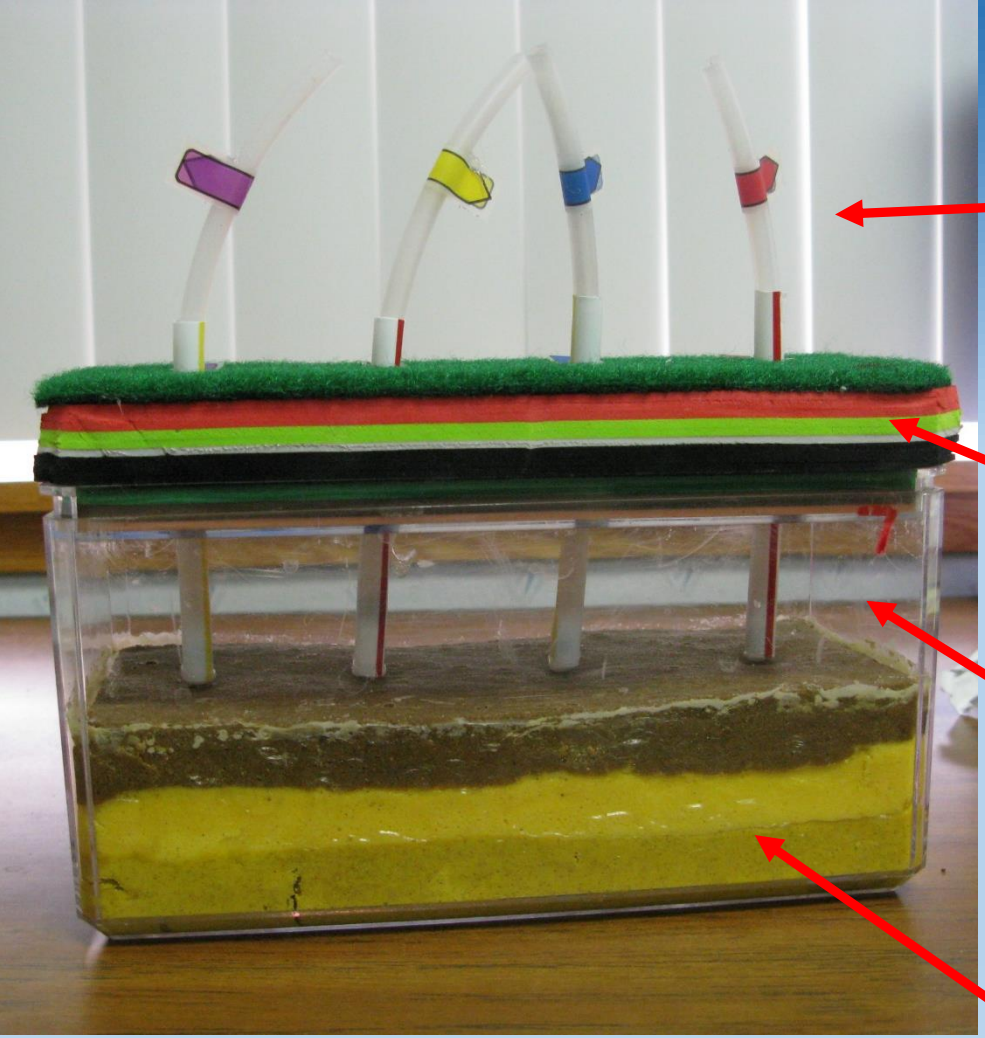
[3]Mallinson Institute for Science Education, Western Michigan University

Hydraulic Fracturing Module

- Core Pumps – illustration of porosity and permeability in both reservoir and seal rocks
  - Conventional vs. Unconventional Reservoirs
- Coring drilling bit and Core samples – discussion of mechanics of drilling well
- Hydraulic Fracturing Model – illustration of unconventional reservoir
- Teachers resources -- http://www.fracky.org/uploads/3/2/9/9/3299341/fracky_speaks_out.pdf

Children using our core pump experiment.


Core Energy – St Charlton #4-30
P# 57916
30-31N-1W
Otsego Co., MI
3054
CM



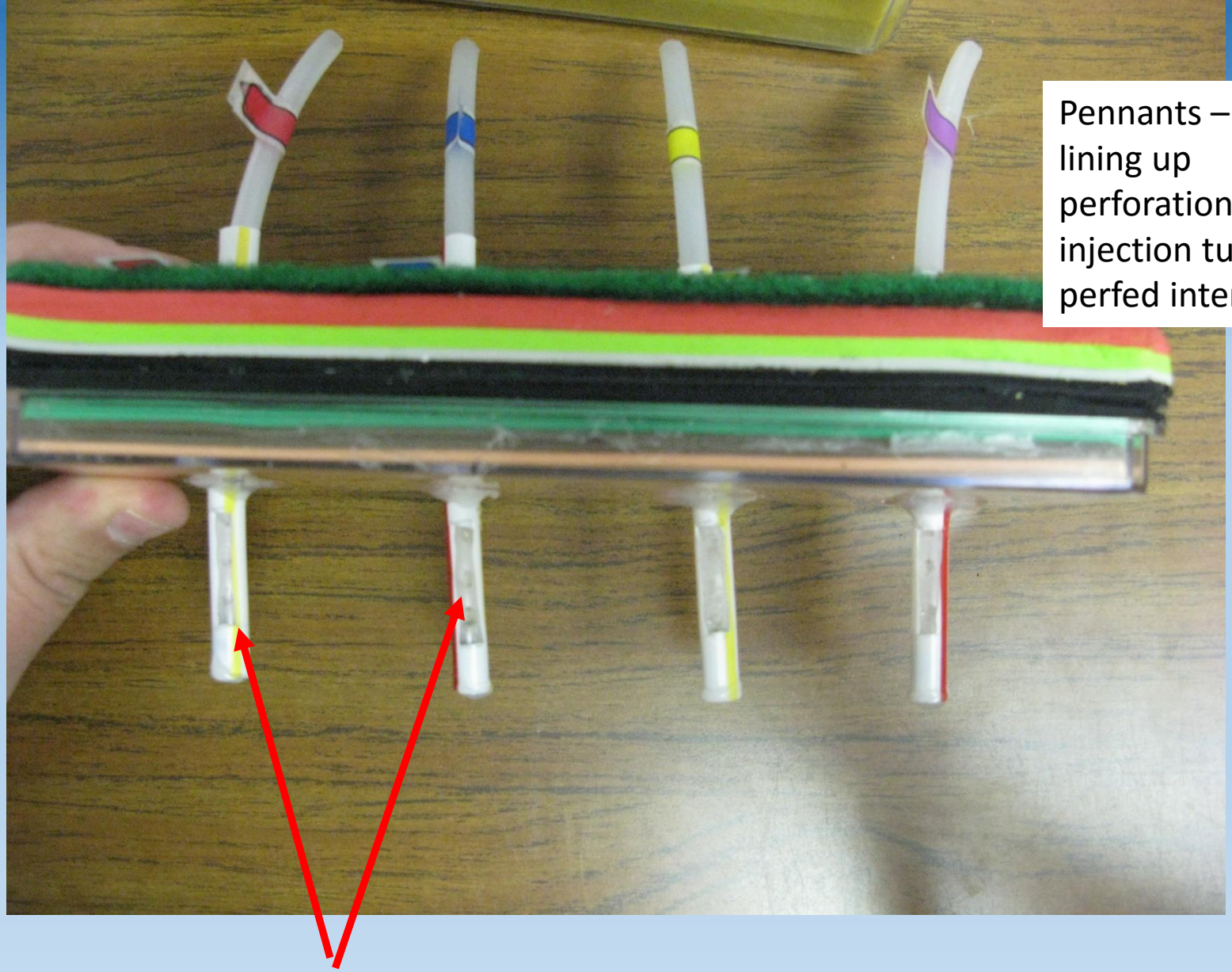
The Model

Well Casing– with injection tube for hydraulic fracturing fluid

Impermeable upper layers and ground surface analog

Chamber for agar – shale analog with pre-positioned well casings/well bores

Layers of sand – sand cemented with glue. Impermeable layers.

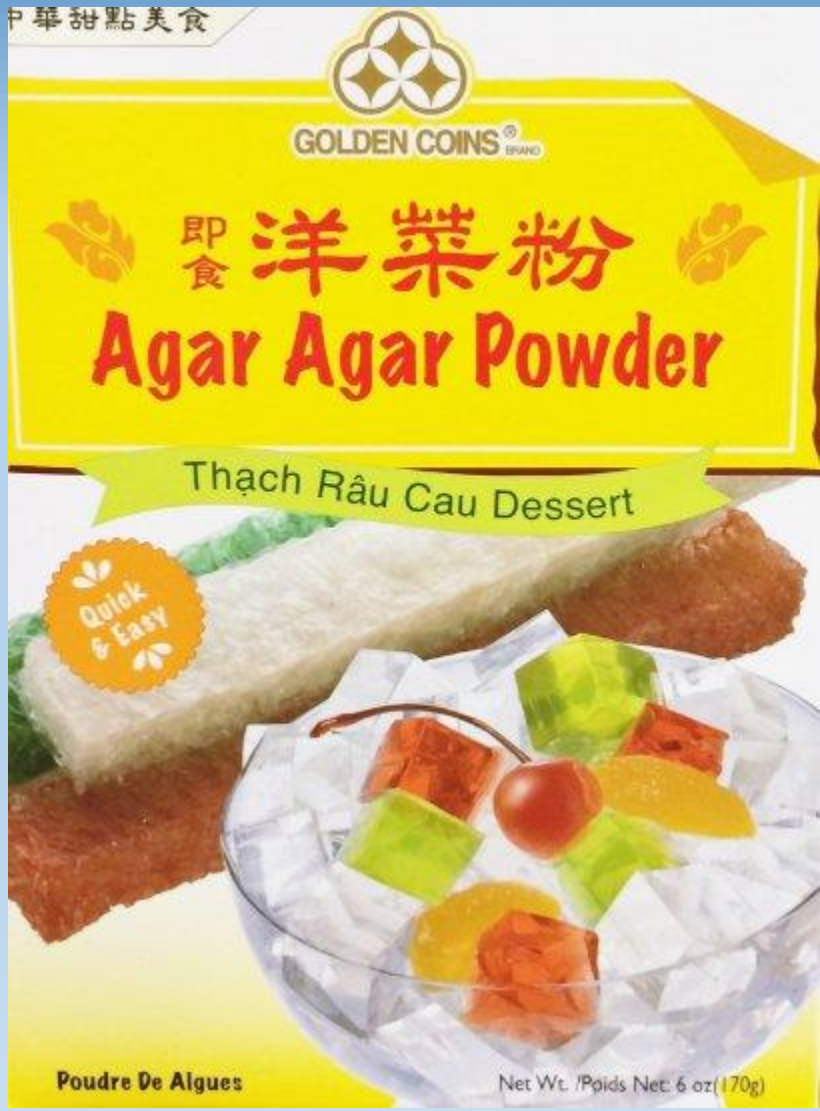


Pennants – allow for lining up perforations in injection tube with perfed interval

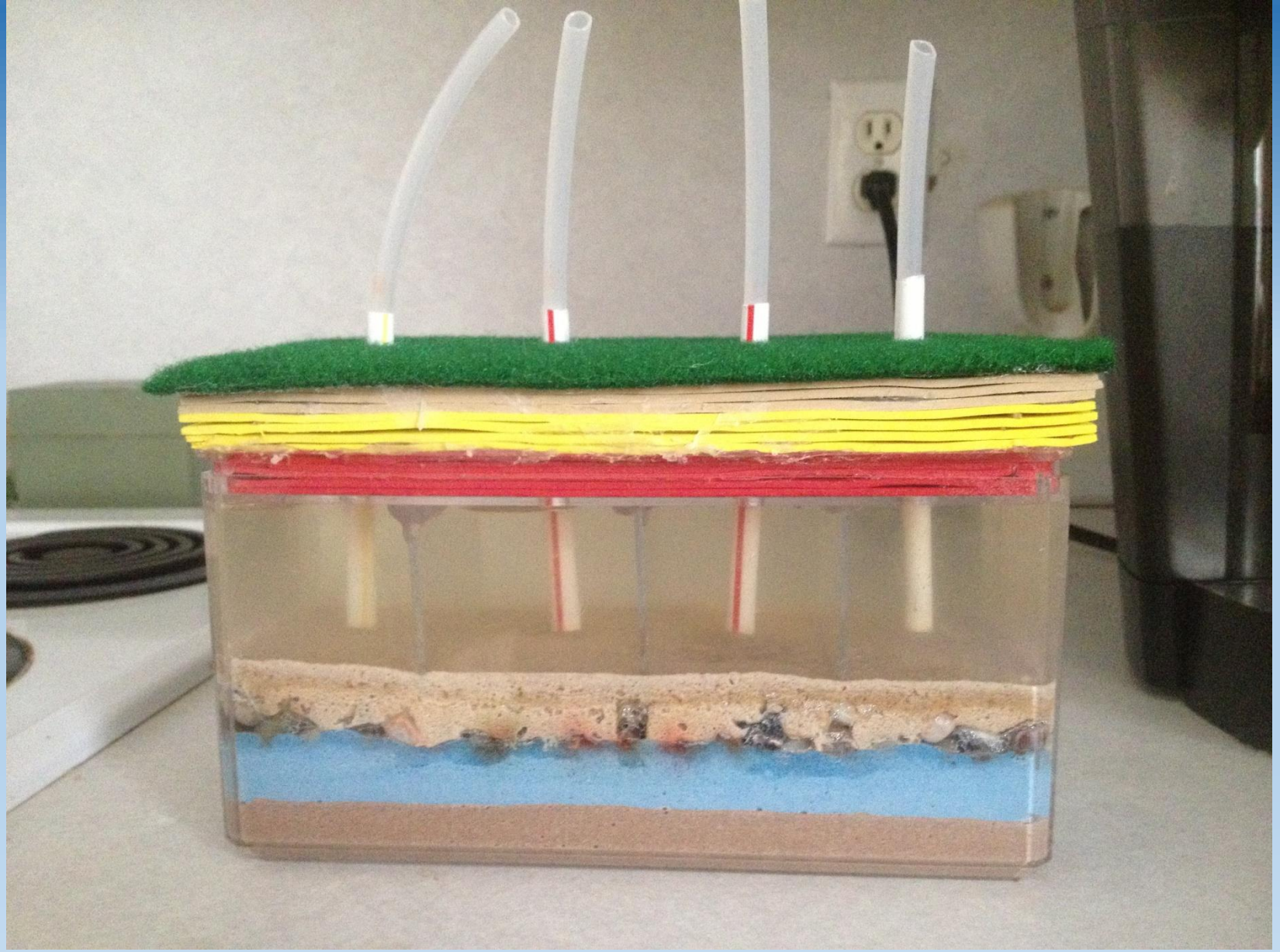
Perfed interval in the well casing with perforations in the injection tube.

Shale Analog = Agar

- Agar – translucent, gelatin
- Follow directions on box – but allow to cool at room temperature
- Stays gelatinous at room temperature
- Disadvantages – growth media (becomes fuzzy if left out for a couple of days!)



http://ecx.images-amazon.com/images/I/81jx6to1nxL._SY550_.jpg



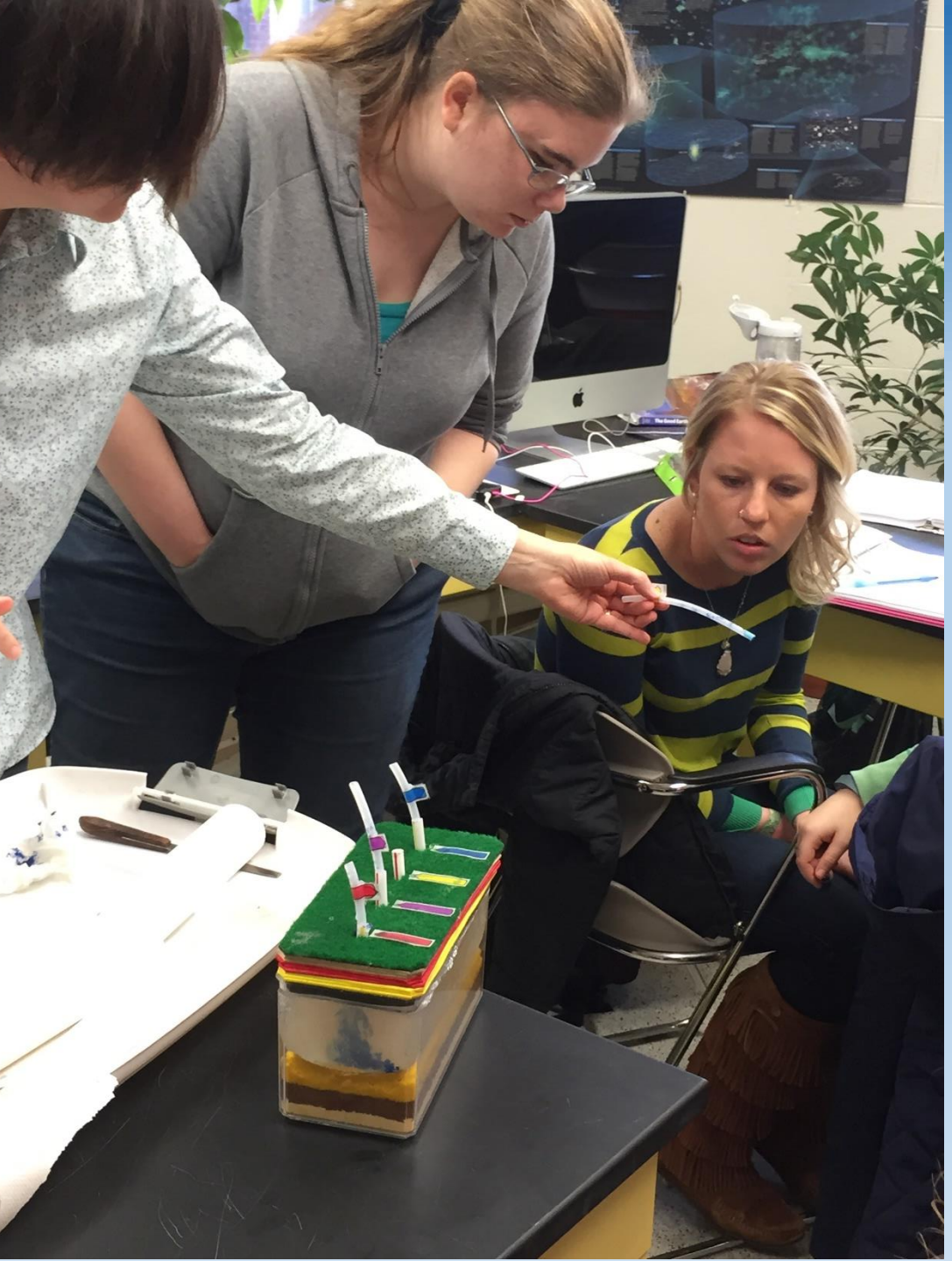
Earlier prototype with agar

Injection of Fluid into Agar

- We use a sand + glycerin mix as our hydraulic fracturing fluid analog
  - Sand = propant
  - Glycerine = fluid
- Higher viscosity fluids worked better at pressures required (glycerin, molasses)
  - Water and baby oil – did not keep sand in suspension – led to clogging of perfs and fluid running up well casing
- 1:1 mix of sand and glycerin – worked best
  - Too much sand – clogs syringe and perfs
  - Too little sand – fluid tends to run up along well casing and pools on top of agar

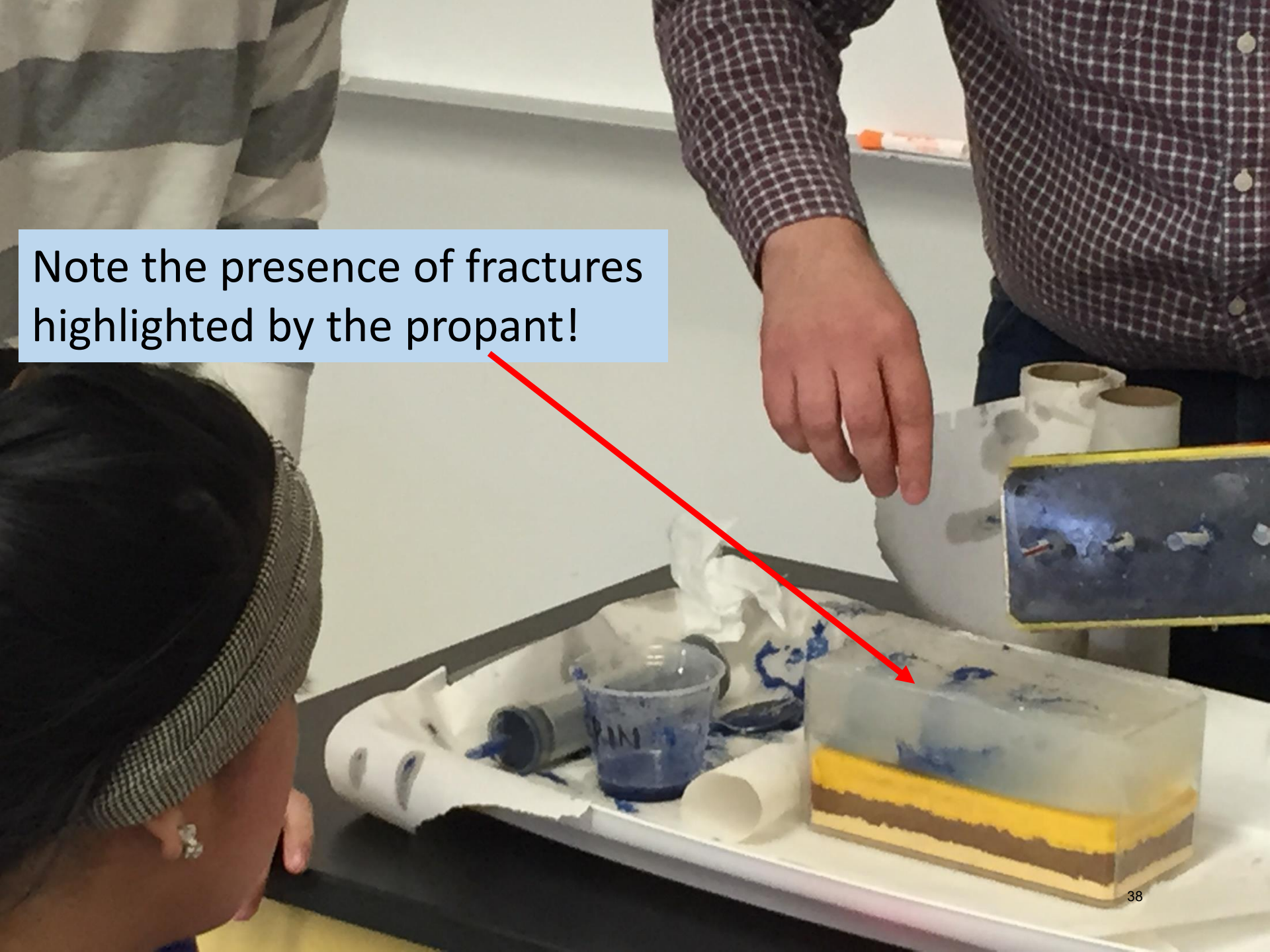
We use a brightly colored sand for the propant – so one can observe the process in the agar

Injection of hydraulic fracturing fluid into well -- in this case, using molasses as the fluid.



Students observing the perforations in the injection tube – ask them to predict types/shapes/numbers of fractures generated

Injecting the Hydraulic fracturing fluid at the well


Note the presence of fractures highlighted by the propant!

Fractures and Agar

- Agar – easily removed from model
  - Either pour agar directly into model
  - Or line model with saran wrap and pour agar into that
- Agar slides right out – and then can be dissected with plastic knives – cut across or along fracture planes to illustrate propant properties of sand
- Afterwards – rinse model and spray with lysol

Conclusions

- Fun (messy) way to illustrate an analog model of hydraulic fracturing
- Relatively cheap to build the model – which is reusable
- Agar, sand and glycerin – only continuing costs

Acknowledgements

- Ann Gilchrist and Bill Harrison
- Betty Adams and Andrew Bentley
- Laura Tinigin
- John Fowler

- Funding from the Michigan Section of the American Petroleum Institute

North-Central Section - 50th Annual Meeting - 2016

Paper No. 26-1
Presentation Time: 8:10 AM

INCORPORATING TECHNOLOGY INTO K-12 OUTREACH: LESSONS LEARNED FROM AN AUGMENTED REALITY SANDBOX

VOICE, Peter J., Michigan Geological Survey, Western Michigan University, 1903 W. Michigan Ave, Kalamazoo, MI 49008-5241, HOWE III, Thomas, Department of Geosciences, Western Michigan University, 1903 W. Michigan Ave, Kalamazoo, MI 49008-5241 and PETCOVIC, Heather L., Department of Geosciences and The Mallinson Institute for Science Education, Western Michigan University, 1903 W Michigan Ave, Kalamazoo, MI 49008-5241, peter.voice@wmich.edu

The Department of Geosciences at Western Michigan University has two major outreach units: the Lloyd Schmaltz Museum and the CoreKids program. Between these two programs, more than 20,000 K-12 and college students, teachers and members of the general public interact with our educational content per year. The Lloyd Schmaltz Museum is a traditional earth-science oriented museum with exhibits on mineral and rock specimens, geological tools and techniques, fossils (including a display on the Van Buren Mastodon), and modern seashells. In an effort to revitalize the Museum, students and staff have worked to develop new exhibits over the past five years including the development of an Augmented Reality Sandbox (AR-Sandbox).

The AR-Sandbox was developed based on the plans and software provided by the University of California Davis, Department of Geology (Reed et al. 2014) and was placed on display in the Lloyd Schmaltz Museum in early 2015. The AR-Sandbox consists of a sandbox with a Kinect 3D camera and a digital data projector suspended above. The camera is linked to a software package on the computer which projects a topographic map onto the sand. The topographic map is refreshed in real-time allowing the students to build topographic features and observe the corresponding contours projected onto the sand. A second transportable AR-Sandbox was built for use in external outreach events as well as to be brought into the classroom on campus.

The introduction of the AR-Sandbox exhibit has increased the frequency and duration of student visits to the Museum, including incoming students on formal campus tours. The AR-Sandbox has been incorporated into coursework on topographic maps and has aided in student understanding of how contours maps are constructed and interpreted. Having a visually appealing and interactive hands-on model of topography is very helpful in the understanding of 3D concepts for a variety of reasons. Courses from several different areas of study such as geography, earth science education, geomorphology, climate science and art have incorporated visits to the AR-sandbox exhibit into portions of their curriculum. The use of the sandbox by WMU and the CoreKids program has increased the visibility of the Department of Geosciences at WMU both on and off campus.

Session No. 26

T27. Geoscience Outreach—50 Years of Innovation
Tuesday, 19 April 2016: 8:00 AM-12:00 PM

Lincoln Room (I Hotel and Conference Center)

Geological Society of America *Abstracts with Programs.* Vol. 48, No. 5
doi: 10.1130/abs/2016NC-275294

Back to: T27. Geoscience Outreach—50 Years of Innovation

Previous Abstract | Next Abstract >>

Incorporating Technology into K-12 Outreach: Lessons Learned from an Augmented Reality Sandbox

Peter Voice, Thomas Howe III, and Heather Petcovic

Department of Geosciences and the Michigan Geological Survey, Western Michigan University

WESTERN MICHIGAN UNIVERSITY

CORE Kids

MICHIGAN GEOLOGICAL SURVEY
WESTERN MICHIGAN UNIVERSITY GEOSCIENCES
Established 1837

Department Outreach Activities

- On-campus – the Lloyd Schmaltz Geology and Mineral Museum - tours
- MGRRE Facility – tours
- CoreKids program – external outreach activities – school visits, booths at allied partner events (other Museums, mineral shows, etc.)

- Developing integrated approach – outreach on and off campus

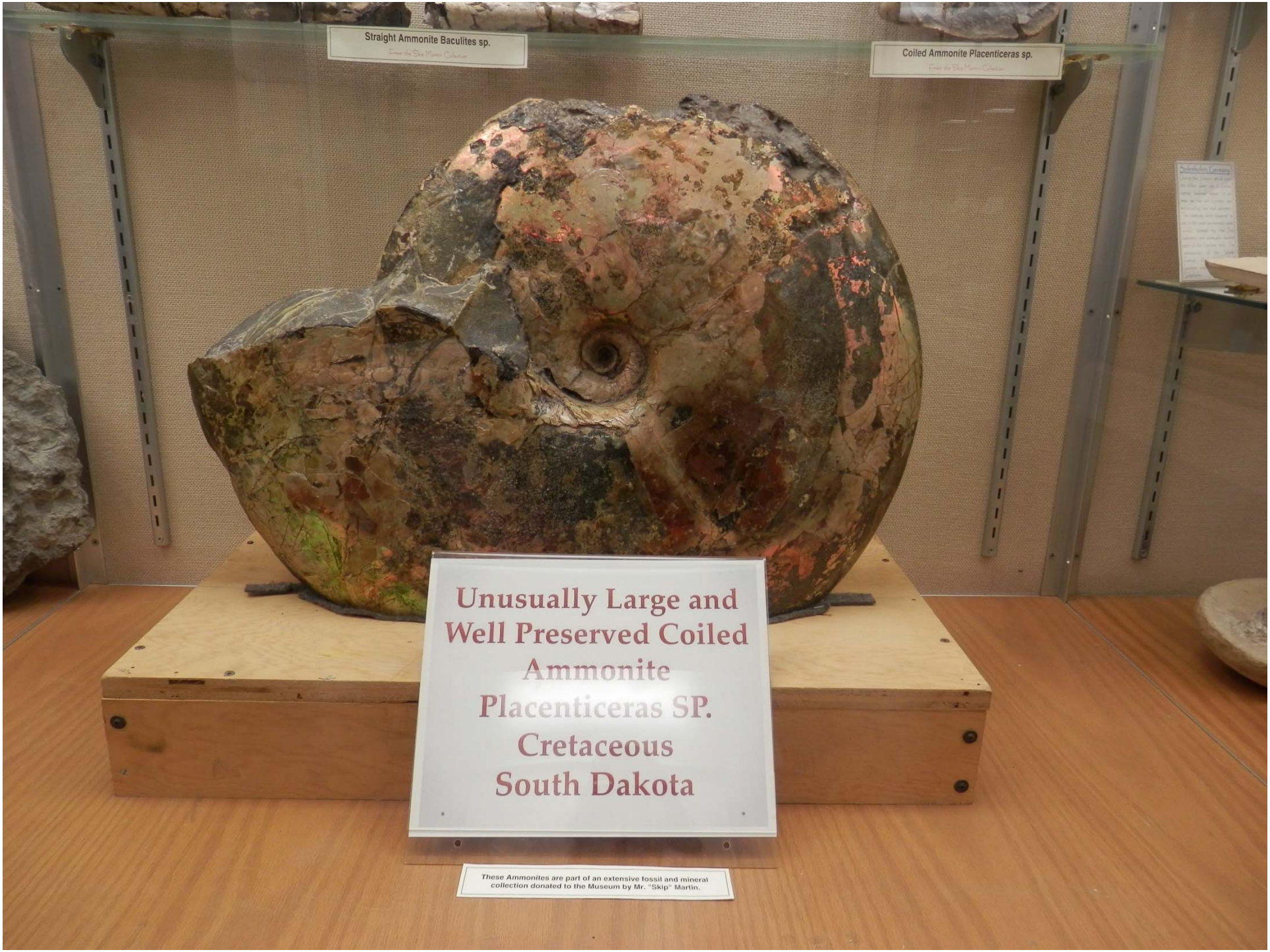
Lloyd Schmaltz Geology and Mineral Museum

- Fixed displays – minerals, rocks and fossils
- Traditional Museum
  - Everything closed off in display cases – no tactile experiences
  - High traffic area – between 2 large classrooms (Quiet rules)
  - Cabinets sprawl through rest of first floor of Rood Hall – specialized displays
    - Shark teeth, donated mineral collections, seismograph, etc.
- Most visitors – students in between classes; but also general public visitors and some school groups


LLOYD J. SCHMALTZ
GEOLOGY MUSEUM
1988

The Lloyd Schmaltz Geology and Mineral Museum

https://www.facebook.com/LloydSchmaltzGeologyAndMineralMuseum


Straight Ammonite Baculites sp.
Coiled Ammonite Placenticeras sp.
Unusually Large and
Well Preserved Coiled
Ammonite
Placenticeras SP.
Cretaceous
South Dakota
These Ammonites are part of an extensive fossil and mineral collection donated to the Museum by Mr. "Skip" Martin.


TOOLS


Port Jackson
SKYSPACE.KIDS.CLUB
www.airzoo.org


18
Fossil and Modern Shark Teeth
Carcharocles Megalodon
Kelley's Guide to FOSSIL SHARKS
Oceanic White-tip
Caribbean Reef
Black Tip Reef
Hammerhead
HEAD
TRUNK
TAIL
Goblin
Port Jackson

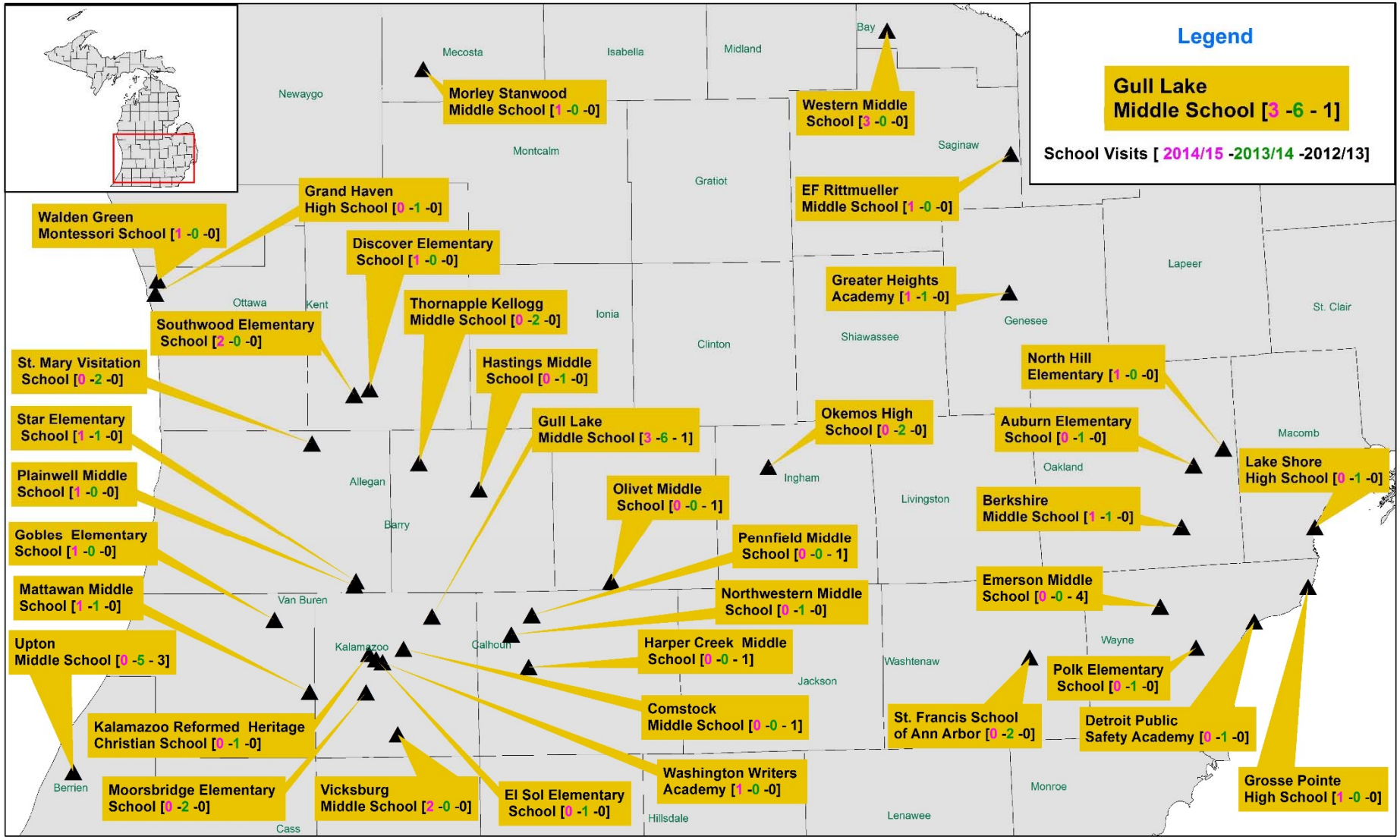

DEPARTMENT OF GEOSCIENCES
Schmaltz Geology Museum


PAUL WOOD
HALL

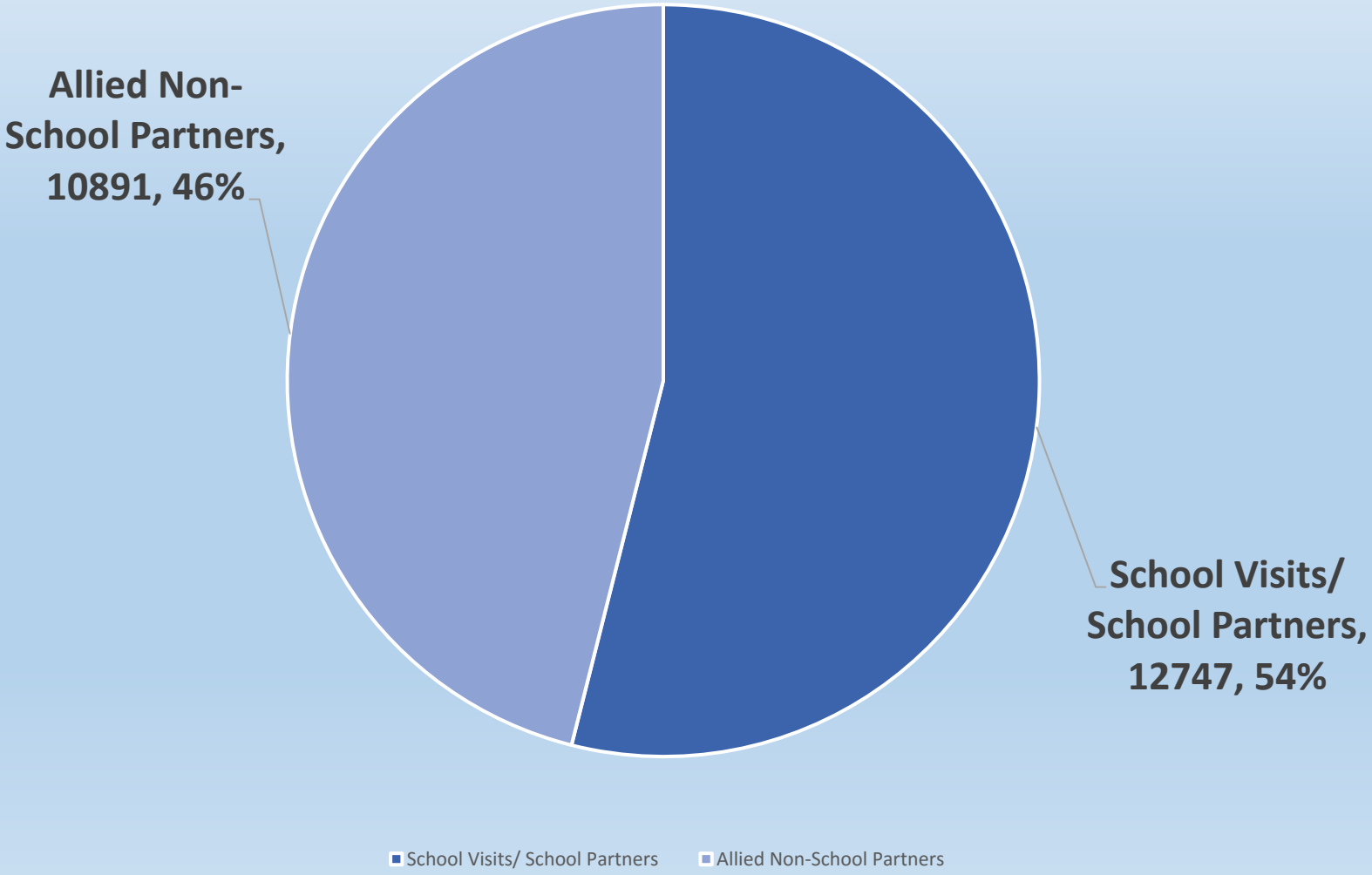
MGRRE, MGS and CoreKids

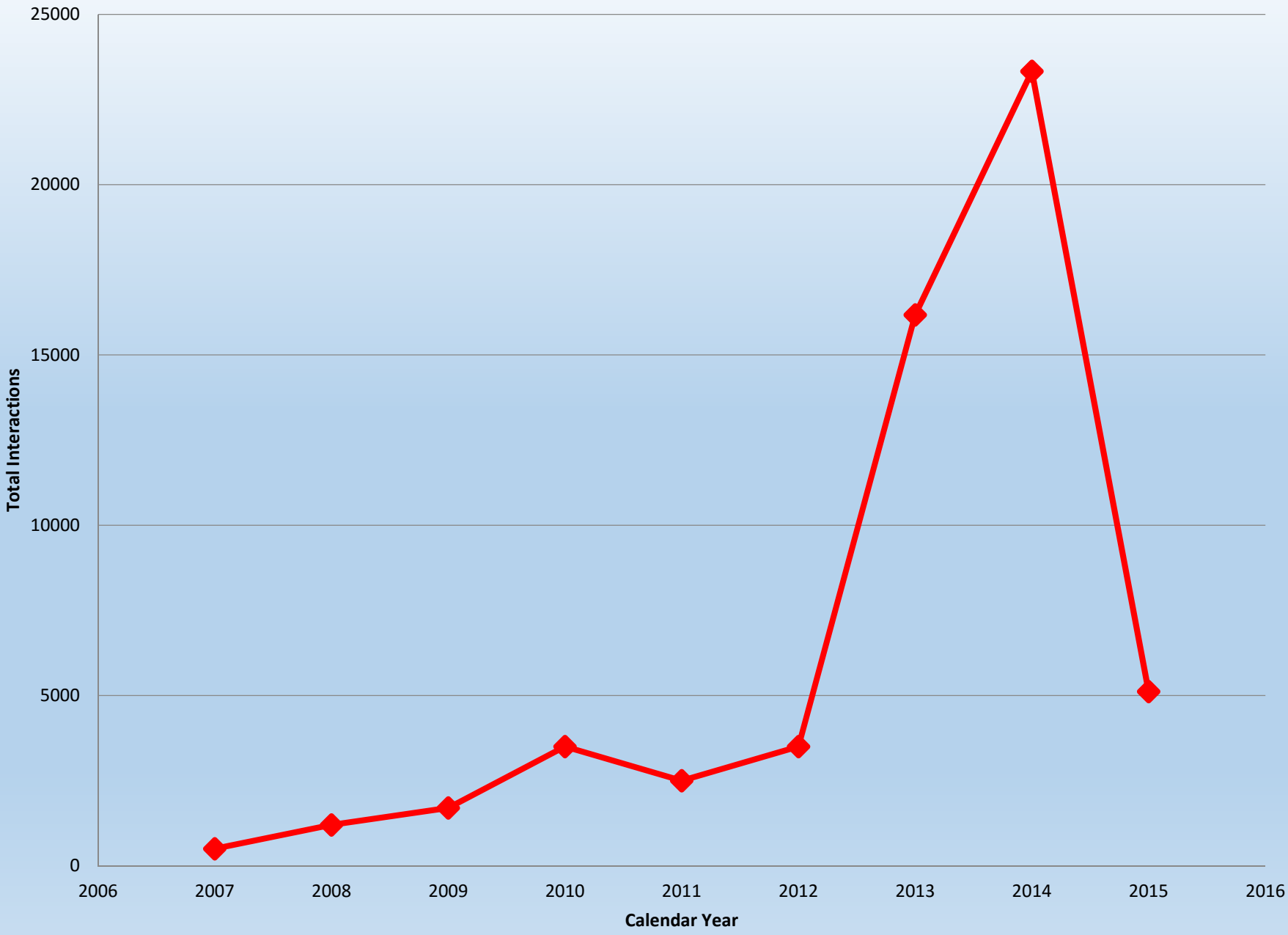
- WMU – home to the Michigan Geological Survey, and has the major, active Core repository for the State
- CoreKids – outreach arm (initially of the Core Repository – now for the Survey)
- ~50 events per year, +10,000 contacts – mostly school visits
- Mix of hands-on activities and presentations from themed modules
- Grant-funded

Distribution of Scheduled School Visits and MGRRE Tours



Generalized Composition of CoreKids Events, 2014-2015




25000
20000
15000
10000
5000
0
Total Interactions
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Calendar Year

Children using our core pump experiment.

Injecting the Hydraulic fracturing fluid at the well in our model


PERIODIC TABLE OF THE ELEMENTS


Michigan Geological Survey
CoreKids
CORE
Bedrock Geology of Michigan
03.06.2014

Augmented Reality Sandbox

- Not our idea – Oliver Kreyos's research page: http://idav.ucdavis.edu/~okreylos/ResDev/SARndbox/
- Aid in teaching – topographic maps and contours

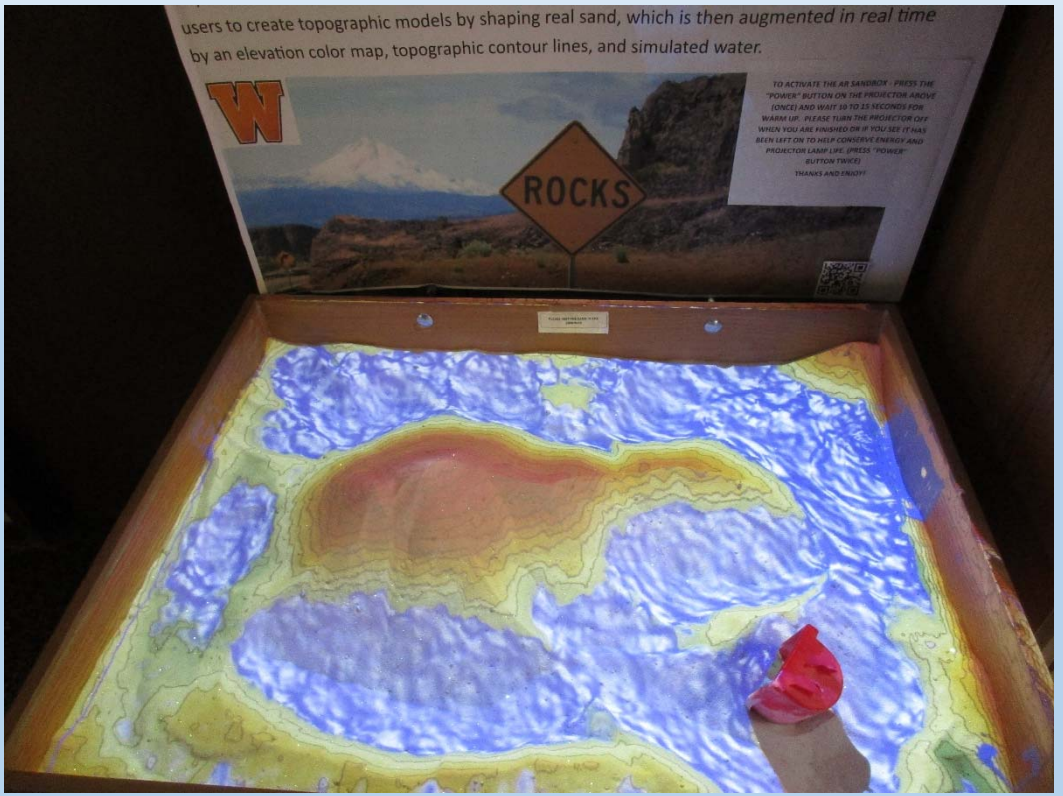
Augmented Reality Sandbox

- Portable – take to classrooms, external events


Geologic Time Scale


PLEASE DO NOT TOUCH THE CAMERA


MUSEUM PREPARAT


users to create topographic models by shaping real sand, which is then augmented in real time
by an elevation color map, topographic contour lines, and simulated water.
W
ROCKS
TO ACTIVATE THE AR SANDBOX - PRESS THE "POWER" BUTTON ON THE PROJECTOR ABOVE (ONCE) AND WAIT 10 TO 15 SECONDS FOR WARM UP. PLEASE TURN THE PROJECTOR OFF WHEN YOU ARE FINISHED OR IF YOU SEE IT HAS BEEN LEFT ON TO HELP CONSERVE ENERGY AND PROJECTOR LAMP LIFE. (PRESS "POWER" BUTTON TWICE)
THANKS AND ENJOY!

Conclusions

- Sand box - Relatively cheap set-up
- Adds hands-on activities to static Museum setting
  - Coursework – applications in geomorphology, planetary science, cartography, earth science education, etc.
  - Play – students spend more time in the museum
- Integrated approach to outreach – not only brings in K-12 students but also has added an element of community building around the science quad.

Teacher Feedback and CoreKids Module Evaluations

Date: 10/20 School: OLD REDFORD Grade Level: 12

District: OLD REDFORD Total # of Students: 140

Teacher: SICHENEDER ~~Sample Copy~~ Office Phone:

Email: jsicheneder@oldredford.com

Presenter: ZACK AND SHELBY Module:

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	4	5
Was Educational	1	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	1	2	3	4	5
Presenter Was Organized	1	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?
- ANYTHING HANDS-ON IS BETTER - THE CORES AND FOSSILS WERE ESPECIALLY COOL - THE PUMPS WERE INTERESTING DEMONSTRATION

4. What was the least favorite part of this activity?
- PIECES OF THE PRESENTATION WERE A LITTLE REPETITIVE - GOALS FOR EACH STATION WERE SOMETIMES UNCLEAR

5. How could this activity be improved?
- I WOULD TRY AND BALANCE OUT THE STATIONS MORE - THE MIGRATES AND ROCKS WERE VERY ENGAGING (AND FOSSILS) BUT THERE WAS LESS TO DO W/ PUMP STATION, FOR INSTANCE.

6. Do you feel this module meets Michigan State Science Standards?

YES

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

YES

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

YES

Date: 11/6/15 School: Greater Heights Academy Grade Level: 4th

District: GHA Total # of Students: 24

Teacher: Botsford Office Phone: (810) 768-3860

Email: botsford@greaterheightsacademy.org

Presenter: _____ Module: Minerals / Rocks

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	(4)	5
Was Educational	1	2	(3)	4	5
Met Expectations	1	2	3	(4)	5
Was Too Difficult for Students	1	(2)	3	4	5
Had Clear Instructions	1	2	3	4	(5)
Had Clear Purpose	1	2	3	(4)	5
Improved Understanding	1	2	(3)	4	5
Presenter Was Knowledgeable	1	2	3	4	(5)
Presenter Was Organized	1	2	(3)	4	5

3. What part of this activity was most effective to help students explore this topic?

I liked how students could touch the rocks

4. What was the least favorite part of this activity?

There could have been a lesson explained before activities.

5. How could this activity be improved?

6. Do you feel this module meets Michigan State Science Standards?

Yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Sure!

Date: 11-6-15 School: Greater Heights Academy Grade Level: 5th/6th

District: Greater Heights Academy Total # of Students: 47

Teacher: Ms. Crane / Ms. Cook Office Phone: 810 - 768 - 3860

Email: craned@greaterheightsacademy.org

Presenter: Dawn Hannah Module: Geology - Rock Fossils

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	4	5
Was Educational	1	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	1	2	3	4	5
Presenter Was Organized	1	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Hands on exhibits.

4. What was the least favorite part of this activity?

5. How could this activity be improved?

Worksheets to document findings.

6. Do you feel this module meets Michigan State Science Standards?

Yes,

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Thank you for bringing this program to our school.

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Date: 11-12-15 School: Marshall Upper Element Grade Level: 4-6

District: Wayne Westland Total # of Students: 8

Teacher: VanDoorne Office Phone: 734-419-2250

Email: vandoornek@wwcsd.net

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	(2)	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	(2)	3	4	5
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	1	(2)	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

How hands-on it was. Very cool.

4. What was the least favorite part of this activity?

Difficult to move around.

5. How could this activity be improved?

N/A

6. Do you feel this module meets Michigan State Science Standards?

Yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Yes

Date: 11/12 School: Marshall Elementary Grade Level: 6th

District: Wayne-Westland Total # of Students: 25 + 26 = 51

Teacher: Mrs. O'Leary / Evanko Office Phone: (734) 419-2277

Email: Olearyjac@wwcsd.net

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	4	5
Was Educational	1	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	1	2	3	4	5
Presenter Was Organized	1	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

the rotations/hands on

4. What was the least favorite part of this activity?

N/A

5. How could this activity be improved?

less

6. Do you feel this module meets Michigan State Science Standards?

Yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop. Yes

Date: 11-12-15 School: Marshall Grade Level: 6

District: Wayne/Westland Total # of Students: 34 + 6 = 40

Teacher: Duvall (Neumann) sub Office Phone: ?

Email:

Presenter: Module:

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	4	5
Was Educational	1	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	1	2	3	4	5
Presenter Was Organized	1	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

The ability to touch, manipulate.

4. What was the least favorite part of this activity?

NONE

5. How could this activity be improved?

1. Perhaps a little more visual intro with overhead projector.

9. Also - worksheet at end - T/F, Yes/No.

6. Do you feel this module meets Michigan State Science Standards?

yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

yes

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

yes

3. Also - perhaps more quick review on behavior expectations during activity.

Date: 11/12 School: Marshall Upper Elem. Grade Level: 6

District: Wayne Westland School Total # of Students: 65

Teacher: Anderson / Nardeen Office Phone: _____

Email: Andersonr@wwcsd.net

Presenter: Dawn / Hannah Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	(1)	2	3	4	5
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

allowing the students to use the materials,

4. What was the least favorite part of this activity?

I loved it all

5. How could this activity be improved?

It was great can't get better.

6. Do you feel this module meets Michigan State Science Standards?

yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

yes

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop. yes- we will definitely invite you again every year.

Date: 11/12/15 School: Marshall Grade Level: 6th

District: Wayne - Westland M Total # of Students: 33

Teacher: Michele Hunt Office Phone: (734) 419-2277

Email: huntm@wwcsd.net

Presenter: Dawn & Hannah Module: Geology

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

The Hands on Activities & learning stations were awesome.

4. What was the least favorite part of this activity?

There really was not a boring part - Higher Order questions were great!

5. How could this activity be improved?

Quick suggestion - Give Students a "Two-Minute Warning" before they have to move Stations. (:)

6. Do you feel this module meets Michigan State Science Standards?

Yes, even though we're not to the Rock Cycle yet... great reference & experience for when we do.

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Absolutely - Science Rocks!

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Awesome job Ladies!

Date: 11/1/13 School: Marshall Upper Elementary Grade Level: 6th

District: Wayne - Westland Total # of Students: 34

Teacher: Mr. Hall Office Phone: _____

Email: halld@wwcsd.net

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	(4)	5
Had Clear Instructions	1	(2)	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Hands on activities!

4. What was the least favorite part of this activity?

5. How could this activity be improved?

Maybe a little more clear directions for each station

6. Do you feel this module meets Michigan State Science Standards?

Absolutely

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

This was poignant and purposeful! My students had a blast

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Date: 11/13/15 School: Marshall Elem. Grade Level: 6

District: Wayne - Westland Total # of Students: 30

Teacher: Paulsen Office Phone: 734 419 2275

Email: paulsensr@wwcsd.net

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Speakers were relatable & energetic, Willing to answer questions & offer exp.

4. What was the least favorite part of this activity?

The kids were not ready to go... they would have loved more time.

5. How could this activity be improved?

—

6. Do you feel this module meets Michigan State Science Standards?

yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop. yes

Date: 11-13-15 School: Marshall Grade Level: 5th/6th

District: Wayne-Westland Total # of Students: 30

Teacher: Kozicki/Martin Office Phone: _____

Email: martinm@wwcsd.net

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	(2)	3	4	5
Had Clear Instructions	1	(2)	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Hands-on

4. What was the least favorite part of this activity?

N/A

5. How could this activity be improved?

6. Do you feel this module meets Michigan State Science Standards?

Yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Presenters did great working with our group of special education students!

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Date: 11.13.15 School: Marshall Upper Elem. Grade Level: 6th

District: Wayne-Westland Total # of Students: 34

Teacher: Erika Millender Office Phone: 734.419.2275

Email: erikanparis@gmail.com

Presenter: Hannah & Zakk Module:

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Hands on activity combined with instruction and background knowledge.

4. What was the least favorite part of this activity?

SHORT TIME AT THE STATIONS! (Makes sense though) Great use of time and leaves them wanting more.

5. How could this activity be improved?

Prep lessons to get students ready

6. Do you feel this module meets Michigan State Science Standards?

Yes!

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?)) ~~Yeah!~~ Watching my students explore and use steps in scientific method & inquiry process WHILE using science vocabulary was a great assessment (formative)

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop. Yes!

Date: 11/13 School: Marshall Grade Level: 6

District: Wayne-Westland Total # of Students: 32

Teacher: Mrs. German Office Phone: _____

Email: germancl@wwcsd.net

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	4	5
Was Educational	1	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	1	2	3	4	5
Presenter Was Organized	1	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Hands on! Presented wonderfully - the students really enjoyed themselves.

4. What was the least favorite part of this activity?

There wasn't one!

5. How could this activity be improved?

A longer period of time might be good.

6. Do you feel this module meets Michigan State Science Standards?

Yes, definitely!

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

The speakers were great + had the students engaged the entire time.

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Yes - definetly

Date: 11/13 School: Marshall Upper Grade Level: 6

District: Wayne Westland Total # of Students: 29here 32 usually

Teacher: Diane Krzyaniak Office Phone: 7344192275

Email: krzyaniakd@wwcsd.net

Presenter: Zack & Hannah Module:

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

hands on

4. What was the least favorite part of this activity?

nothing

5. How could this activity be improved?

nothing

6. Do you feel this module meets Michigan State Science Standards?

yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Perfect for an introduction - Too bad it couldn't be after holiday - closer to when we are teaching it.

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Definitely - would love to schedule for next year again

Date: 11/19/15 School: Handy Middle School Grade Level: 6th

District: Bay City Public Schools Total # of Students: 97

Teacher: Mr Kraut Office Phone: 989-684-1723

Email: krautr@bcschools.net

Presenter: Dawn + Hannah Module: Michigan's Geologic History

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?
Being able to move to each center + Hands-on

4. What was the least favorite part of this activity?

5. How could this activity be improved? Include guide questions @ each center for students to reflect on or write short answers to show their understanding

6. Do you feel this module meets Michigan State Science Standards? Yes!

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?)) The CoreKids Presentation provided my students with a hand-on experience that I could never provide

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop. yes

Date: 11/20/15 School: Handy Middle Grade Level: 6

District: Bay City Public Total # of Students: 83 (81 Petrosky)

Teacher: H. Richards Office Phone:

Email: richardsh@bcschools.net

Presenter: Module:

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Being able to touch, try, smell all of the specimins. Moving from table to table was great! Exploration!

4. What was the least favorite part of this activity?

None

5. How could this activity be improved?

It Was great!

6. Do you feel this module meets Michigan State Science Standards?

Yes - Great tie in to Michigan's Past!

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Great introduction to Michigan's History through the exploration of our rocks and fossils! Thankyou!

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Yes! Will be forwarding info to brother-in-law at CMMS in Bangor Twp. Schools.

Date: 11/20 School: Handy Middle Grade Level: 6th

District: Bay City Total # of Students: 81

Teacher: A. Petrosky Office Phone: _____

Email: _____

Presenter: _____ Module: _____

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

The hands-on activities!

4. What was the least favorite part of this activity?

Last, not least, but students would have liked more minerals

5. How could this activity be improved?

more minerals :)
great fossils :)

6. Do you feel this module meets Michigan State Science Standards?

Excellent!

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Date: 11/24/15 School: Hudsonville Chr. MS Grade Level: 7

District: Hudsonville Chr. Schools Total # of Students: 98

Teacher: Mike Broersma Office Phone: (616) 669-7487

Email: mbroersma@4hcs.org

Presenter: Dawn Module: Hydrogeology

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	1	2	3	4	5
2. This activity:					
Was Enjoyable	1	2	3	4	5
Was Educational	1	2	3	4	5
Met Expectations	1	2	3	4	5
Was Too Difficult for Students	1	2	3	4	5
Had Clear Instructions	1	2	3	4	5
Had Clear Purpose	1	2	3	4	5
Improved Understanding	1	2	3	4	5
Presenter Was Knowledgeable	1	2	3	4	5
Presenter Was Organized	1	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Hands on stuff

4. What was the least favorite part of this activity?

Slideshow at the beginning

5. How could this activity be improved?

Perhaps some groundwater models

6. Do you feel this module meets Michigan State Science Standards?

Yes

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Date: 2/10 School: Gull Lake Middle School Grade Level: 6

District: Gull Lake Total # of Students: 120

Teacher: Laurie Klok Office Phone:

Email: [redacted] lklok@gulllakecs.org

Presenter: Zakk + Hannah Module: Michigan Geology

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	X 1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

the hands-on activities

4. What was the least favorite part of this activity?

none (11)

5. How could this activity be improved?

? more mineral samples

6. Do you feel this module meets Michigan State Science Standards?

Yes- absolutely!

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Yes! we have (11)

Date: 2/24 School: Mattawan Middle Grade Level: 6th

District: Mattawan Consolidated Total # of Students: 155 - (31 AV.)

Teacher: Ablao, John Office Phone: ~~269-762-2730~~ 269-668-3361

Email: jablao@mattawanschools.org

Presenter: Hanna + Zakk Module: Rocks & Minerals.

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Stations were fun. A great way to cover many topics in one hour.

4. What was the least favorite part of this activity?

N/A

5. How could this activity be improved?

6. Do you feel this module meets Michigan State Science Standards?

Yes.

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Yes.

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Date: 2/26 School: Mattawan Middle Grade Level: 6

District: Mattawan Total # of Students: 150

Teacher: Karin Fender Office Phone: 668-3361

Email: kfender@mattawanschools.org

Presenter: Zakk, Shelby, Katie Module: MI Geo Hist.

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

I liked the balance of the intro/background and then to the hands-on stations.

4. What was the least favorite part of this activity?

Ø The students were engaged the entire hour.

5. How could this activity be improved?

Ø

6. Do you feel this module meets Michigan State Science Standards?

Yes, it aligned very well with our content.

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

The kids kept talking about in all their other classes!

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Yes. John will have his wife, a Portage teacher, spread the word.

Date: 3/8 School: Gull Lake Middle Grade Level: 6

District: Gull Lake Community Total # of Students: 128

Teacher: Mrs. K. Clancy Office Phone: 269-

Email: KClancy@gulllakecs.org

Presenter: Hannah Zaid Module: Earthquakes

Please circle one for each question (scale 1-5: 1 = awesome/absolutely agree, 2 = really good/strongly agree, 3 = pretty good/somewhat agree, 4 = fair/slightly disagree, 5 = terrible/firmly disagree)

1. Overall, this module was:	(1)	2	3	4	5
2. This activity:					
Was Enjoyable	(1)	2	3	4	5
Was Educational	(1)	2	3	4	5
Met Expectations	(1)	2	3	4	5
Was Too Difficult for Students	1	2	3	4	(5)
Had Clear Instructions	(1)	2	3	4	5
Had Clear Purpose	(1)	2	3	4	5
Improved Understanding	(1)	2	3	4	5
Presenter Was Knowledgeable	(1)	2	3	4	5
Presenter Was Organized	(1)	2	3	4	5

3. What part of this activity was most effective to help students explore this topic?

Students enjoyed the hands on part

4. What was the least favorite part of this activity?

5. How could this activity be improved?

6. Do you feel this module meets Michigan State Science Standards?

MSS - modeling

7. Comments: (May we use any of your comments in our promotional materials (brochures, module handouts, website?))

Fantastic fun engaging activity

8. Would you recommend CoreKids to your colleagues, friends and other districts? If so, please forward our contact information to them. The more students we reach the more funding we can obtain, and the more modules we are able to develop.

Absolutely

CORE Kids