

Geologic Resources of Iowa for Teachers

Spring & Summer 2023

The aggregation of time on tasks, assignment, and interactions must reflect rigor and expectations equivalent to the federal definition of the credit hour—15 hours of direct faculty instruction and a minimum of 30 hours of out-of-class student work for each credit hour awarded." But it should be noted that to do well in any educational effort it is your concentration/dedication, inquisitive mind, and overall scholarship engagement that will lead to an appreciation and understanding of any subject.

On-line: UNI continuing education & Adobe Connect then Summer workshop
Credits: 2 credit hours – UNI Grad. Credit
Sessions: Tuesday 4 to 6 pm
Sponsors: The Iowa Limestone Producers Association (ILPA) www.limestone.org
Professor: Dr. Chad Heinzl
Course website: <https://www.exploreiowageology.org/GeoResourcesOfIowa.php>
Contact: chad.heinzl@uni.edu , (319)-273-6168
Zoom to Panopto Sessions, Tuesdays 4 to 6PM, encouraged real-time but sessions may be taken asynchronously with follow up homework, questions and answers.

Learning objectives

- A. Discover Iowa's diverse geology & the benefits of their subsequent natural resources, while obtaining a basic proficiency in their identification
- B. Develop your own mineral, rock and fossil classroom collections
- C. Focus on the significance of these items in understanding and interpreting Earth's history and the geology of Iowa.
- D. Using the National Generation Science Standards and Iowa Core Curriculum explore effective pathways of addressing Earth and Environmental Science standards.
- E. Learn the various economic and environmental aspects of Iowa geology.

Course Description –

EarthSci6233 - Introduction to the interactions and relationships between humans and natural resources: stone, clay and soil in beautiful Iowa ☺

Online

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| Session 1
March 7 | Welcome, Logistics then Geologic foundations, tools and concepts then History and Importance of Geology in Iowa <i>Text Reading Ch. 1-3</i> |
| Session 2
March 21 | Geologic History of Iowa Part 1 - The Bedrock
Minerals and Rocks of Iowa and adjacent states <i>Text Reading Ch.3-5</i> |
| Session 3
April 4 | Geologic History of Iowa Part 2 – The Bedrock continued
Mining in and around Iowa <i>Text Reading Ch. 6-9</i> |
| Session 4
April 18 | Geologic History of Iowa –The Surficial sediments <i>Text Reading Ch. 10-11</i>
Economic Geology Part 2 – Soil, Land Use, & Environmental challenges |
| Session 5
May 2 | Finishing up and getting ready for the summer session |

Summer workshop – June 19-22 (Monday to Thursday), subject to change slightly

June 19 – A. Environments of Deposition, B. The Aggregate Industry C. Geology, NGSS/Iowa Core Curriculum

June 20 – A. Quarries Vs. pits, B. Quaternary Geology of Iowa, C. Economic Geology

June 21 – A. Paleontology, B. Cement Production, C. Iowa's Stratigraphy

June 22 – A. Geology of Eastern Iowa, B. Limestone Vs. Dolostone Aggregate, C. Karst Topography, caves and environmental geology

Grading

Course work	points
Pre-survey	20
Homework	
Session 1	20
Session 2	20
Session 3	20
Session 4	20
Field work (Summer 2020)	
4 days of participation	40
June 19 activity	20
June 20 activity	20
June 21 activity	20
June 22 activity	20
<u>Paper/project</u>	<u>40</u>
	260 points

Approx. grade distribution

X>220 = A X>200 = B X>180 = C

Class Attendance and Participation

Course questions will reflect and cover class 1) discussions, 2) field and lab activities, 3) text/journal readings, and 4) small group activities. Anything I say/discuss is fair game for a quiz or exam. Attendance is essential. If you listen, ask questions, take very good notes, and study for tests chances for earning a good grade are high! And the general guidelines of UNI's attendance policy will be employed, (<https://policies.uni.edu/306>).

UNI - All Statements for Student Success

UNI Information and regulations regarding Free Speech, Equity, Accessibility, The Learning Center and others may be accessed via <https://provost.uni.edu/syllabus-statements>

Additional recommendations from UNI's Center for Excellence in Teaching & Learning

- A. Course materials, accessibility and opportunities for enhanced success
- a. Textbook – Iowa Geological Past by Wayne I. Anderson – Will be provided to you courtesy of the Iowa Limestone Producers Association (ILPA)
 - b. Computers and data – For the online portion you will need access to a computer, a good internet connection and headphones with mic capabilities.
 - c. Field trips – Our summer course will be a series of field trips.
 - d. Course webpage – You will have access to some course materials and additional learning resources through the following webpage - <https://www.exploreiowageology.org/GeoResourcesOfIowa.php>
 - e. Optional resources
 - 1) Iowa's Minerals by Paul Garvin
 - 2) Landforms of Iowa by Jean Prior

B. Classroom civility –

- a. Be respectful to everyone at all times.
- b. Be on time, pay attention and participate.
- c. Represent UNI well when on and off campus.
- d. Reduce use and silence phones in class and during field trips.
- e. Social distancing and masks are required, please be respectful and safe 😊

C. Pro-Tips for doing well in this class

1. Engage the content material before coming to the weekly discussions.
2. Participate in activities and discussions, ask a lot of questions 😊
3. If you have to miss a class please let me know ahead of time.
4. You will need to work, read, research and plan approximately 60 hours on your own time to complete the course work and learning opportunities.

D. Summer course

Due to a generous donation from the Iowa Limestone Producers Association, you are getting free tuition, lodging, field trip transportation, textbook, a hardhat, sampling bags and the majority of your summer course food paid for...

Required Items that you need to bring =

One pair of close-toed shoes, water bottle, a pair of pants, one long sleeved shirt notebook, about 15 pages of loose-leaf/lined paper, pencils... Our quarry visits require little skin showing/protective clothing Tennis shoes are fine

Suggested items

Personal snacks, sun hat, sunscreen, bug/tick spray, portable coffee mug if you like to drink coffee during the day.

Geology's 'Big ideas' - You shouldn't leave this class without!

BIG IDEA 1. Geologists use repeatable observations & testable ideas to understand & explain our planet.

1.1 Earth scientists find solutions to society's needs. Earth scientists work on challenging problems that face humanity on topics such as climate change and human impacts on Earth. Earth scientists successfully predict hazards to humans and locate and recover natural resources, making possible the flourishing of humans on Earth.

BIG IDEA 2. Earth is 4.6 billion years old.

2.1 Earth's rocks and other materials provide a record of its history. Earth scientists use the structure, sequence, and properties of rocks, sediments, and fossils to reconstruct events in Earth's history. Decay rates of radioactive elements are the primary means of obtaining numerical ages of rocks and organic remains. Understanding geologic processes active in the modern world is crucial to interpreting Earth's past.

BIG IDEA 3. Earth is a complex system of interacting rock, water, air, and life.

3.1 The four major systems of Earth are the geosphere, hydrosphere, atmosphere, and biosphere. The geosphere includes a metallic core, solid and molten rock, soil, and sediments. The atmosphere is the envelope of gas surrounding Earth. The hydrosphere includes the ice, water vapor, and liquid water in the atmosphere, the ocean, lakes, streams, soils, and groundwater. The biosphere includes Earth's life, which can be found in many parts of the geosphere, hydrosphere, and atmosphere. Humans are part of the biosphere, and human activities have important impacts on all four spheres.

BIG IDEA 4. Earth is continuously changing.

4.1 Earth's geosphere changes through geological, hydrological, physical, chemical, and biological processes that are explained by universal laws. These changes can be small or large, continuous or sporadic, and gradual or catastrophic.

BIG IDEA 5. Earth is the water planet.

5.1 Water is found everywhere on Earth, from the heights of the atmosphere to the depths of the mantle. Early in Earth's history, surface water accumulated through both out-gassing from its interior and the capture of some extraterrestrial ice. Water vapor in the atmosphere condensed and rained out as the planet cooled.

BIG IDEA 6. Life evolves on a dynamic Earth and continuously modifies Earth.

6.1 Fossils are the preserved evidence of ancient life. Fossils document the presence of life early in Earth's history and the subsequent evolution of life over billions of years.

BIG IDEA 7. Humans depend on Earth for resources.

7.1 Earth is our home; its resources mold civilizations, drive human exploration, and inspire human endeavors that include art, literature, and science. We depend upon Earth for sustenance, comfort, places to live and play, and spiritual inspiration.

BIG IDEA 8. Natural hazards pose risks to humans.

8.1 Natural hazards result from natural Earth processes.

These hazards include earthquakes, tsunamis, hurricanes, floods, droughts, landslides, volcanic eruptions, extreme weather, lightning-induced fires, sinkholes, coastal erosion, and comet and asteroid impacts.

BIG IDEA 9. Humans significantly alter the Earth.

9.1 Human activities significantly change the rates of many of Earth's surface processes. Humankind has become a geological agent that must be taken into account equally with natural processes in any attempt to understand the workings of Earth's systems. As human populations and per capita consumption of natural resources increase, so do our impacts on Earth's systems.

BIG IDEA 10. Becoming an earth scientist is an extremely meaningful and rewarding career!

Climate Principles

Principle #1 Humans can take actions to reduce climate change and its impacts.

Actions taken by individuals, communities, states, and countries all influence climate. Practices and policies followed in homes, schools, businesses, and governments can affect climate. Climate-related decisions made by one generation can provide opportunities as well as limit the range of possibilities open to the next generation. Steps toward reducing the impact of climate change may influence the present generation by providing other benefits such as improved public health infrastructure and sustainable built environments.

Principle #2 The Sun is the primary source of energy for Earth's climate system.

Sunlight reaching the Earth can heat the land, ocean, and atmosphere. Some of that sunlight is reflected back to space by the surface, clouds, or ice. Much of the sunlight that reaches Earth is absorbed and warms the planet.

Principle #3 Climate is regulated by complex interactions among components of the Earth system.

Earth's climate is influenced by interactions involving the Sun, ocean, atmosphere, clouds, ice, land, and life. Climate varies by region as a result of local differences in these interactions.

Principle #4 Life on Earth depends on, is shaped by, and affects climate.

Individual organisms survive within specific ranges of temperature, precipitation, humidity, and sunlight. Organisms exposed to climate conditions outside their normal range must adapt or migrate, or they will perish.

Principle #5 Climate varies over space and time through both natural and man-made processes.

Climate is determined by the long-term pattern of temperature and precipitation averages and extremes at a location. Climate descriptions can refer to areas that are local, regional, or global in extent. Climate can be described for different time intervals, such as decades, years, seasons, months, or specific dates of the year.

Principle #6 Our understanding of the climate system is improved through observations, theoretical studies, and modeling.

The components and processes of Earth's climate system are subject to the same physical laws as the rest of the Universe. Therefore, the behavior of the climate system can be understood and predicted through careful, systematic study.

Principle #7 Human activities are impacting the climate system.

The overwhelming consensus of scientific studies on climate indicates that most of the observed increase in global average temperatures since the latter part of the 20th century is very likely due to human activities, primarily from increases in greenhouse gas concentrations resulting from the burning of fossil fuels.

Principle #8 Climate change will have consequences for the Earth system and human lives.

Incidents of extreme weather are projected to increase as a result of climate change. Many locations will see a substantial increase in the number of heat waves they experience per year and a likely decrease in episodes of severe cold. Precipitation events are expected to become less frequent but more intense in many areas, and droughts will be more frequent and severe in areas where average precipitation is projected to decrease.

Source materials =

Geology – www.earthscienceliteracy.org

Climate – www.cleanet.org