



1005 Discovery Dr. | Chisholm, MN 55719 | Phone: (800) 372-6437 | (218) 254-7959 | Fax: (218) 254-7971

Minnesota Discovery Center Hall of Geology Interpretive Plan

Description (“walkthrough”): The Hall of Geology will explore over 3 billion years of geologic and paleontological history of the Iron Range. The exhibit seeks to address these three questions throughout: Why are there iron deposits on the Iron Range, what kind of life pre-dated human activity, and why does the modern landscape look the way it does today? The overall structure of the exhibit is both thematic and sequential. It does follow a basic chronological order but also focuses that order around those three questions above.

The exhibit begins with a basic introduction to geology and paleontology and what the visitor will experience in this hall. The next section is an interactive timeline that will hopefully get the visitor adjusted to just how old this geologic story is and cover some of the major highlights for each time period covered in the exhibit.

Following this timeline, we want the visitor to then move to what we hope will be a central piece to the exhibit. As of now, we are simply calling it the Central Hub, a circular display piece that will help summarize four major zones: formation of iron deposits, mountain-building and volcanism, Cretaceous Period, and glaciation. With reading rails surrounding it, we want each zone to be a focal point for its topic. Our goal is to have this hub be interactive and focus more on visuals/specimens than labels.

The layout of this exhibit hall is very open, and we want a central piece to really pull in the visitor and get them wanting to see more. We want this central hub to have verticality to it as well. The exhibit firm we hire for this project will need to help us flesh out this section and help turn our ideas into a physical reality.



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The visitor then moves into the section highlighting the Great Oxygenation Event and stromatolites how these two were instrumental in the formation of our region's iron deposit. This section ends with the discussion of the Sudbury Impact and its implications for the Iron Range.

Next is the great Mid-Continental Rift that included serious episodes of mountain-building and volcanism for our region. This is what formed the shore of Lake Superior. Following this is our entire section of Iron Range fossils, moving from the Paleozoic Period to the Cretaceous. Here we will focus on our Hill Annex Paleontology Project and what we've learned about what the Iron Range was like 90 million years ago.

The last section will be on the rise of mammals and glaciation. This will also connect to the questions of what types of living things were once found here as well as why is the landscape the way it is today. The lasting effects of glaciation can be seen all across our region, but few may know how glaciers did this and what they left behind.

Exhibit Messages and Means of Expression:

**all specimens listed under means of expression are from MDC's collections unless otherwise specified*

Zone 1: Introduction

Messages:

1. Define geology and paleontology
2. Introduce visitor to Iron Range geology
3. Explain three different rock types
 1. Explain why this matters
 2. Explain what they tell us about the history of the earth before humans



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Means of Expression:

- Small touchable samples of the various rocks:
 - Igneous: granite, andesite/rhyolite, gabbro, basalt
 - Sedimentary: mudstone, sandstone, conglomerate, fossiliferous limestone
 - Metamorphic: gneiss, phyllite, slate, marble

Zone 2: Timeline Wall

Messages:

1. Discuss stratigraphy and how it is useful for geology/paleontology
2. Concept of geologic time
 1. What a million vs a billion years looks like
 2. Show just how recent humans are to geologic time
3. Dating methods: absolute vs relative dating etc
4. Touchable timeline wall with key specimens for each time period

Means of Expression:

- Archean specimens:
 - Morton Gneiss
 - Ely Greenstone
 - Slate
- Early-Mid Proterozoic
 - Stromatolite
- Late Proterozoic
 - North Shore volcanic rock
- Ordovician



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- Trilobite and fish fossils
- Cretaceous
 - Ammonite, shark, and crocodile fossils
- Mural depicting the changing environment between geologic periods

Zone 3: Central Hub

Messages:

1. Basic introduction saying BIFs are why the range is here
2. Plate tectonics, mountain-building, volcanoes
3. Classic visual of collision of plates to mountains to volcanoes to rifts/spreading
 1. Tiered 3D model of above to increase verticality of the display
4. Basic description of Cretaceous Period
5. Different features of glaciers and topography they leave behind

Means of Expression: (this would need to be designed and fabricated)

- Large Mary Ellen Jasper slab depicting stromatolites
- Plate tectonic model
- Dromaeosaur (small raptor) model
- Glacier landscape model

Zone 4: Banded-Iron Formation, Oxygenation, and Sudbury Impact

Messages:

1. Rise of photosynthesizers: cyanobacteria and how this connects to iron deposits
 1. Explain how oxygen was a waste product and not the primary product of cyanobacteria
 2. Explain how this is why we have oxygen on Earth
2. What kind of life was around this long ago



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3. How cyanobacteria helped form iron
4. Cover Great Oxygenation Event
5. Explain the Sudbury Impact and its regional/global implications

Means of Expression:

- “Rough” stromatolite specimen showing concentric rings in top surface
- Cut and polished stromatolite specimen showing side view of layered structures
- Piece of banded iron
- Piece of taconite
- Hematite minerals
- Magnetite minerals
- Goethite
- Limonite
- Sudbury Impact ejecta layer

Zone 5: Mid-Continental Rift and Volcanism

Messages:

1. Explain churning of mantle and how it pulled apart (Mid-continental rift)
2. Plate tectonics are key here
3. Explain rise of volcanic activity in Minnesota and along what we now call the North Shore
4. Explain how agates are tied to this volcanic activity and where they come from
5. Explain how we can detect the mid-continental rift underground

Means of Expression:

- Basalt (large touchable sample)
- Gabbro (large touchable sample)



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- *Vesicular basalt*
- *Natural, un-cut agates*
- *Cut and/or polished agates*

Zone 6: Fossils

Messages:

1. Explain why the Iron Range doesn't have Paleozoic fossils but other parts of Minnesota do
2. Introduce the Cretaceous Period
3. Introduce the Western Interior Seaway and where what is now Minnesota was in relation to that
4. Define fossils
 1. Actual fossil specimens
 2. Trace fossils
 3. Index fossils
 4. Explain how environment/landscape/climate was vastly different millions upon millions of years ago
5. Fossilization models

Means of Expression:

- Trilobite
- Brachiopod
- Tabulate coral
- Eurypterid
- Crinoid
- Dunkleosteus
- Dimetrodon
- Dromaeosaur claw



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- Crab exoskeleton
- Plant material from the Cretaceous
- Shark teeth
- Fish teeth
- Various vertebrae
- Plesiosaur vertebra and teeth
- Clams, molluscs, etc
- Crocodile snout
- Mural depicting the Iron Range during the Cretaceous Period

Zone 7: Glaciers/Ice Age

Messages:

1. Define glaciers
2. Process of building glaciers
3. Duration of the Ice Age
4. Explain how glaciers moved: process of advancing and retreating
5. Discuss results of glaciers on our landscape
6. Where did glaciers go, what happened after they left

Means of Expression:

- Bedrock specimen with striations
- Samples of rocks moved from glaciers
- Ice age mammal fossils