# Title: Michigan’s Changing Environment

## Stage 1 - Desired Results

### Goals:
1) Students will be introduced to pre-contact environmental change and human adaptation,
2) Students will be able to find various environments and resources on a map,
3) Students will recognize the interconnectedness of humans, plants, climate and environment.

(Grade 3 GLCEs) H3.0.1, H3.0.2, H3.0.7 G1.0.2, G2.0.1, G5.02

<table>
<thead>
<tr>
<th>Understanding(s):</th>
<th>Essential Questions(s):</th>
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<tbody>
<tr>
<td>Students will understand that…</td>
<td>1) What is climate change?</td>
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<tr>
<td>1) Michigan’s climate has changed over thousands of years.</td>
<td>2) How does it happen and what are the effects?</td>
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<td>2) As the climate changed the plants and animals living here changed too.</td>
<td>3) What animals live in different environments?</td>
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<td>3) Native peoples had to adapt their hunting techniques and tools to the changing environment.</td>
<td>4) What do animals do when the climate changes?</td>
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<th>Students will know…</th>
<th>Students will be able to…</th>
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<tr>
<td>1) Logically link natural changes in climate with changes to plant and animal habitat;</td>
<td>1) Use maps to find information;</td>
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<tr>
<td>2) Use maps to find information;</td>
<td>2) Use web pages to find information on the habitat and diet of animals;</td>
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<tr>
<td>3) Use web pages to find information on the habitat and diet of animals;</td>
<td>3) Describe how people adapted to use the changing resources available to them.</td>
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<td>4) Describe how people adapted to use the changing resources available to them.</td>
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## Stage 2 - Assessment of Evidence

### Performance Tasks(s):
1) Student teams will read maps and web pages for information to answer comparative questions about pre-contact hunting.
2) Students will create a picture story or diorama of animals, hunting and environment in the Paleo-Indian or Late Woodland period.

### Other Evidence:
- U of M Biokids – “caribou”
  [http://www.biokids.umich.edu/critters/Rangifer_tarandus/](http://www.biokids.umich.edu/critters/Rangifer_tarandus/)
- U of M Biokids – “whitetail deer”
  [http://www.biokids.umich.edu/critters/Odocoileus_virginianus/](http://www.biokids.umich.edu/critters/Odocoileus_virginianus/)
- “How to hunt a Mastodon”
- Encyclopedia of Life, “Mastodon”
  [http://www.eol.org/pages/4454807](http://www.eol.org/pages/4454807)
Stage 3 - Learning Plan

Learning Activities:

**Michigan’s Changing Environment**

**Background Information**

**Paleo-Indian Period**

About 12,000 years ago, after glaciers began to recede from the Lower Peninsula, Michigan’s first Native people arrived to find a cold, and dry tundra landscape. Archaeologists have given them the name “Paleo-Indian.” Because the climate was so cold, and the passing of giant glaciers had scoured the landscape, there were few trees and plants. Southern Lower Michigan was covered with tundra grassland with a sparse growth of spruce trees, similar to Alaska’s North Slope today. Animals at home in tundra environments, like caribou and musk ox roamed Michigan. Mammoths grazed on the grassy plains. Mastodons lived near spruce bogs feeding on trees and shrubs. These large animals soon became extinct.

Paleo-Indian hunters probably hunted a variety of smaller animals, but we know that they focused on hunting caribou, and also hunted mastodons (and probably mammoths). All these animals would have been hunted using a team approach, and people would have cooperated in butchering and processing the meat and hides after the hunt. Paleo-Indians used lances (long spears) tipped with long, sharp fluted points for hunting. Fluted refers to the long grooves removed from both sides of the point’s base. This technique probably helped in attaching the point to the wooden shaft of the lance so it would not come off and be lost. It took a great deal of skill to make these points.

Caribou would have been hunted as they migrated north from the edge of the spruce forest to the cold, open tundra. Paleo-Indian groups would have camped near the migration route, the trail thousands of caribou followed every year. The hunters would choose a spot where the trail narrowed and forced the herd into a tight spot. Families would work together to wave their arms and frighten animals into a cul-de-sac where the waiting hunters would kill as many animals as they could.

Hunting mastodons would have been trickier. See “How to Hunt a Mastodon” below.

**The Late Woodland Period (AD800-1200)**

Over thousands of years, as the Earth’s climate warmed, Michigan’s environment changed. The warmer temperatures allowed more trees and plants to grow. The boreal forests of spruce trees gave way to pine, birch and maple trees. Forests more like those we are familiar with today emerged between 8,000 and 5,000 years ago. By the Late
Woodland period (about 1,100 years ago) Michigan’s native peoples had adapted to a life far different from Paleo times.

When the climate warmed, cold-weather animals left and made way for different species, as they moved north to follow their favorite foods and climate. Caribou wandered for miles in the cold, wide-open tundra eating their favorite food, lichen. Caribou developed thick, insulating fur to keep them warm. When Michigan’s climate warmed up, animals like the caribou moved north. Today, caribou live in tundra regions in far northern Canada and Alaska.

Some animals from the Paleo-Indian period did not survive. Mammoths and mastodons became extinct not long after people arrived in Michigan. Some scientists think that hunting by people may have contributed to their extinction.

New animals moved into Michigan, like the whitetail deer, which eats a variety of trees and plants and likes the cover of the thicker forest. Deer can tolerate both cold and warm environments; today their habitat range stretches from Mexico to northern Canada.

As new animals became available to pre-contact hunters, new hunting techniques were developed. Woodland hunters learned to hunt animals like the whitetail deer in dense forests with bows and arrows. Bows were invented around AD800. They used arrows with much smaller stone points. These points were made in large quantities (to tip all the arrows!). Bows and the smaller arrows make hunting in closer, denser forests easier.

**Student Activities**

1) Divide the class into teams (Paleo-Indian and Woodland hunting groups).
2) Have the teams compare the maps of what food was available in Michigan in the Paleo-Indian period and in the Late Woodland period. What types of food were available in each period? Where could these types of food be found? What foods were available to Late Woodland people that Paleo-Indian people did not have?
3) Teams should then explore the photos of glaciers, tundra, and forest environments. How are these environments different?
4) Teams should use the photos and web page descriptions of a caribou, mastodon, and whitetail deer to compare each animal’s habitat and food preferences. Why do animals have preferred environments? What different things do they eat? Why is it important for hunters to know these things?
5) How did different tools help pre-contact hunters? What tools would you use to go hunting?
6) Have students write a picture story about a Paleo-Indian hunt for mastodon, or a deer hunt in Woodland times, or...
7) Have students build model of a caribou, mastodon, or deer and its environment.
How to Hunt a Mastodon
By Dean Anderson

Two Paleo-Indians with spears
Can you imagine hunting elephants with weapons like these?

Around 10,000 years ago, Paleo-Indian peoples hunted prehistoric elephants called mastodons using spears tipped with stone points. How were they able to do that? They were also armed with knowledge and cooperation. They knew a lot about their environment, including the habits of mastodons. And, since killing a mastodon required many spears, they had to assemble a group of several hunters and develop a strategy that would allow a handful of people to kill a large, powerful animal like a mastodon.

One way this probably happened was to ambush a mastodon on the shore of a pond or lake as it came to drink. At a given signal, the hunters would yell, scream, and whistle to startle the mastodon, and hopefully, cause the animal to panic and go forward into the water where its great weight would cause its feet to stick in the soft lake bottom. With the mastodon unable to flee, and hampered by the mud in turning to fight its attackers, the hunters could use their spears at close range to inflict multiple wounds. As the animal weakened, the hunters would eventually be able to cause greater blood loss, and perhaps reach vital organs with their spears.

Figure 1 - Mastodons eating tree branches near a pond
Figure 2 - Glacier edge

Figure 3 - Melting glacier edge
Figure 4 - Tundra landscape

Figure 5 - Barren Ground Caribou
Figure 6 - Migrating caribou herd

Figure 7 – Lichen
Figure 8 - A mammoth (right) and mastodon

Figure 9 - Mammoth herd
Figure 10 - Fluted Spear Points

Figure 11 - A Paleo-Indian family
Figure 12 – Paleo spruce forest and tundra

Figure 13 - Late Woodland Forest
Figure 14 - Whitetail deer

Figure 15 - Deer eating at the forest edge
Figure 16 - Late Woodland arrow points

Figure 17: Late Woodland hunter with bow and arrow