



*Among skulls of over 20 Michigan mammals in our collection, this is the only specimen that is not truly wild. What species? Here's a hint. It's also the only one with a given name: Misty.*

In Michigan public schools students are expected to learn the various characteristics that set the five classes of vertebrates (often simplified to “groups of animals with backbones”) apart from one another. For instance, the typical combination of mammalian traits includes warm-bloodedness, a hair/fur-covering, live-birthing, and nursing of young.

In addition to a mammal possessing an efficient, four-chambered heart, here are two more that we encourage our students to keep in mind when it is time for classroom discussion on the topic: 1. A mammal has an anus, whereas fish, amphibians, reptiles and birds possess a cloaca. The difference? The anus is a specific body opening for expulsion of solid waste. Mammals possess a separate opening (urethra) for liquid waste. In the other four classes all body waste is eliminated from a single orifice, the cloaca. 2. Mammals have highly-specialized teeth. The teeth of members of other classes (if they have them at all) tend to be relatively unspecialized. One tooth in the mouth looks similar to the next – generally, somewhat conical and slightly curved.

Over the years, Nature Discovery has accumulated a fairly impressive and varied collection of Michigan mammal skulls. We use these in multi-disciplinary educational lessons in a variety of venues from preschools to high school zoology classes.

Specialization in mammal dentition can be viewed at several levels – in contrast to non-mammalian vertebrates described above, but also between mammalian species and within the overall dentition of any given species.

Teeth serve different roles in a mammal's mouth. Basically, incisors are for nipping, canines for piercing or grasping flesh, and molars and premolars for grinding or shearing.

Studying mammal dentition in addition to other skull characteristics allows for a natural segue into understanding biological classification or taxonomy. You know the drill – Kingdom, Phylum, Class, Order, Family, Genus, Species. We find that most adults, understandably, have a limited familiarity with

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## ***Skulls: Bone-ified Teaching Tools***

usage of taxonomic terms. For most, it was something required to be learned, remembered at test time, then, due to lack of utility in their lives, forgotten. Thus, we often hear erroneous statements along the line of, “Rats and squirrels are in the rodent family.” Actually both are members of the *order*, Rodentia, but are classified in separate rodent families, Muridae and Sciuridae.

All rodents share characteristics in their dentition that, once recognized, should allow you to classify a skull to this order at a glance: a pair of prominent incisors on the upper and lower jaws followed by a gap with no teeth (diastema), then flat, chewing teeth that appear almost fused into one elongated molar on each side of the jaw. Some other rodent families with Michigan representatives include Castoridae (beaver), Erethizontidae, (porcupine), and Dipodidae (jumping mice). Rabbits and hares are not members of Rodentia, but of Order Lagomorpha. Although the prominent incisors and diastema are present, a handful of other dental and skull characteristics warrant their separation.



*Eastern Gray Squirrel. Note the traits that identify it as a rodent: prominent incisors, a diastema, and a tight row of flat molars and premolars.*



*A look at the mandibles of the Coyote (front) and Black Bear immediately identify them as members of Order Carnivora, but the shape of the molars and premolars are markedly different between them. Mammal dentition is specialized to the predominant diet of respective species.*

(cat), Mustelidae (weasel), and Mephitidae (skunk).

Other Michigan mammal orders not mentioned thus far include Chiroptera (bats (no, they’re nothing like flying mice!)), Insectivora (moles & shrews), and Artiodactyla (even-toed ungulates, i.e., deer, etc.).

During our next open Sunday, February 9, attend our original presentation, *Michigan Mammal Skulls Up Close*. There is interesting material here for kids and adults of all ages, and visitors are encouraged to bring any mammal skulls they found outside, too. Won’t you join us? Details in the ensuing pages.

*-Jim McGrath*

# *Michigan* *Mammal* **SKULLS** *Up Close*



**Sunday, February 9 Doors Open 1 - 5pm**

**Admission: \$5/person**

Mammals are unique from other vertebrate animals, not just by their warm-bloodedness, hair-growth, live-bearing nature and nursing of young. Mammal teeth are more highly specialized and varied than those of any other animals on earth. In fact, the skull of any mammal on the planet can be identified to species just by studying its characteristics. On Sunday, February 9 learn about mammal skulls with a Michigan slant. At 2pm join us for the presentation, *Michigan Mammal Skulls Up Close*. Powerpoint images are coupled with a display of over 20 genuine skulls of Michigan-native mammals, displayed and passed among audience members for close inspection. The presentation begins with a quiz! Audience members will try to guess which skull belongs to which state-native species.



*Michigan's most insectivorous snake, the Smooth Green Snake has declined precipitously over the past several decades. This species is also notoriously difficult to keep alive in captivity. Ours is thriving, though! Ask to see it eat a cricket while you're here.*

Learn the dental and skull characteristics common to mammals which share the same order, then further, to those which share the same family. It's an effective hands-on lesson in mammal classification for all ages. Have you found a mammal skull and are uncertain as to what species it is? Bring it with you. We can help you identify it.

Before, during or after the program, visit with our huge interactive zoo of Michigan reptiles and amphibians. Our knowledgeable staff will assist you or your children in handling a large but gentle rat snake, identifying all 10 species of state-native turtles, feeding crickets to frogs, and so much more. Take a guided winter walk out back! We'd like to help visitors of all ages make the most of their visit.



## *Catch Nature Discovery on Coffee Break Monday, February 17*

Jim is scheduled to appear on Monday, February 17 at 9:45am, discussing and playing recordings of bird songs heard outside in late winter. The show airs weekdays from 9 to 10am on 89.7 FM. Listen live online at [lcc.edu/radio/onair/](http://lcc.edu/radio/onair/) or watch it live (or later in the day at 6pm) online at [lcc.edu/tv/watch](http://lcc.edu/tv/watch). We'll post a reminder on our Facebook fan page.



*Snowy Owls are still being reported at a few locations around Mid-Michigan.*

## *Late Winter Mid-Michigan Birding Day*

*Saturday,  
February 22  
7am to 3pm*

Join an intimate guided trip in our minivan to a few prime Mid-Michigan birding locations, including Maple River State Game Area north of St. Johns, then back to the Lansing area to bird the riversides of Potter Park, Moore's Park, and other locations depending on the latest internet bird reports. Specialty birds we'll pursue include the Snowy Owl, still being seen with some regularity at Maple River and Capital City Airport; and the Peregrine Falcon, a pair of which call the power plant across the river from Moores Park home. As many as 40 other species are in store, too. Participants will be given bird checklists to keep track of the day's finds. On our return drive from Maple River the group will stop at a local restaurant for a late breakfast.

Enrollment is limited to five adults. A teen may attend without a supervising adult. Maximum enrollment: 5. Advance registration required. FEE: \$45, includes all transportation to and from Nature Discovery. Arrangements may also be made to pick up /drop off at your door or another convenient location.



*Horned Larks begin singing territorial songs over farm fields in late February.* Photo © Steve Sage



## *Around the State in February*

- ❖ *Tuesday, February 11: 7pm. Michigan Turtles Presentation; Petoskey Audubon Club, Independence Village, Petoskey.*
- ❖ *Wednesday, February 12: 7pm. Giant Silk Moths Presentation; Straits Area Audubon Society, Cheboygan Public Library, Cheboygan.*
- ❖ *Thursday, February 13: 6-8pm. Michigan Reptiles & Amphibians Exhibit; Rose City Elementary School, Rose City.*
- ❖ *Thursday, February 20: 6:30-8pm. Michigan Reptiles & Amphibians Exhibit; Kinawa Middle School, Okemos.*

*This Yellow-bellied Sapsucker, an uncommon winter lingerer in Michigan, visited our suet feeder in early January. Sapsuckers are the only woodpeckers that possess a white “longitudinal” wing stripe - a good identification aid.*

## *CCR – Stop the Debate Already!*

Amid the hullabaloo of another Super Bowl - America’s annual sounding board to its penchant for excess - the distracted media continue to marginalize the grave issue regarding our role in the atmospheric deterioration of our planet and the inevitable collapse of quality of life that’s ahead for our children.

The marginalization comes in the form of keeping a debate simmering as long as possible provided the majority of the populace continues to tolerate it. Based on a recent *USA Today* poll regarding the Keystone XL pipeline, it’s working: <http://www.usatoday.com/story/news/nation/2014/01/28/keystone-pipeline-poll/4935083/>

The climate debate has been dragging on for so long now it is fading to background static – white noise among the steady, revolving door of new items and issues that flip past our collective consciousness. Its arrested conclusion is orchestrated by the side that stands to benefit from it, since a decisive course of action cannot begin until the debate is settled. How do you rig a debate to be endless? Continue to allow equal weight (air time) to both sides despite the fact that one side’s argument has been overwhelmingly corroborated by the world’s most specialized experts in the field.

Here are a couple of recent examples:

James Inhof (R-Okla) gave a “Global Warming” speech on January 8 in which he stated this month’s cold spell “has to make everyone question... whether global warming was ever real.” Climate scientists have moved away from the term “global warming” years ago due to the fact that the term greatly oversimplifies the complexity of what is happening to our atmosphere. However, it is still the preferred term of those who wish to invalidate the scientific evidence to lay people.

In light of the recent severe winter weather Donald Trump tweeted, “this very expensive GLOBAL WARMING bull---- has got to stop.” (I couldn’t help but notice... this guy puts out more tweets in a day than my 17-year-old daughter. How does he get anything done?)

Here is a January 30 *USA Today* opinion that includes the above comments:

<http://www.usatoday.com/story/opinion/2014/01/30/climate-change-global-warming-polar-vortex-editorials-debates/5066231/>

More citizens who have done their homework need to speak up. Even submitting your name to a petition, like this one by the Sierra Club, is a start:

[https://secure.sierraclub.org/site/Advocacy;jsessionid=412311930123A2D137B77DEEDB866B0F.app214a?pagename=homepage&page=UserAction&id=12467&autologin=true&s\\_src=214ABOAN04](https://secure.sierraclub.org/site/Advocacy;jsessionid=412311930123A2D137B77DEEDB866B0F.app214a?pagename=homepage&page=UserAction&id=12467&autologin=true&s_src=214ABOAN04)



### ***PUT A BABY FOX SNAKE INTO YOUR EDUCATIONAL SETTING!***

We’ll give a first-year, Michigan-native Western Fox Snake, along with all the care support you need, to any educational institution that uses our services. It’s a low-maintenance, highly-handleable classroom mascot! We can even supply you with discount frozen pinkie mice. Two per week are all it needs. Contact us for details...

*A few of our four-month-old fox snakes bask under their light. Each currently measures about 12 inches in length. Within a few years they will grow into gentle adults nearly five feet in length.*

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