

Michigan **Science**

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FIELD TRIPS

Area Science Museums Feature Giant Killer Dinosaurs, Space Simulators and Simple Machines



BIGGER THAN T. REX: GIANT KILLER DINOSAURS OF ARGENTINA

The recently discovered Giganotosaurus and Mapusaurus skeletons dwarf even the mighty T. Rex. See their enormous remains with your own eyes and explore the world they lived in. Also view T. Rex and other dinosaur fossil heads and enjoy hands-on activities.

Alden B. Dow Museum of Science & Art, 1801 W. St. Andrews Rd., Midland, Mich. Jan. 20 through May 15, 2011. Open Wednesday, Friday and Saturday from 10:00 a.m. to 4:00 p.m.; Thursday from 10:00 a.m. to 8:00 p.m.; Sunday from 1:00 p.m. to 5:00 p.m. Tickets are \$8.00 for adults, \$5.00 for children 14 and under.

For more information, call 989-631-8250 or 800-523-7649 or go to www.mcfta.org/ExhibitionsABDMdino.html.

JOURNEY OUT OF YOUR COMFORT ZONE

Air Zoo's space shuttle ride offers a 3-D tour of the life of an astronaut. Through this simulation, join the crew working to assemble the International Space Station, and see what Earth looks like from space.

Air Zoo, 6151 Portage Rd., Portage, Mich. Open Monday through Saturday from 9:00 a.m. to 5:00 p.m.; Sunday from noon to 5:00 p.m. Admission is free; ride tickets are \$2.00.

For more information, call 269-382-6555 or 866-524-7966 or go to www.airzoo.org/page.php?menu_id=12.

MONARCH BUTTERFLY AND CECROPIA MOTH

Watch the metamorphosis of Monarch butterflies and Cecropia moths, from caterpillars eating and preparing cocoons, to beautiful butterflies and moths flying free. If you're lucky, you may catch one just emerging from its chrysalis.

Ann Arbor Hands-On Museum, 220 E. Ann St., Ann Arbor, Mich. Open Monday through Saturday from 10:00 a.m. to 5:00 p.m.; Sunday from noon to 5:00 p.m. Opens at 9:00 a.m. on Tuesdays. Tickets are \$9.00.

For more information, call 734-995-5439 or go to www.aahom.org/exhibits/index.php.

COLLECTIONS, SCIENCE, AND SCHOLARSHIP

This exhibit offers access to the very collections researchers use to learn more

about anthropology, paleontology and zoology. Expand your understanding of how scientists in the field discover the things taught in classrooms.

University of Michigan Museum, 1109 Geddes Ave., Ann Arbor, Mich. Open Monday through Saturday 9:00 a.m. to 5:00 p.m.; Sunday from noon to 5:00 p.m. Admission is free for groups under 10 people, with a suggested donation of \$6.00. Contact the museum for group rates.

For more information, call 734-764-0478 or go to <http://bit.ly/f7tGSY>.

SIMPLE MACHINES

Experience one of Impression 5's newest exhibits, where you can learn how simple machines can make lifting yourself on a pulley chair or raising a 500-pound block of cement easy tasks.

Impression 5 Science Center, 200 Museum Dr., Lansing, Mich. Open Monday through Friday from 10:00 a.m. to 5:00 p.m.; Saturday from 10:00 a.m. to 7:00 p.m.; and Sunday from noon to 5:00 p.m. Tickets are \$5.00.

For more information, call 517-485-8116 ext. 32 or go to www.impression5.org/mos/view/Exhibits/Exhibits/Simple_Machines/.



LEGISLATION WAS INTRODUCED last year in the Michigan Legislature that would grant a \$20,000 credit against the Michigan business tax for gas stations that put in public charging points for electric vehicles. Washington has already provided tax credits of up to \$7,500 for purchasing electric vehicles such as the Nissan Leaf and the Chevy Volt.

The New York Times reported that 20,000 people reserved a Nissan Leaf. Nissan expects the typical Leaf buyer to be affluent, college-educated consumers in their mid-40s. The federal government offers a \$7,500 tax credit as well as a \$3,000 home-charging unit to buyers. On top of this, Tennessee, where the Leaf is built, is offering free public charging stations along its freeway system and \$2,500 cash rebates. Legislation has been introduced in Michigan that would also provide perks for electric car owners.

The market for electric vehicles is questionable, mainly due to their high cost and limited range. For most households, a vehicle is the second most expensive purchase next to their home. The economic reality is that most American households cannot afford to purchase an electric vehicle that does not meet all of their transportation

needs. The average American family needs a vehicle they can pack up and drive to Disney World without experiencing lengthy delays to recharge batteries.

It is interesting to note that MIRS, a Lansing-based news service, reports that those groups lobbying for the tax credit were environmental groups and companies that would benefit, such as Consumers Energy and DTE, which would like to sell more electricity, and Dow Kokam-Midland, which would like to build more electric car batteries. Conspicuously absent at the committee hearing were the Michigan motorists who will have to pay the bill for this latest taxpayer-funded subsidy.

A different note, however, was sounded last fall at the Custom Integrated Circuits Conference in San Jose, Calif., where a former beneficiary of similar subsidies stated: "The high cost of batteries will keep pure electric vehicles such as the Nissan Leaf and Chevy Volt out of the mainstream consumer market." That came from Ian Wright, the co-founder of Tesla Motors, maker of the first modern electric cars.

"Today's Chevy Volt is well designed, but will cost about twice as much as a similar gas vehicle," Wright said in what was the



keynote speech of the gathering. "Gas prices will have to soar above \$10 per gallon to make such consumer EVs economical even at the lower battery costs."

Wright believes that electric vehicles will remain only a "niche" market. "We can't even afford to fix potholes in the road, so where are we going to get trillions for battery charge stations?" he asked. "The economics don't work without massive subsidies."

This push is not new. For example, in 1967, the Detroit Free Press proclaimed that "[C]ompanies are searching for a billion-dollar breakthrough in battery design. General Dynamics is working on a zinc-air cell battery. Ford is actively interested in a sodium-sulfur cell. Gulton Industries and General Motors are tinkering with lithium. ... All the activity is bound to pay off probably within the next five years. ..." ■

By the Numbers

Beyond propaganda and rhetoric, numbers tell the real story

AN ADVISORY council will study the feasibility of a limited moose hunt in the Upper Peninsula. Former Gov. Jennifer Granholm signed legislation in late December allowing for the study, which is tasked with studying the sustainability of the herd if hunting is allowed. The Department of Natural Resources Wildlife Division estimates that 500 to 750 moose live in the U.P. A limited hunt of 12 to 15 moose a year is being considered, with a license costing \$100.

For more information, visit: http://outdoornews.com/michigan/news/article_c4826926-18e8-11e0-b6a6-001cc4c002e0.html?mode=story.

AMERICAN OIL production could increase 20 percent by 2015 as drilling companies invest billions of dollars to drill new wells in North Dakota, Colorado, California and Texas. The new wells could produce as many as 2 million barrels of oil per day, which is more than the Gulf of Mexico produces. As a result, the amount of imported oil could be reduced by half within 10 years.

For more information, visit: <http://detnews.com/article/20110211/NATION/102110371/U.S.-wells-producing-more-oil#ixzz1Df6pY8hT>.

COLD WATER temperatures appear to be the cause of death for about 2 million fish in Maryland's Chesapeake Bay, according to the Maryland Department of the Environment. The juvenile spot fish washed up on shore in early January.

For more information, visit: <http://www.mde.state.md.us/programs/PressRoom/Pages/010511.aspx>.

BY RUSS HARDING

ENVIRONMENTAL REGULATION IN MICHIGAN

A BLUEPRINT FOR REFORM

Michigan suffers from an inability to attract and retain jobs. What many people don't realize is that state-level regulatory reform may be one of the most important factors in reversing our job losses.

Most businesses desiring to locate or expand in the state must enter through the regulatory gate before they can invest and create jobs. State air and wetland permits are the two environmental requirements that most often hinder businesses that would like to locate or expand in Michigan. The state's tax or labor policy makes little difference if a business cannot obtain an operating permit or license in a timely fashion. The regulatory gate in Michigan has all too often become a regulatory barrier.

Michigan needs a sensible regulatory system more than ever, as technology provides businesses more flexibility in locating and moving their operations. Much is made of loss of jobs to foreign competition, but the bigger threat facing Michigan is job loss to other states, such as Indiana, that have fewer regulatory barriers. For example, Michigan's wetland statute and implementation of federal wetland law are more stringent than in other states that Michigan competes with for jobs.

The good news is Michigan's uncompetitive regulatory bureaucracy can be fixed with common-sense reform; it does not require the polarizing debates that often surround changes in tax and labor policy. However, fixing the regulatory problem will require decisive and bold action from elected and appointed officials. We must streamline the state's dysfunctional regulatory system so that it protects human health and the environment while encouraging job growth and providing regulatory certainty.

PRINCIPLES

The following principles should be adhered to in legislating and administering regulatory requirements in Michigan:

- Environmental protection and economic development are not mutually exclusive, and both goals can be accomplished by utilizing sound conservation principles.
- State government should perform only core regulatory functions — specifically, making final permit and enforcement decisions, rather than conducting routine administrative tasks that can be performed by the private sector.

- All state regulatory procedures should ensure that law-abiding parties are treated fairly and promptly, rather than being subjected to arbitrary, belated or open-ended decisions by state regulators.
- State regulatory requirements should be set by elected officials — not by state administrative personnel, who are not accountable to voters.

PROPOSALS

Statutory Change

NO REGULATION WITHOUT REPRESENTATION

When the Legislature passes a bill, it often omits many of the details needed to make the bill complete. To address this shortcoming, the Legislature requires a regulatory agency, such as the Department of Natural Resources and Environment, to write regulations to supplement the bill's language. Hence, the agency drafts the regulations, revises them after taking testimony at "public hearings" and promulgates the regulations as law.

These regulations are effectively laws, but unfortunately, they have never been voted on by the people's representatives in the Legislature. Moreover, agency hearings typically involve less public participation than the legislative process does, and legislators often complain that the regulations distort the bill's intent.

The Legislature should end this unresponsive and undemocratic process for all regulations — not just environmental rules — in the following ways:

1. Legislative approval of regulatory proposals

The Legislature should amend the Administrative Procedures Act to strip agencies of the power to propose binding regulations. Instead, the agencies should be directed to draft proposed legislation specifying the details necessary to supplement the original bill. The proposed legislation would then be reviewed, amended and approved — or rejected — by the Legislature. In effect, regulatory agencies would serve as a second, technically informed Legislative Service

Bureau, helping to draft specialized laws, but not approving them.

2. Periodic review and sunset of regulations

All regulations that have been promulgated by agencies should include a provision that they will sunset in five years unless they are reviewed and specifically reauthorized by the Legislature prior to the expiration date. All existing regulations should be reviewed on a rotating basis to determine if they have achieved their intended results and have been cost-effective. Regulations like wetland rules that impose significant costs on businesses and residents should receive the highest priority for review. Any regulations found to be ineffective or not cost-effective should be rescinded.

3. No more stringent than federal requirements

If legislators cannot agree on legislative approval of regulatory proposals, they should at least pass a law that prevents state agencies from promulgating regulations more stringent than federal requirements without approval of the Legislature. State regulators frequently generate rules that exceed federal restrictions with little or no oversight from elected officials. While it may be appropriate in certain instances to adopt regulations more stringent than federal law in order to protect human health or the environment, this should be done only with explicit authorization from the Legislature and not be left to the discretion of unelected regulators.¹

PERMIT ISSUANCE DEADLINES

In theory, state agencies must issue permits within legislatively specified timeframes. In practice, these requirements lack teeth.

¹ Also see www.mackinac.org/6956.

The Legislature should impose genuine deadlines. Agencies should be required to issue permits within 30 days for straightforward cases, such as most wetland permits, and within 60 to 90 days for the most complex cases, such as air permits for auto assembly plants. The Legislature should stipulate that if an agency fails to act within the specified timeframe, permits will be deemed approved and the applicant refunded any permit application fees. Georgia, Virginia and South Carolina have implemented this requirement.²

FISCAL NOTES ON REGULATIONS

The Administrative Procedures Act should be amended to require that the House and Senate fiscal agencies prepare fiscal notes for each set of regulations proposed. The notes would estimate the cost of regulatory enforcement to state government and the cost of regulatory compliance to businesses and individuals, thereby making the expense transparent to voters and policymakers. Such fiscal notes are already required for state legislation.

REGULATORY BILL OF RIGHTS

State law should provide for a regulatory bill of rights. This list should stipulate that if a permit applicant meets the requirements of state law, the permit will be issued in a timely manner by the responsible agency. It should also specify that all permit applicants be treated fairly and their applications be adjudicated without political interference. This recommendation does not introduce any new reforms, but is nonetheless important in sending a clear signal to the regulated community that they have a guarantee of fair treatment in the regulatory process.

² Some argue that the federal government would rescind Michigan agencies' power to issue permits if applicants began receiving permits by default when deadlines were missed. This outcome would follow only if there were a widespread failure to issue timely permits — an unlikely event.

Proposals Regulatory Administration

SINGLE PERMITTING AGENCY

Currently, the Department of Natural Resources and Environment is responsible for both issuing and enforcing environmental permits. The culture of the agency often fosters a negligent attitude toward prompt adjudication of permit applications. The agency's mission of protecting the environment often conflicts with the agency's role of fair and timely permitting. The governor should sign an executive order that separates environmental permitting from enforcement by creating a new, dedicated permitting agency, while leaving environmental enforcement with the DNRE. The new permitting agency would provide a one-stop shop for all individuals and businesses needing state permits or licenses, including nonenvironmental ones.³

This organizational change would send a clear signal that Michigan is serious about improving its regulatory climate. Creation of a permitting agency would not require hiring new employees, but rather involve transferring permitting and licensing employees from existing agencies. The new agency would be directly responsible to the governor and subject to statutory direction from the Legislature. In contrast to the current priorities at the DNRE, the primary mission of the new agency would be to adjudicate permits and licenses in a timely manner.

SHED REGULATORY PROGRAMS TO OTHER LEVELS OF GOVERNMENT

The executive office should review all regulatory programs to determine if the state should continue to administer them

³ The state requires a variety of business permits and licenses. Barbers must obtain licenses, for instance (see www.michigan.gov/statelicenseresearch/0,1607,7-180-24786_24788-79920--,00.html).

or return the responsibility to the federal government. Most state environmental regulatory programs, such as water, air and hazardous waste, result from federal laws that states have the option of administering. States administer federal regulatory programs when they believe they can do a better job than the federal government. However, the cost versus benefit of some state-operated environmental regulatory programs is questionable. The following environmental regulatory programs should be considered for elimination or return to the federal government:⁴

1. Wetland permitting

This program should be returned to the federal government and the state wetland law repealed. Extensive federal wetland laws would still apply in Michigan, but Michigan's wetland regime would now be similar to those in other states.⁵

Michigan is one of only two states that operate the wetland permitting on behalf of the U.S. Army Corps of Engineers. The state wetland permitting program is more expansive and difficult to comply with than the federal program; this is a major obstacle for both landowners and businesses attempting to develop property and create jobs in the state. In *Rapanos v. United States*, the U.S. Supreme Court ruled that the federal government has jurisdiction only on wetland directly connected to waters of the nation. Return of the wetland program would save the state approximately \$2 million in state general fund money currently allocated to maintaining a state wetland program.

2. Superfund program

Superfund is a federal program that addresses cleanup of the most contaminated land and water sites in the nation. Currently, the state operates this program, but there is little advantage in its doing so. The U.S. Environmental Protection Agency makes all the final decisions, and most Superfund sites in the state are in the final stage of remediation, with the remedy for cleanup having already been selected.

⁴ Some in the regulatory community may be concerned that return of environmental programs to the federal government could lead to difficulty, since they would be required to deal with the U.S. Environmental Protection Agency. This concern may be valid for some programs, such as air permitting, but it should not be for either wetland regulation or contaminated property cleanup. The EPA has limited jurisdiction in both programs and less restrictive requirements than does the state.

⁵ Also see www.mackinac.org/10486 and www.mackinac.org/9504.



Hart Enterprises Inc., a medical device manufacturer with around 100 employees, is located on a nine-acre plot in an industrial park in Sparta, Mich. Hart personnel design and manufacture specialty medical needles and customized medical devices used in hospitals around the world. But when the company wanted to expand its parking lot to accommodate new employees, the Michigan Department of Environmental Quality blocked it, claiming that the quarter acre of land adjacent to the lot (pictured at right) was a "regulated wetland."

3. State cleanup and remediation program

During the 1990s, Michigan lawmakers amended Michigan cleanup law to set clear standards for outcome-based remediation that allowed landowners and potential investors to remedy contaminated property and invest in it with certainty. This reform ended the owners' previously open-ended cleanup obligations and led to considerable private investment in restoring and developing brownfield sites.

The positive statutory changes made to this program in the 1990s have been largely undone by bureaucratic fiat, and the program has become a barrier to redevelopment. Terminating this program would allow prospective developers to deal directly with the federal government, which has adopted many of the positive changes Michigan pioneered in the 1990s.

4. Solid waste program

The regulation of solid waste should be done by local government. Landfills are local concerns, and local governments have the most at stake to ensure the sites are properly operated. The state has appropriately established landfill construction standards, but should leave the enforcement of those standards to local government.

5. Groundwater discharge regulation

The state Auditor General has repeatedly found this program to be ineffective. In most cases, requiring groundwater permits for each individual discharge should be replaced with general permits that authorize categorical discharge limits, such as limits for car washes. This change would better protect the environment, as there is currently very little enforcement to ensure that individual groundwater discharge permits are being complied with. A small staff could be retained for enforcement purposes.

PRIVATIZATION OPPORTUNITIES

An executive order should be issued directing all state agencies with regulatory functions to identify opportunities for privatization wherever feasible. For example, state environmental laboratories could be closed and their work competitively contracted to competent private firms.⁶

⁶ Also see www.mackinac.org/6911.

In addition, some states create a list of private firms approved to prepare and review environmental permit applications to ensure that the applicant meets or exceeds all state and federal regulatory requirements. State officials would still maintain final decision-making authority. Privatization of permitting functions would shorten permit review periods, save the state money and provide state officials the flexibility to adapt to changes in future workloads without hiring or laying off employees.

STATE PERMITTING REPORT CARD

The executive branch should establish a report card that tracks the performance of issuing state-required permits and licenses. Aggressive goals that exceed statutory requirements should be established, tracked and reported to the public on a regular basis.

Michigan can no longer afford to conduct business as usual. State elected officials must make bold transformational changes to cumbersome state regulatory programs that hinder job creation. Expecting better results while continuing to do business the same way places the state's economic future at risk. Amid brutal competition with other states, Michigan needs every strategic advantage possible to attract new jobs. Fortunately, it is not too late to revamp the current state regulatory system. The recommendations in this report need to be adopted without delay.

Postscript

Future economic prosperity in Michigan will depend upon the state's ability to compete in the global marketplace. It will be difficult for Michigan to contend for jobs without a reformation of its current regulatory process. Adoption of the recommendations discussed here is essential to reclaiming Michigan's world-class economic status.

A good quality of life requires not just protecting our abundant natural resources, but allowing the state's residents and businesses to prosper as well. In other words, a healthy human environment requires freedom. Michigan will come closer to that environment by adopting common-sense regulatory reform.

VIRTUAL LEARNING IN MICHIGAN'S SCHOOLS

by Michael Van Beek



Scan for a video on the virtual learning revolution

Technological advancements that took place between 1900 and 2000 dramatically altered almost every level of human activity. The advancements in transportation, science, medicine, engineering, agriculture and energy were truly revolutionary.

Yet while people's lives were steadily improving as a result of these innovations, the methods for educating children largely remained unchanged. The buildings are bigger today, there are "smart" boards and other technology in classrooms, but the overarching approach to teaching is more similar to the way it was done in 1900 than it is different. We still haul kids to a central location, sit them in a classroom with a teacher for several hours a day and expect them to learn.

This isn't an indictment — most of the technological and scientific advancements wouldn't have had much of an impact on education one way or another. And most of the time, learning does occur in the traditional classroom environment. But the real question is whether or not we can now do it better, with computer and Internet technologies challenging the notion that the best way to teach kids is in a one-size-fits-all classroom setting.

This new phenomenon is known by many different names: online education, digital learning, virtual schooling or distance learning. No matter what's it called, the use of the power of computer software and the Internet can revolutionize how schools operate, so much so that maybe a century from now they'll list virtual schooling has one of the amazing innovations of the previous century.

Virtual learning is using digital technology to deliver instruction to students. Sometimes this just means students log on to a computer for a course during their regular school day and learn through the computer software program instead of using the traditional method of relying on a face-to-face interaction with a teacher. Other virtual learning programs don't require students to attend school at all — the entire interaction with the teacher occurs through the Internet. Instruction can be delivered in real-time through streaming lectures and live group discussions can happen through group chat programs. With the power of the Internet, nearly all the interactions that a student might experience in a classroom can be realized remotely.

Unleashing the power of these new technologies in the area of teaching has led to some very inventive courses. Florida Virtual School, for example, offers a history course called "Conspiracy Code" that is a fully interactive, three-dimensional video game. Students explore a fictional world and uncover history-based clues to progress through the game. Online teachers provide assistance and facilitation, and students engage in some traditional coursework, like writing essays, participating in discussion groups and taking tests. But the history lessons are delivered through the interaction with the game, not through a classroom lecture or textbook.

For one reason or another, some people are skeptical about the ability of students to learn through these electronic media. When you consider that nearly everyone alive today was schooled in the traditional face-to-face method, it's understandable why some might hesitate to give virtual learning a fair shake. A common criticism posited from skeptics is that kids can't learn by just sitting in front of a computer.

On its face, that may be true. But virtual learning is much more than passively contemplating a computer. It's interacting with material and immersing oneself in a learning environment. It's asking questions and doing original research. It's taking assessments and working to master different skills. In the end, virtual learning, although it occurs through a computer, can be designed in such a way as to replicate all of the traditional classroom functions that students have performed for centuries.

Perhaps these same people would have made the same complaint when Gutenberg invented the printing press — after all, everyone knows that you can't learn from just reading a book! In some ways books could be seen as the first form of "virtual learning," because students could learn from a teacher without having the lesson come directly out of the teacher's mouth. The current concept of virtual learning is not much different, and in many ways is significantly better than just learning from a book.

Another common criticism is that students will miss out on the human interaction that is inherent in a face-to-face environment. This seems plausible — students' relationships with their teachers are often considered critical to helping students develop a love of learning and a motivation to succeed. If you talk to online teachers and students, however, many of them will report that they actually feel more connected to each other in a virtual environment than in a classroom setting. Because communication can take place at any time and in any place, teachers find it easier to provide students with more one-on-one attention.

Individualization of the instruction is just one advantage virtual learning has over the traditional face-to-face classroom setting. For instance, in a typical classroom, teachers are forced to measure and teach to the average pace of the collective class. This is extremely difficult because not all students learn the same material at the same pace. In fact, most students learn different material within a particular subject at different paces: a student might be able to breeze right through the Pythagorean theorem but get hung up on distinguishing congruent triangles.

In a virtual environment, however, each student can learn at his or her own pace, completely independent from the progress of the rest of the class. Software programs can detect how well students understand particular concepts, increasing the pace when students are clicking along and slowing down when things

become difficult. Even when the instruction is delivered live by a teacher through the Internet, these sessions can be recorded and played back in their entirety — affording students who need extra work on a particular lesson the ability to replay the material without worrying about what their peers might think.

Indeed, working in an individualized learning environment through a computer software program or the Internet can set students free from certain levels of peer pressure that may prevent them from realizing their full learning potential. For instance, there's an old teaching adage that "there's no such thing as a stupid question." But every student knows better. If a student asks a "stupid question," they'll hear about it later from their peers. Conversely, some students might hold back their performance in the classroom for fear of being labeled a "nerd." In a personalized learning environment, however, many of these types of adverse peer pressures disappear as students are free to move through and master the curriculum at their own pace — without having to worry about how their peers will judge them.

Michigan traditionally has been seen as a leader in online learning. Michigan Virtual School was one of the first state virtual schools in the country and currently enrolls more students in virtual learning courses than any other program or school in the state. Students signed up for more than 14,000 different courses offered through MVS in 2009. Additionally, in 2006, then-Gov. Jennifer Granholm signed into law a new high school requirement that all students take at least one online course or "learning experience" in order to graduate.

Another leader in virtual learning in Michigan's public schools is "GenNET," a program run by the Genesee Intermediate School District. GenNET grants access to any student in Michigan to 900 different online courses. While GenNET does not actually provide the instruction through these courses, it monitors quality and coordinates access and enrollment in the courses. GenNET acts more like a portal to these online courses



Kim Roberts, an elementary teacher with the Michigan Connections Academy, interacts with students online. View a video about virtual learning in Michigan's schools at www.mackinac.org/14439.

through a wide variety of course providers, many of which cost a fraction of what it costs a local district to provide the same course to individual students.

Many other districts throughout the state are creating their own online programs to engage students that for whatever reason are not being served well in the traditional brick-and-mortar classroom. Students who have dropped out or are at risk of dropping out are the most likely to benefit from these kind of online programs. Students who are struggling to keep up with their grade level or who are soaring ahead can also benefit, since virtual learning programs allow them the flexibility to retake difficult material or take on more if desired.

Michigan also has two virtual charter schools that serve students in grades K-12 from all around the state. These two schools began operating last fall and quickly filled their legislatively mandated enrollment cap.

Based on the potential benefits that virtual learning can provide, Michigan should make this opportunity available to more students. Current law limits the virtual learning opportunities for students, especially if they are interested in a full-time online program. States like Minnesota and Florida have policies that enable students and parents a wider range of choices to enroll in online courses, and the demand for these courses has only grown (as it has in Michigan, despite the legal limitations).

It should be noted that online learning might not be the right fit for every student. Some virtual courses, especially full-time online ones that don't require any regular school attendance, are best designed for students

who are highly motivated and organized. Having an appropriate amount of support either at home or elsewhere is also important when taking a full-time online course.

That doesn't mean that only high-achieving students can benefit, though. In fact, many students who have become disengaged from the conventional classroom are some of the first ones to try virtual learning. Many of the first programs established around the state were specifically geared to serve students who've dropped out, are homebound, have been expelled or suspended, or are at risk of failing. Additionally, the number of different types of courses that exist is ever-expanding, and companies are constantly attempting to make their courses appeal to as many students as possible.

Challenging high-achievers to accomplish more and re-engaging students who've become disinterested are worthwhile goals. But virtual learning can provide even greater gains. This technology holds the potential to break down many of the disparities that have developed between different types of schools and districts based mainly on geographical or socio-economic factors.

With online learning, students are no longer limited to the types of courses or instructional quality of their local school. All students could theoretically sign up for the very best courses taught by the very best teachers. Students in Detroit, the Upper Peninsula, Bloomfield Hills and Kalamazoo would all have the ability to take any of the courses that most aptly fit their particular goals and learning plan.

The virtual learning phenomenon is growing at a remarkable pace — the International Association for K-12 Online Learning estimates that there are now 1.5 million students in the United States that take at least one online class. Since this new mode of delivering instruction holds potential to increase students' learning opportunities and better meet their individual and diverse needs, Michigan schools should look for ways to make more of these courses available to more students. ■

BY CHUCK GAIDICA

FORECAST: CLOUDY

MOST OF US know someone who has a second home or spends a significant amount of time in a warm-weather state during the winter. What do they have that many of us don't? Aside from a really nice condo in Naples, they have more sunshine to brag about.

Several Michigan cities are on the list of the 10 cloudiest in the Midwest. There are meteorological reasons for this, but there are also side effects that may affect everything from your attitude and mood to your health.

The snowbelt that is centered in North America lies downwind of the Great Lakes. Along with snow, this area also gets more cloudiness in the cold weather months.

Even though Lake Erie may eventually freeze over during the winter, the rest of the Great Lakes freeze over slowly, if ever. This allows cold air to whistle across the relatively "warm water" of the big lakes, pick up moisture from the open lake water and drop large quantities of lake effect snow along Michigan's coastlines.

When the cold, dry air sweeps across the lakes, large amounts of heat are released into the atmosphere. This process causes an unstable lower atmosphere and helps to stimulate condensation, clouds and precipitation over the lakes and downwind where many of us live.

Clouds carry the moisture, and often these clouds are slow to break once they have set up in the lee of the lakes. In winter, the number of cloudy days downwind of Lake Michigan is more than double that of a Michigan summer.

In addition to winter cloudiness, many cities near the big lakes get a “bonus” at the beginning and end of each winter season as fog forms over the lakes in late fall and early spring. This fog often drifts downwind and remains in place as a low cloud deck. Fog is a ground-based cloud, and it is hard to tell the difference sometimes between it and other low stratus clouds.

A lower sun angle in the winter also doesn't help “burn-off” clouds.

TOP 10 CLOUDIEST PLACES IN THE MIDWEST:

1. 209 days: Sault Ste. Marie, MI
2. 205 days: Grand Rapids, MI
2. 205 days: Youngstown, OH
4. 202 days: Muskegon, MI
4. 202 days: Cleveland, OH
6. 200 days: Houghton Lake, MI
7. 198 days: Akron, OH
8. 195 days: Flint, MI
9. 194 days: Alpena, MI
10. 193 days: South Bend, MI

According to the National Climatic Data Center, Grand Rapids is one of the cloudiest cities in Michigan and in the Midwest, during winter months.

You may notice the lack of cities in southeast Michigan on the list. While the clouds stream in off of the big lakes, the wind and other thermal effects of the ground influence how long the clouds remain in southeast Michigan.

Clouds can influence high and low temperatures. If the lake effect clouds

hang around for days, cooling at night may be less dramatic than on clear nights. Daytime high temperatures are affected as well.

Often, the lakes provide a buffer from the coldest arctic air as it moves across them.

All of these factors can give local forecasters fits. We try to use computer models, intuition and historical knowledge called climatology to forecast the effects of lake effect clouds on any given period of time. Often, the clouds don't break as scheduled and the forecast is off.

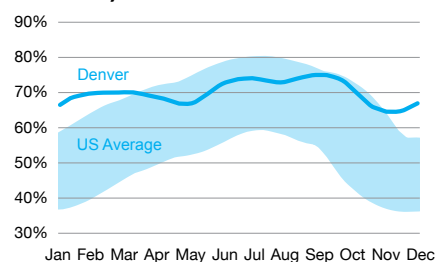
Back to the snowbirds for a moment. They are likely each year to travel south or southwest. It may be snow that scares them off, but even if they don't verbalize it, they may be seeking more sunshine and its effects on their health.

I heard Dr. Oz on his television show say that all of us in the northern United States should be exposed to more sunshine on a daily basis. He went on to say that even in the winter months, we should go out to a park bench, roll up our sleeves and pant legs and be exposed to the sun for several minutes per week. Where I live in southeast Michigan, the middle of winter sunshine rarely gets a glimpse of my dry legs. But the point is important. There are many among us who suffer from Seasonal Affective Disorder and get blue from the lack of bright sky, and others who just want to see the sun. I have heard more than a few friends say that they could tolerate a Michigan winter better if they could see the sun more often.

To see more sunshine, we may have to travel. In my case, as an instrument-rated pilot, I have been known to take a “mental health flight,” which is a day when I would travel up, not over. I would fly up though the clouds just to get a glimpse of the sun and blue sky.

But, if you want to travel for the winter, the graph (at the top of column 3) is interesting. This graph represents the amount of monthly sunshine in Denver, Colo. Notice that even as you get into a Denver winter, the monthly sunshine

Seasonal Sunshine: Denver, Colorado



doesn't change as dramatically as it does in many Michigan cities.

If you want sunshine but still love winter, Denver is the place to visit. It gets cold and has plenty of snow, but the blue sky and sunshine are a big bonus.

The sunshine prescription given by Dr. Oz may hold more benefit than a mood-enhancing device.

After two years of research, a recent study released by the Institute of Medicine indicates that most of us are getting enough vitamin D from the sun and other nutritional sources. Vitamin D is important in bone health and may help prevent diseases like cancer, heart disease, diabetes and more.

While the study indicates that vitamin D supplements may not be needed, many doctors disagree. Even my own personal physician suggests that many of us should take a few thousand international units per day of vitamin D.

He suggests that a Michigan winter is further reason to supplement with higher doses of the vitamin than conventional wisdom suggests.

Regardless of where you or your doctor stand, sunshine is needed by all of us in Michigan during the winter. I have adopted the “if you can't beat 'em, join 'em” philosophy. I try to make winter fun. I own some high-tech snowshoes and cross-country skis. And, the most fun of all is my two Siberian Huskies.

They can't take me to the sunshine, but they sure do brighten my day! ■

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