

EARTH DAY



EVERY DAY

**CLASSROOM
FUN BOOK**



mgOe[®]
your community energy company



EARTH DAY!

Woo-hoo! There is much to celebrate! A day to remind us to learn about how to protect our precious Earth and put our ideas into action to be Earth friendly each and every day!

Every year millions of people around the globe participate in events and activities on Earth Day to celebrate our environment and unite in activism to

spread education and ideas to help our

Earth. But this year's Earth Day 2020 is even more special, because it marks 50 years of the special day to draw attention to the issues facing the environment.

As the development of technologies using renewable energy continues to grow, we have new hope for a cleaner, better world for generations to come.

Thank you to Wisconsin's Gaylord Nelson for his amazing spirit that spearheaded the Earth Day movement!



Gaylord Nelson – a Wisconsin native and the founder of Earth Day.

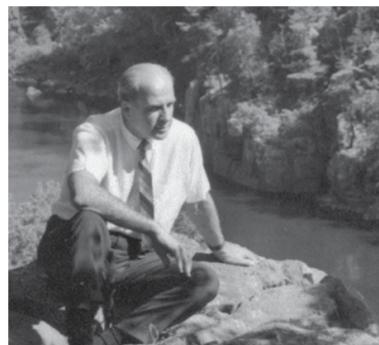


Photo: WHS-93130

Gaylord Nelson, the Founder of Earth Day, was born in Clear Lake, Wis., and was 89 when he died in 2005.

Nelson was elected Governor of Wisconsin in 1958. Four years later, he was elected to the U.S. Senate. He served in the U.S. Senate from 1962 until 1981.

During his time in the U.S. Senate, Nelson was an advocate for the environment. The idea for

Earth Day evolved over a period of years starting in 1962. His first idea to bring attention to environmental issues was to persuade President Kennedy to go on a national conservation tour. President Kennedy liked the idea and began

a five-day, 11-state tour in 1963. When this presidential tour did not get the environmental issues on the national agenda, Nelson did not give up.

Six years later, during a conservation speaking tour in the summer of 1969, Nelson had the idea of applying "teach-ins" used as part of the anti-Vietnam War demonstrations to organize a huge grassroots protest over what was happening to the environment. In September 1969, Nelson announced a nationwide demonstration in spring 1970. The response from the media and people across the country was immediate.

The success of the first Earth Day was spectacular and beyond anything that Senator Nelson had anticipated. More than 20 million demonstrators and thousands of schools and local communities participated. As Senator Nelson recounted, "That was the remarkable thing about Earth Day. It organized itself."

You can learn more about the history of Earth Day at nelsearthday.net.

Earth Day is
April 22!

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Look for these "fifties" to learn about protecting our Earth.

Partnering with Schools

Schools use new tools to protect the environment

Olson Elementary - happy, healthy 10 years

Olson Elementary School, on Madison's west side, is home to a richly diverse population of 430 students who speak more than 20 languages. Olson is striving to develop a green and healthy school culture, starting with Swimmy the Otter, the school's mascot, who symbolically unifies the school's diverse population and promotes the values of safety, respect, responsibility and being an ally. Swimmy models these values when he is quoted in morning announcements or attends special events at Olson.

Olson's green initiatives have exposed students to a variety of outdoor learning experiences that allow students to become stewards of the environment. Olson's school grounds feature a large natural prairie behind the school. Throughout the years, students of all ages have participated in outdoor projects, such as planting prairie seeds, planting straw bale gardens, doing controlled burns of the prairie, raising and releasing butterflies, and weeding and planting rain gardens. The University of Wisconsin-Madison Arboretum and Earth Partnerships for Schools have helped Olson develop the prairie while engaging students in a variety of learning experiences.

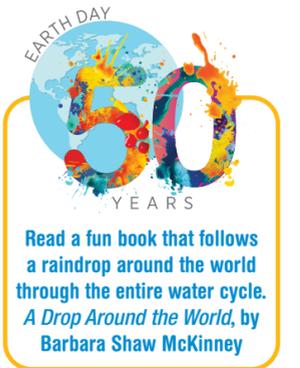
Olson recently celebrated its 10th anniversary. During the preparations, the staff reunited with the family of the school's namesake, Paul J. Olson – a longtime Wisconsin conservationist and school principal. He helped organize Madison's school forest, which is still being used as an outdoor conservation classroom.



Staff is in the process of applying for Green & Healthy Schools Wisconsin recognition. The facility was built following many guidelines of green buildings, including LEED Silver new building certification. It features a geothermal heating and cooling system, rooftop solar panels, and lighting in learning spaces. Over the summer, teachers at Olson collaborated with Wisconsin Green Schools Network curriculum coaches to develop lessons featuring several of the new Wisconsin Standards for Environmental Literacy and Sustainability.

Olson Elementary is living green!

Reprinted with permission from *Wisconsin School News*.



Read a fun book that follows a raindrop around the world through the entire water cycle. *A Drop Around the World*, by Barbara Shaw McKinney

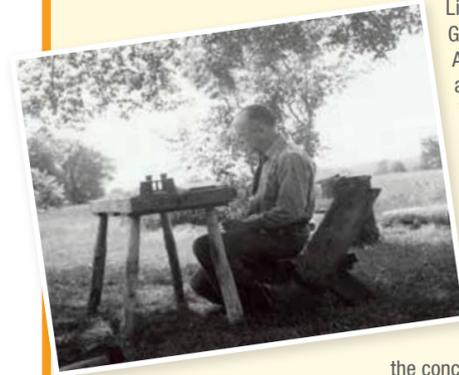
Visit Aldo Leopold Nature Center!

Earth Day is 50!

Senator Gaylord Nelson believed, as many people do, that we only have one Earth and it is our duty to protect it. Today, Earth Day is celebrated annually around the world to demonstrate support for a healthy planet. People young and old participate in Earth Day in a variety of ways. Some people might pick up litter, while others start a compost bin at home or at school. Others might start a new habit such as turning off the water while they brush their teeth or cutting out single-use plastics, like straws.

How do YOU celebrate Earth Day?

For more information on Earth Day, please visit earthday.org.



Like Senator Gaylord Nelson, Aldo Leopold is another important Wisconsin conservationist who also believed that our Earth is a very special place we must take care of. Famous for coining

the concept of the "land ethic," Aldo Leopold believed that living and non-living things are all part of our one ecosystem and that humans live healthier, more fulfilling lives when we work to preserve all aspects of this "land." Aldo Leopold said,

"When we see land as a community to which we belong, we may begin to use it with love and respect."

Aldo Leopold is also known as the "father of phenology." **Phenology is the science of observing and recording events as they occur in the natural world.** Thanks to Aldo Leopold and his family, we have pages of meticulous records that span decades and include observations such as the bloom times of plants, the return of migrating birds and the changes in seasons.

When we spend time outside, whether we are playing or hiking, building a compost bin or picking up litter, just sitting and resting, or camping and adventuring, we are developing a connection with the living and non-living things around us.

Another way to develop a sense of community with the land is to observe what is happening around us in nature and record these events. Whether drawing or writing, using creativity to explain, share and tell stories about what we see creates impressions on our psyches about our experiences in nature.

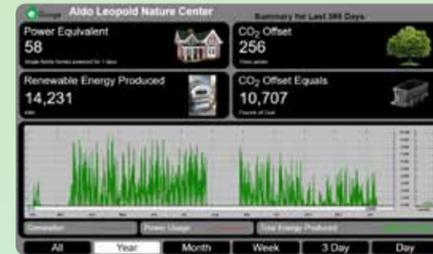
Phenology is not only important for marking the change in seasons and knowing when to plant seeds to avoid frost but also provides evidence of a changing climate. In fact, some climate scientists are using the Leopold family data to illustrate that several phenological events are occurring earlier every year.



Aldo Leopold Nature Center
aldoleopoldnaturecenter.org
330 Femrite Drive, Monona • (608) 221-0404

For the past 25 years, the Aldo Leopold Nature Center (ALNC), located in Monona, has been home to reclaimed native prairie, wetland and woodland habitats.

ALNC's mission, in the spirit of Aldo Leopold, is to engage and educate current and future generations, empowering them to respect, protect and enjoy the natural world.



Madison Gas and Electric (MGE) has partnered with ALNC for more than 20 years to educate the next generation about the need to use energy wisely and make good decisions for a sustainable future for all people and living things.

MGE helped to install one of the region's largest solar photovoltaic systems on ALNC's roof. It converts light energy into electricity and helps power environmental education at ALNC.

Why does the amount of energy produced on the ALNC roof change from day to day and month to month?



Madison Children's Museum Energize your fun!

The museum offers many ways to learn about new forms of energy and ways to conserve. Let's all take care of our wonderful Earth.



We love renewable energy!

Madison Children's Museum, in its ongoing commitment to sustainability and helping the environment, uses **renewable energy** to power some of its exhibits and programs on the museum's rooftop—solar panels create enough energy to give some back to the grid, where others can use it.

What is renewable energy? It's energy derived from natural sources that can be replenished. Instead of using fossil fuels to generate energy, renewable energy can be harnessed from the sun (solar power), the wind (wind power), moving water (hydro power), Earth's heat (biomass and geothermal) and even from human power.

Currently, the majority of energy in the world is derived from fossil fuels. Fossil fuels are raw materials like coal, oil and natural gas that are used to produce electricity, heat, fuel for transportation and many petroleum products or plastics that we use every day. These fuels took millions of years for the earth to create, are **nonrenewable** and will eventually run out. The process of refining these nonrenewable energy sources causes carbon dioxide (CO₂) to be released into the air, which contributes to pollution, climate change and global warming by trapping heat in our atmosphere.

Madison Children's Museum is able to conserve energy and support its energy needs by using renewable energy. It is in all of our best interests to use less fossil fuels and more renewable energy sources to protect our environment for future generations and slow down climate change. In 2014, the museum was awarded LEED Gold Certification, Leadership in Energy and Environmental Design, which recognizes the museum's national leadership in promoting sustainable design and practices. When we use renewable energy, conserve energy or use less plastic, we are cutting down on our use of fossil fuels and making choices that are good for our planet.

What can you do to help our environment?

- If you are able, use human power and walk, bike, or take the bus instead of taking the car.
- Use human-powered flashlights and appliances.
- Use LED lightbulbs instead of incandescent bulbs.
- Use the sun and wind to dry clothes outside on a line instead of in the dryer.
- Stop or cut back on using single-use plastics.
- Bring your own reusable bags to the grocery store.
- Compost.
- Upcycle instead of throwing things away.
- Plant trees.
- Recycle.
- Turn off lights when you leave a room.
- Cook in a solar oven.



Visit MadisonChildrensMuseum.org for more information.

Let's make our very own nature journals!



Materials:

Brown paper lunch bags, scissors, glue or tape, hole punch, ribbon, scrap paper, found objects, and crayons or markers

Directions:

1. Tape or glue down the flaps on each bag. Stack however many bags you are using in alternating directions.
2. Take stacked pile and fold in half, forming a book shape.
3. Hole punch the left-hand side of the "book." Lace with ribbon and tie.
4. Cut and glue scrap paper into your journal and onto the front page.
5. Decorate and then take it with you on your next nature adventure. Record what you see!

Thanks for the fun craft idea *Nature Net* and *Simply Rachel*!

You can make your very own nature journal and take it with you on nature walks to record what you see. By observing and recording, you too can participate in phenology!



Your Henry Vilas Zoo cares for many creatures both big and small, and we know that every critter no matter their size is important! From rhinos and orangutans to millipedes and bees, we take care of creatures for everyone to see!

How can we help orangutans?

We take excellent care of our orangutans at the zoo, but we also help orangutans in the wild. Henry Vilas Zoo is a part of the Saving Animals From Extinction (SAFE) program for orangutans, which means we work with other zoos to figure out how we can best help orangutans in the wild. One issue that orangutans are facing is deforestation, people removing trees from their natural habitat. Orangutans need native plants in their homes to survive. Zoos are helping to plant trees to connect orangutan forests and make them bigger. What native plants grow where you live? Making a native garden at home is a great way to help lots of animals!



UH OH, it looks like it's getting harder for the orangutan to move around her habitat. When deforestation happens, it makes it harder and harder for orangutans to find the things they need. Can you help the orangutan find her food? What are zoos doing to help orangutan habitat in the wild?

Help bees help themselves!

Another animal that needs native plants in their home is our local bees! Henry Vilas Zoo recently acquired a bee hive with more than 60,000 bees! These amazing little insects can help pollinate plants within a 2-mile radius of the zoo! Bees need nectar from flowers to survive, and by planting native plants, you are helping bees find food!

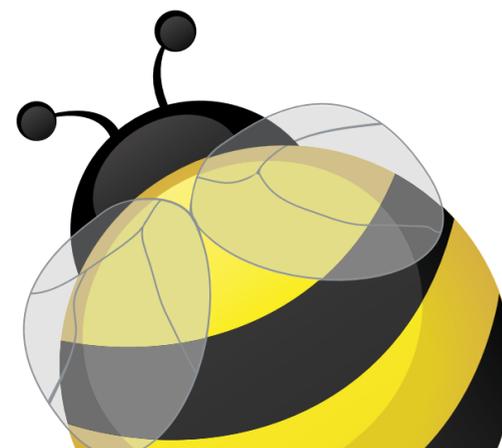
Make a bee bath!

Bees and other pollinators need water just like you! You can help bees by giving them a place to rest and take a drink.

What you need:

- Bird bath or shallow dish
- Rocks
- Fresh water

Place rocks in the dish and fill it up with water so that the top of the stones are not submerged. This helps the bees so they have something to land on before they take a sip. Place it in a spot where it is protected and shady. Be sure to take care of your bee bath and change the water daily, and clean the bath once a week.



JOIN US APRIL 25

Lake Wingra Watershed Activities • 9:00 a.m. to Noon Party for the Planet • Noon to 3:00 p.m.



We are throwing a FREE family-friendly event at the Henry Vilas Zoo, and you're invited! At Party for the Planet, you can participate in activities and actions that make a positive impact locally, starting right here in the zoo's local watershed. Kids and families everywhere are celebrating the 50th Anniversary of Earth Day, and we want you to join in the fun! More than one billion people around the globe are expected to step up to make Earth Day an inspiring time of action. That's why so many organizations around Madison and Dane County have joined forces to make this an event to remember.

Kick off the celebration by volunteering at one of the many events around the Lake Wingra watershed. Visit henryvilaszoo.gov/event/party-for-the-planet/ to find out more details. The party continues with a ton of activities at the zoo. Spring into action with us, and use the Party Passport (see below) to help guide your fun. Climb a tree, make a seed bomb and party with the polar bears. Collect stamps for all the activities you see and do to win prizes. And the fun doesn't stop with one day; check out all the ways you can make a difference for our planet throughout the spring and summer. Follow us on Instagram @PartyforthePlanet.WI to see challenges and upcoming events. Share photos of yourselves at the event with us on Instagram and be entered to win even more prizes!

Can't make it to the Party, but want to make a difference? Help out at your nearest City or County park! Whatever you do, we hope you'll join in the celebration!



Pick up your passport at the zoo on April 25!



This year, the Party for the Planet Earth Day celebration at the zoo will be powered by 100% green power. MGE's Green Power Tomorrow program gives the Zoo an opportunity to offset its carbon emissions from electricity used at the event with green power!

Learn more about the Henry Vilas Zoo at www.henryvilaszoo.gov.

Plug into the electric ride!



Buses

Madison buses are going electric and will have three battery-electric buses on the road by September 2020. The power/fuel cost to operate an electric bus is \$0.16 per mile compared to \$0.63 per mile for Metro's hybrid electric buses, \$0.74 per mile for compressed natural gas vehicles and \$0.84 per mile for standard diesel buses. The City is working to electrify its bus fleet.

In addition to zero emissions and outstanding fuel economy, these buses create little to no noise when idling. In motion, they operate at a noise level that is measured below that of a normal conversation. It is also expected that these vehicles will carry a much lower maintenance cost than standard diesel buses.

Bikes

The electric bike has been around for some years, but it's gaining ground again as new brands and models enter the market. They've also gotten faster and go farther on a charge, and you can get up those steep hills more quickly!

Scooters

Electric scooters are an awesome way to get around. They take no gas and need no insurance, so it's a really inexpensive way to get around. At a cost of about \$400, they are scooting into cities all across the country.



mge.com/lovEV

 **ev.** electric vehicles. *there's a lot to love.*



1970s

Gas shortage sparks interest in electric vehicles (EVs).

NASA's lunar rover runs on electricity.

1990s



Regulations and environmental concerns renew interest in EVs.



2000s

Toyota releases the Prius, the first mass-produced hybrid car.

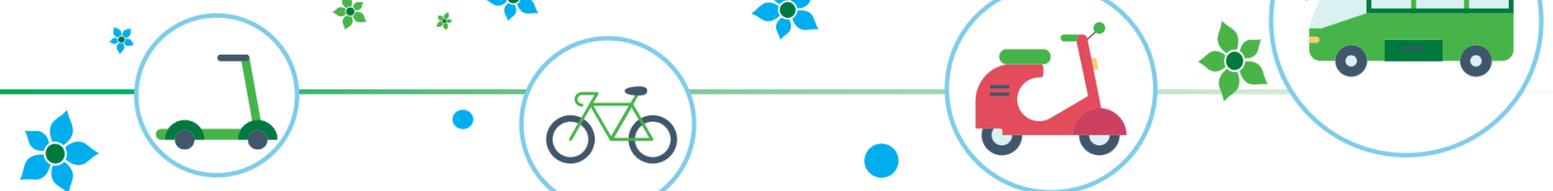
EV charging infrastructure is developed.
Battery costs decline.

2010s



Whether it's to reduce carbon emissions from gas-powered vehicles or to power an electric vehicle (EV) with more renewable sources of energy, like wind and solar, EVs are a super cool choice for getting from here to there.

More and more modes of transportation are going electric. It's an amazing movement that is sure to gain speed and traction!



How do electric vehicles (EVs) work?

An EV is powered by an **electric motor** rather than a gasoline or diesel engine. While some newer EVs have their own distinctive exterior designs, you'll really notice the difference under the hood.

- A conventional engine is replaced by an **electric motor**.
- The speed and direction of the vehicle (forward or reverse) is determined by a **controller**.
- The motor gets its power from an array of **rechargeable batteries**. (Source: auto.howstuffworks.com)

Charge up here and there!

Plug 'em in, charge 'em up and go! MGE has installed more than 40 charging stations in the area. In addition to the charging stations MGE installed around the Madison area, many apartments and companies are adding stations for their residents and employees. Check out mge.com/evcharging to find the closest one to your home or school.

Partnering to study sustainability—and EVs!

Did you know MGE offers an EV-related, standards-based sustainability curriculum to local schools for grades 6 through 12? The partnership with the "sustainable intelligence" curriculum developer EcoRise helps MGE share this new technology and the environmental benefits of EVs with students and faculty. Data from EV charging stations can be used to study energy usage, environmental impacts and more. To learn more about the curriculum and how to use it, contact Jim Jenson, MGE Community Education Manager, at jejenson@mge.com.

How far can they go?

EVs are now available that can travel 200+ miles on a charge. Automotive engineers are working on technology to help extend the range so they can go even farther. Following are the ranges between charges for some of today's EVs.

	Distance on a full charge
Chevrolet Bolt EV Automatic	259 miles
Volkswagen e-Golf Automatic	125 miles
Tesla Model 3 Standard	250 miles
BMW i3 BEV Automatic	114 miles
Ford Mustang Mach-E	300 miles
MINI all electric	110 miles

(Source: EPA Estimate)

Benefits of EVs

- 1 Reduced gasoline use. In 2018, about 391 million gallons of gasoline were consumed per day.
- 2 Lower fuel costs. Electricity is less expensive per mile driven than gasoline or diesel fuel.
- 3 Reduced air emissions. MGE customers can offset electricity emissions by buying green power for your home and vehicle charging through MGE's Green Power Tomorrow program.



In 1990, Earth Day went global, mobilizing 200 million people in 141 countries and lifting environmental issues onto the world stage.

Is your house ENERGY SMART?

Home energy investigation

Look for ways to save energy. You'll save natural resources and reduce our impact on the environment.

Need more energy-saving tips? Contact the MGE Energy Experts at 608-252-7117 or visit mge.com.

Doors and windows

Check your exterior doors. Do the doors shut tightly? Is there weatherstripping around the edge? It reduces drafts. In summer, pull shades down to keep out sunlight and heat. In winter, open shades to let in light and heat on sunny days.

Lighting

Replace a 75-watt incandescent bulb with a 17-watt LED bulb. Over its life, it can save \$160 in energy costs.

Bathroom

Do you use low-flow showerheads? Standard showerheads use three to five gallons of water per minute. Low-flow showerheads use one to two gallons per minute. They save water and energy to heat the water.

Refrigerator

The inside temperature of your refrigerator should be 37°F to ensure food safety and energy savings.

Dehumidifiers

Do you have a dehumidifier? Operate your dehumidifier on a timer so that it runs at night instead of at high energy-use periods during the daytime.

Home electronics

An estimated 10% to 15% of all electricity used in American homes can be attributed to the buzz of electronic devices. Unplug small devices that aren't being used.

Water heater

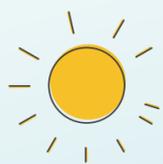
Locate the EnergyGuide label on the tank. It compares your water heater to other water heaters of similar size. With an adult, place a household thermometer under hot running water. Check the temperature. MGE recommends a water temperature of 120°F to prevent scalding and to save energy.

Thermostat settings

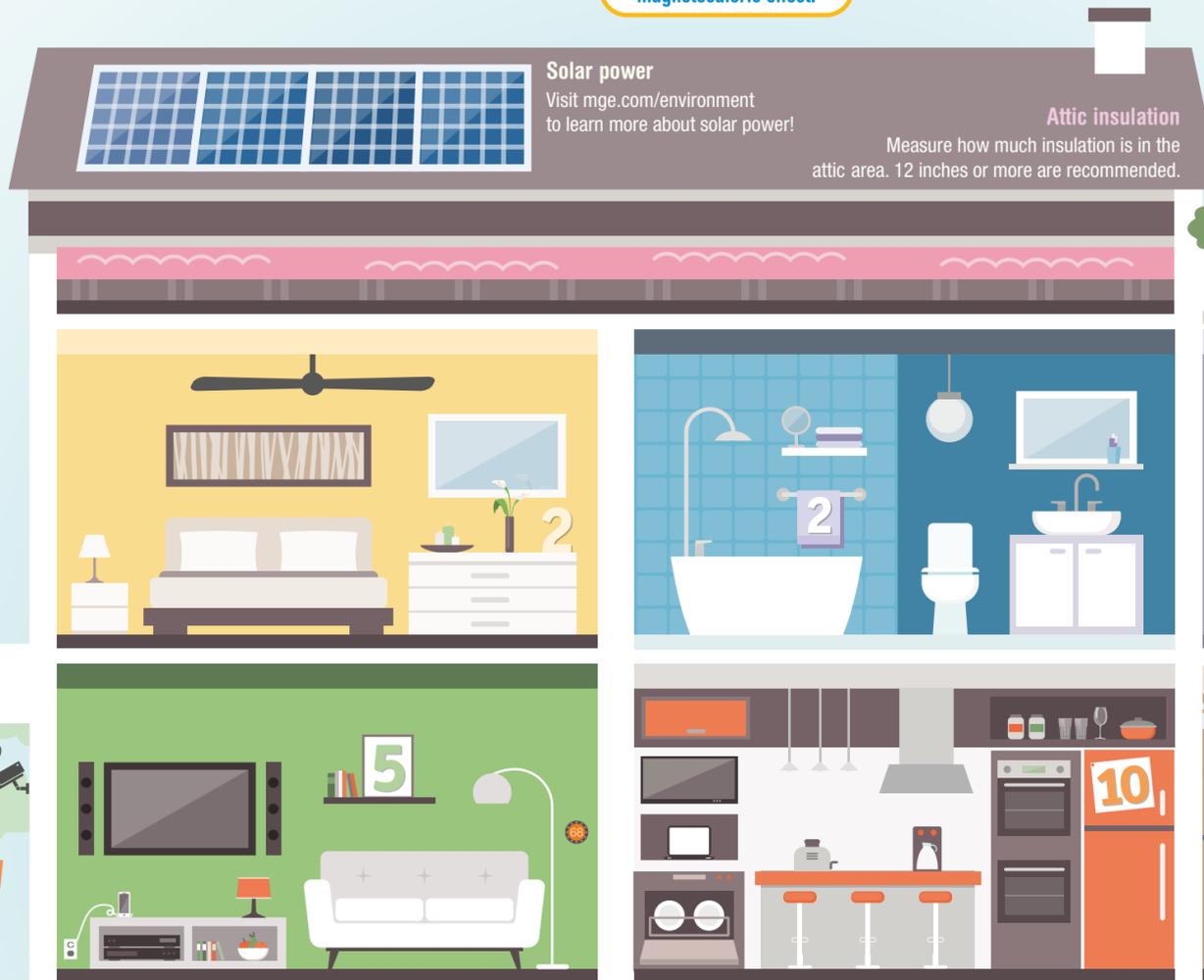
Use a setback thermostat. Set the temperature no higher than 68 degrees in the winter and no lower than 78 degrees in the summer.

Furnace and air-conditioning systems

Furnace and air-conditioning systems should be inspected each year by qualified professionals. It helps to ensure safe and efficient operation. MGE recommends that you change standard furnace filters monthly during the heating and air-conditioning seasons. High-efficiency filters should be changed every three months.



A revolutionary new type of refrigerator in development uses magnets to create cold, also known as the magnetocaloric effect.

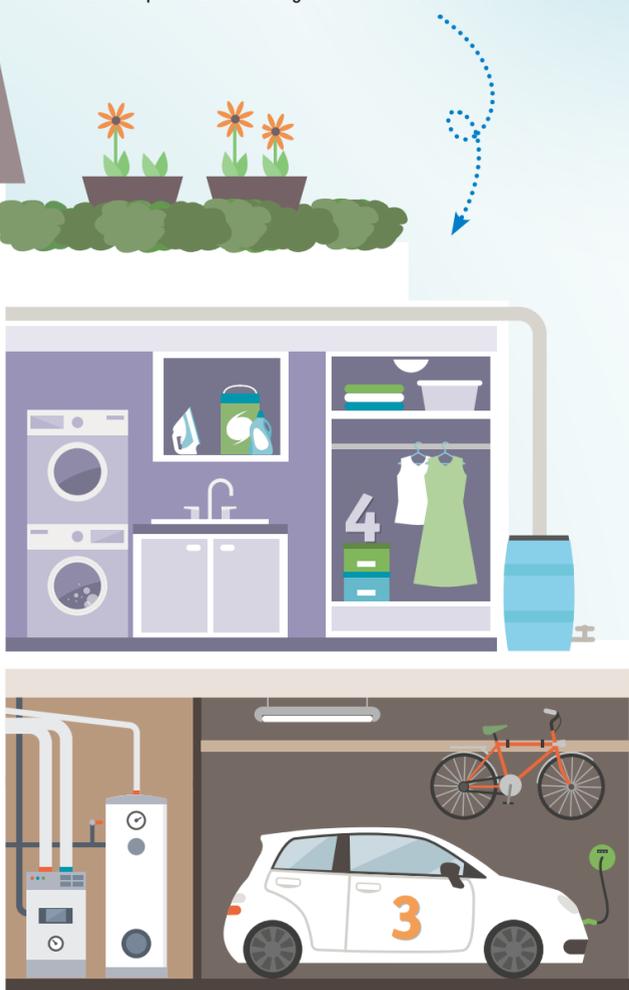


Find the energy users in the home below

Each room of the house below contains a number that indicates how many energy users are in the room.

Can you name them and rank the energy users from most to least power used in each room?

The answer key is below the house. You might be surprised at the things that use a lot of power and the things that don't use that much!



Green Power Tomorrow

Your parents can buy green power for your home. Visit mge.com/greenpower to learn more!

Are there Energy Vampires in your home?

Many of the electronic devices in your home stay on, even when they're "off." Chargers for cell phones, computers, power tools and other gadgets suck energy from your home. Unplugging electronics that are not in use can decrease phantom energy.



Can you find the Energy Vampires in this home? Use the list of items, and circle each electronic device that uses phantom energy. If the device isn't pictured, write its name in the room that you would most likely find it. Take the phantom energy quiz at mge.com/earthday.

- Cable box
- Cell phone charger
- Computer or Notebook
- Game console
- Home audio system
- Ink-jet printer
- Rechargeable power tool
- Satellite receiver
- Television
- Wireless router

Use smart home technology to save

New home automation can control lighting, climate, entertainment systems, appliances and home security, and many can be controlled remotely through a smart phone or the internet. With heating and cooling being the biggest home energy users, a smart thermostat is a wise investment.



Smart power strips are an effective way to prevent phantom energy by detecting when a device is in standby mode and then cutting off power to that device. Also, LED-based smart bulbs connect to your home's Wi-Fi network, allowing you to control lights from anywhere you have internet access.



Go to mge2050.com for ideas to save energy.

How long to charge your car?

You can plug your electric car into your charger. How long will it take to charge it? Find information about charging at mge.com/lovev.

Learning about good ENERGY for today and tomorrow!

Building your community energy company for the future

Bring on good energy ideas!

MGE is committed to building a smarter, cleaner energy future for all of us. We have set goals to reduce carbon emissions and produce more energy from renewable sources.

MGE's website, mge2050.com, is your source for learning how we all can work together to save energy.

Another program, Balance Madison, helps promote green living and environmentally friendly practices by engaging families like yours with support on energy ideas and savings programs.

It's a fun way to learn about caring for our environment.

MGE partners with Focus on Energy®, which can help you determine ways to save energy in your home. An energy audit can identify things to do and better appliances and lightbulbs to purchase that can greatly reduce your energy use and save you money. Get a free sack of goodies to improve your energy efficiency!

We love to help all our customers, partnering with many non-English-speaking communities to empower everyone with good information to use energy wisely!

responsibl**e**nvironment

12 MGE takes responsibility to preserve and protect our environment while providing affordable, reliable energy.

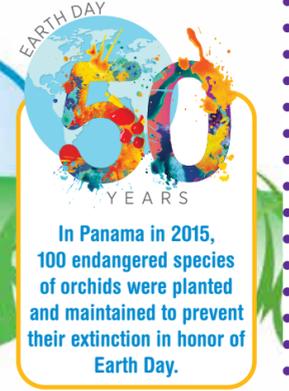
[Solar energy] SOLAR energy is renewable energy produced by the sun. It comes to Earth 🌍 in the form of visible light and infrared radiation. Solar energy can be harnessed in a variety of ways to heat homes 🏠 and businesses, heat water, grow plants 🌱 and produce electricity.

1. WHAT KIND OF TILES ARE ON THE ROOF OF CLARK ST. COMMUNITY SCHOOL? [Hint: visit mge.com/greenviewsolar]



2. _____ IS PRODUCED BY HEATING AND COOLING ON THE EARTH'S SURFACE.

[Wind energy] Wind energy is a clean, renewable energy source produced by the daily cooling and heating patterns on the surface of the Earth 🌍. Wind energy can be harnessed to produce electricity ⚡, pump water, grind grain and move sailing vessels.



[Charging stations] Where can you plug in? 🚗. MGE has a network of charging stations around our community. Find the charging station closest to you at mge.com/evcharging.

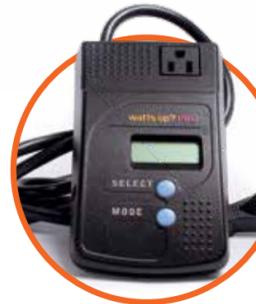
3. HOW MANY MGE CHARGING STATIONS ARE THERE IN THE MADISON AREA?

The fast charge unit can charge an EV battery to 80% in less than ⚡ 30 minutes. The fast charging option now makes commuting longer distances more convenient for EV drivers.

4. WHERE ARE MGE'S FAST CHARGING STATIONS LOCATED?

[Geothermal energy] IS BENEATH YOU! Geothermal heat pumps circulate liquids 💧 through pipes buried in a continuous loop (either horizontally or vertically) to heat 🔥 and cool ❄️ buildings. Geothermal energy takes advantage of the constant subsurface ground temperature.

5. WHICH COMMUNITY CENTER IN MADISON HAS GEOTHERMAL TECHNOLOGY?



[Watts Up portable energy meter] Phantom or standby energy users are devices that require electricity even when you aren't actively using them. 📺 They don't use much power individually, but when you add them up, they impact your monthly energy use. 💡 Check out a "Watts Up" portable energy meter from your public library to learn which equipment uses power when turned off.

6. WHERE CAN YOU BORROW A PORTABLE ENERGY METER FROM?

[Fight climate change by planting trees!] Last year, the Amazon rainforest experienced a massive fire 🔥, wiping out 7,200 square miles of the most diverse places on earth. Losing so many trees has been devastating to the biggest area of the Earth's lungs.

What can we do? Since the Amazon rainforest is 3,634 miles away from Madison, it's hard for us to plant trees there, but you can make an impact at home. Planting trees 🌲🌲🌲 is one thing you can do in your community that will make a big difference.

7. PLANT A TREE ON ARBOR DAY! WHEN IS ARBOR DAY THIS YEAR?



Answers: 1. Solar Panels 2. Wind 3. About 40 4. E. Washington Avenue, Railroad Street, Home Depot, Kelley's Market 5. Lussler Community Education Center 6. Public Library 7. Friday, April 24

Solar ENERGY

is a natural.

Solar energy, or **SUNLIGHT**, can be used to generate electricity; provide **HOT WATER**; and **HEAT, COOL, and LIGHT** buildings.

There are a number of ways to capture the energy in sunlight.

Passive solar

No mechanical devices are used in passive solar heating. Buildings designed for passive solar heating often have large windows that face south to absorb as much sunlight as possible. They might also use building materials that absorb and slowly release the sun's heat. Passive solar designs can reduce heating bills by up to 50%.

Photovoltaic (solar cells)

Photovoltaic cells turn sunlight directly into electricity. The simplest cells might power your watch or calculator. To power a building, many cells are combined into a system or array.

Concentrating solar power

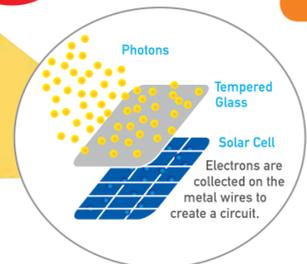
Some power plants use a concentrating solar power system. The sun's energy is concentrated in one area using mirrors. This creates a lot of heat. The heat produces steam used to run a generator that creates electricity.

Solar hot water

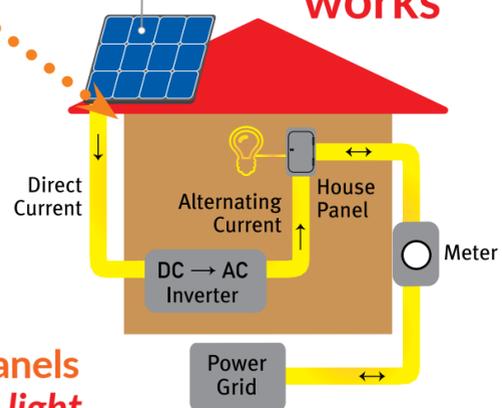
Solar water heaters use the sun to heat water that flows through a panel that faces the sun. These systems can reduce the need for conventional water heating by two-thirds. Sometimes, the hot water that is collected also can be used to heat a building.

Solar energy in our schools

MGE has installed photovoltaic systems on area high schools and community sites to create more awareness of renewable energy. Visit mge.com/solarschools for more information.

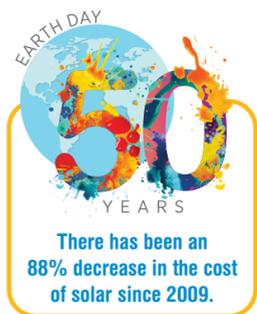


How solar works



Solar panels convert light

into electricity, which is why they work in the cold and even with indirect sun.



MGE solar rooftop

MGE installed 442 solar panels at its main office. The solar array supplies nearly 10% of the energy used by the building each year.

Solar projects in the area



- Aldo Leopold Nature Center
- Bike Path Lighting
- Dane County Arena
- Dane County Henry Vilas Zoo
- Olbrich Gardens Solar Flair
- Goodman Pool
- Lussier Family Heritage Center
- Solar Parking Canopy at MGE
- Madison Children's Museum
- State Capitol
- UW-Madison Arboretum
- Middleton Operations Center
- Badger Hollow (under construction)
- Morey Field Solar (under construction)

See the solar energy generated by the sun firsthand. Work with your teacher and classmates to build this fun and tasty solar hot dog cooker.

<https://www.education.com/science-fair/article/solar-hot-dog-cooker/>



Sharing the sun!

Shared Solar is an awesome way to share in the power of the sun! MGE built a huge array of solar panels on the City of Middleton Municipal Operations Center. MGE customers have signed on to the program to help foster the use of locally generated solar energy in our community. The clean, renewable electricity generated helps the environment by reducing CO₂ emissions.



Solar ENERGY in our history.
Put the solar energy timeline events in order online.

Play the solar energy timeline online! This interactive project involves matching up historical developments in solar energy in the order in which they occurred (mge.com/earthday).

Solar dog!
Yum!
Yum!



Wind ENERGY is a breeze.

Wind is always here.

It's great for flying kites and generating electricity, too!

Wind turbines capture the wind's energy with propeller-like blades that are mounted on a rotor. Turbines are placed on top of high towers to take advantage of the stronger wind at 100 feet or more above the ground.

Single wind turbines can be used to generate power for a single home or farm. Utilities build a large number of wind turbines close together to form a wind farm.

Wind Energy Facts On wind farms, the turbines take up only 5% of the land, leaving the rest for other uses like farming.

The total wind resource in the United States is very large. All states have some windy areas, but the Great Plains and Midwest lead the rest of the country. The states of Texas, Kansas and North Dakota could provide enough electricity to power the entire U.S.

Five nations, including the U.S., Germany, Spain, China and India, account for roughly 73% of the world's installed wind energy capacity. Wind energy is the fastest-growing renewable energy source around the world.

Learn more about wind power at awea.org.



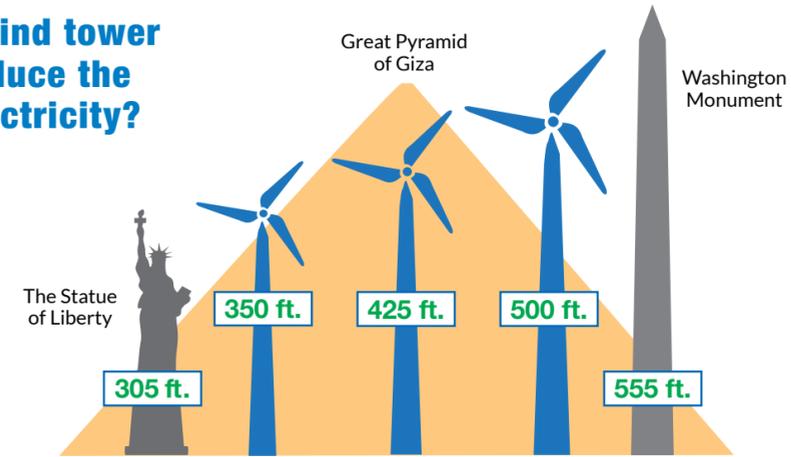
Wind power has no pollution!

What's a wind farm?

MGE has a 17-turbine wind farm in Kewaunee County, Wis.; an 18-turbine wind farm in Kensett, Iowa; and a 33-turbine wind farm in Saratoga, Iowa. All three wind farms save about 368,000 tons of CO₂ from being produced annually from fossil fuels.

Which wind tower will produce the most electricity?

- A. 350 ft.
- B. 425 ft.
- C. 500 ft.



1390 The Dutch create the Tower Mill and hire wind-smiths to run them.

Late 19th Century Americans start using a multi-blade windmill to generate electricity.

Wind energy has been used since early recorded history to do work. From powering boats along the Nile as early as 5000 B.C. to pushing the blades on a windmill in order to pump water and to crush a farmer's grain, wind has been, and still is, used as a viable source of energy.

MGE builds new wind farm west of Madison

MGE built a new wind farm about 200 miles west of Madison near Saratoga, Iowa, an area known for its wind. The 66-megawatt wind farm is MGE's largest to date and serves about 47,000 households. The turbines reach nearly 500 feet in the air.



Green TV It's a big neighborhood and this great web channel brings us all together. It's called Green View and features stories about how MGE is investing in wind and solar energy. Visit mge.com/towerpower.

Green Careers People who have green careers promote energy efficiency and increase the supply of renewable energy. Most green careers require a post-high school degree. Can you fill in the blanks to spell six green energy careers?

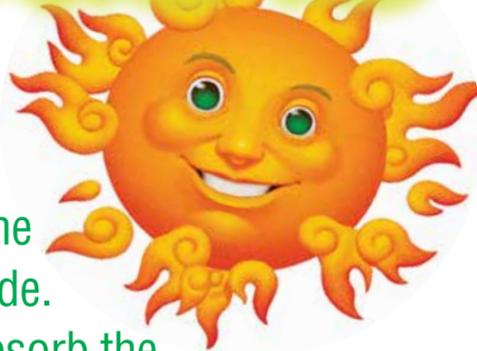
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 _ o _ an _ _ t



- Answers C - 500 ft.
- Architect
- Surveyor
- Arborist
- Civil engineer
- Hydrologist
- Botanist

BioMAss

Biomass energy is energy that comes from **plants, animals and any organic material** with the energy from the sun stored inside. **Plants use photosynthesis to absorb the energy from the sun.**



Sun energy from plants gets passed on to people and animals as they eat plants. When people, animals and plants create waste products, that material is still full of unused energy. Making good use of that energy is good for the environment.

Biomass energy is renewable because we can replace what we use by growing more crops and creating more waste. Using biomass energy reduces harmful emissions, recycles waste products and supports agricultural products.

While burning biomass materials releases CO₂ into the atmosphere, growing more biomass crops captures nearly an equal amount of CO₂ out of the atmosphere.

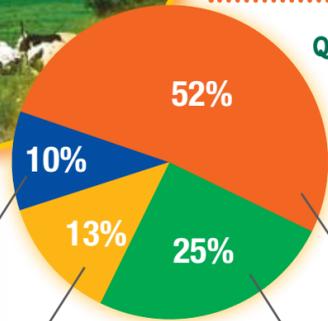


Quiz

What portion of the following contributes to how we are managing solid wastes?

- recycling
- composting
- combustion with energy recovery
- landfilled

Label the corresponding piece of the pie chart.



Management of municipal solid waste in the U.S., 2017



Cow power: Keeping even more phosphorous out of local lakes is the goal behind building Dane County's second manure digester near Middleton. The digester converts the cow manure into electricity that MGE purchases. The manure digester completed its first full year of operation at the end of 2014. During 2018, the digester generated 11.5 million KWh of electricity, which is enough to power approximately 2,000 homes. This renewable biomass energy is added to MGE's community energy grid as part of its overall fuel mix. Hurray for poop power! Learn more at mge.com/cowpower.



Cow chip throw festival:

Early settlers used cow manure for fuel, in their cookstoves or to protect their outdoor structures from wind and to collect the solar heat. While we don't use manure directly any longer, we do have fun throwing it! Each year, nearly 40,000 people attend the Wisconsin Cow Chip Throw Festival in Prairie du Sac, Wisconsin! People compete to see who can throw the cow chip the farthest. Do you know the current Wisconsin Cow Chip Throw state record?

- A. 470 feet
- B. 248 feet
- C. 822 feet
- D. 106 feet



Answer is **B. 248 feet**. Lots of other fun festival activities also take place including a parade, a run/walk, arts and crafts, a game tent and fun dancing performers. There's even a kids category to compete!



Come and throw some cow poop!!!

Here are some examples of alternative fuels:

Ethanol is a type of fuel made from plants. In the U.S., we grow a lot of corn and turning that corn into fuel makes good use of an abundant and renewable crop. In South and Central America, sugar is an abundant crop that can also be turned into ethanol. Many cars today can run on ethanol or a combination of ethanol and gasoline. Ethanol is renewable because we can always grow more corn, sugar and other plants that can be turned into fuel.



Landfill gas: As waste products break down in our landfills, methane gas is emitted. This methane gas can be collected and used as a fuel source.

How many other companies or organizations are using biomass energy in our area? Do a little research and share what you've learned with your classmates.

NATURE NET

APRIL 17-26, 2020

CALENDAR OF EVENTS



Have you ever been a part of a team? You all work together, right? Well, that's how Nature Net works.

It's your favorite nature centers, parks and museums teaming up to teach us all more about our precious environment. When we all work together, we can help your teachers make outdoor field trips possible. Or, we can give you a bunch of really cool places to visit with your Nature Passport. Or, we can pull together all the things we know and email your parents a nature net newsletter (even parents like to learn new things). By working together, Nature Net makes learning about the environment fun, easy and exciting! Find more details, activities and ideas of things to do outside this season at naturenet.org.

Celebrate spring and the weeks around Earth Day with a range of free or low-cost family events each day!

NATURE NET SITES

- Aldo Leopold Foundation
- Aldo Leopold Nature Center
- Bethel Horizons Nature Center
- Cave of the Mounds
- Cherokee Marsh
- City of Madison Conservation Parks
- Community GroundWorks at Troy Gardens
- Dane County Parks
- Henry Vilas Zoo
- International Crane Foundation
- Lussier Family Heritage Center
- MacKenzie Center
- Madison Children's Museum
- Madison School Forest
- MMSD Planetarium
- Olbrich Botanical Gardens
- Upham Woods
- UW-Madison Arboretum
- UW Geology Museum
- Welty Environmental Center

JOIN THESE NATIONAL PROGRAMS

- **National Environmental Education Week** (April 20–24, 2020) – Register your Earth Day project at EEWeek.org.
- **Green and Healthy Schools** – Get your school to reduce environmental impact and costs and improve environmental and sustainability literacy.
- Find more details, activities and ideas of things to do outside this season at naturenet.org.

Due to the unpredictable nature of the COVID-19 situation, many of the Nature Net activities listed here have been cancelled or postponed. Please continue to check our website for up to date event information.

4/17 FRI

Aldo Leopold Nature Center
Wonder Bugs: Mud Pies in the Skies

9:30–10:45am • \$
For children ages 2-5 and their parent/caregiver. As the ground begins to thaw, we will dig and we will draw. There is more to soil than meets the eye. Come learn about fun critters that live in the mud. We'll play and sing until we say bye-bye. Fee: \$10

aldoleopoldnaturecenter.org



Madison Children's Museum
Science Dabblers: Seed Planting

2–3pm • \$
Children will learn more about seed cycles and plant seeds to bring home. Fee: museum admission.

Madisonchildrensmuseum.org

4/18 SAT

Aldo Leopold Nature Center
Land Steward Work Day

10–11:30am • FREE
Help restore and maintain ALNC's prairie, marsh and woodlands with a seasonal work project.

aldoleopoldnaturecenter.org



International Crane Foundation
Annual Midwest Crane Count

FREE ☎
Join more than 2,000 volunteers across the upper Midwest to monitor the return of Sandhill and Whooping Cranes to their northern breeding grounds. To participate in the Crane Count, log in to www.cranecount.org and contact your County Coordinator.

Cave of the Mounds National Natural Landmark
Hike: ClueQUEST: Sinkholes and Habitats!

2–3pm • FREE*
Celebrate Earth Day! We'll search for clues along the trails on the landscape aboveground that tell us a cave may be underfoot - and discover the diverse habitats of Wisconsin's driftless area at Cave of the Mounds. *Optional Cave Tour can be added for a separate admission fee.

caveofthemounds.com

4/19 SUN

UW-Madison Arboretum
Walk for the Love of Earth

9:30–10:45am • FREE
Honor Earth Day on an early spring walk to search for signs of renewal in the gardens and woodlands.



arboretum.wisc.edu

4/21 TUE

Lussier Family Heritage Center & Friends of Capital Springs
Earth Day Stewardship & Environmental Education Program for Students

8:30am–12:30pm • FREE ☎
Students and teachers will learn about and care for natural habitat using hand tools and will take a naturalist-led hike to Lake Waubesa looking for signs of life along the way. All ages welcome. Please contact the Lussier Family Heritage Center or the Friends of Capital Springs for more information. Registration is requested by Friday, April 3, 2020.

www.lussierfamilyheritagecenter.org

4/22 WED

EARTH DAY

Madison Children's Museum
Earth Week

April 22 through 25 - 9:30am–5pm • \$

The Museum's daily programs will celebrate Earth Day. Science Dabblers, Exploration Station, Mess Monsters, Story Circle and Lilypad Theatre will be themed to celebrate the Earth. Check the museum's website for program days and times. Fee: Museum admission.

madisonchildrensmuseum.org



4/24 FRI

Aldo Leopold Nature Center
Self-Guided Hike

Trails open dawn to dusk, building hours 9am–4pm • FREE
Hike and explore our award-winning interpretive prairie, pond and woodland trails. Stop inside to find information on our Scavenger Hunts, Nature BINGO, Digital Docent: Climate Change Impacts Walking Tour, Family Trailside Backpack Program or to explore our indoor Nature Nooks.

aldoleopoldnaturecenter.org



Brought to you by Nature Net

Nature Net: Powered by the Aldo Leopold Nature Center with charitable support from American Girl Fund for Children.

Program fees and registration vary. For event information, registration details and more, click on the Earth Day Bouquet icon at naturenet.org.

☎ registration is required
\$ fee or ticket price

While you're there, don't forget to check out all the Nature Net sites for programs and special events throughout the year! You can also sign up for Nature Net News – a free monthly e-newsletter with tips, tricks and cool ideas – designed with busy families in mind!

Ongoing Events in April

- Self-guided tours at **Aldo Leopold Foundation** M–F 10am–4pm.
- Family trailside backpacks free with a Family Membership at **Aldo Leopold Nature Center** M–F 9am–4pm, Saturday & Sunday 10am–2pm.
- Hike boardwalks at **Cherokee Marsh** dawn to dusk seven days a week.
- Climb the observation tower, tour the Wildlife Exhibit or Logging Museum and picnic at **MacKenzie Center**. Trails and grounds open daily, dawn to dusk; exhibits and museums open M–F 10am–4pm.
- Explore the outdoor gardens during extended hours at **Olbrich Botanical Gardens**. Gardens open daily from 9am–8pm, Bolz Conservatory 10am–4pm.
- Check out the exhibits at the **UW Geology Museum** M–F 8:30am–4:30pm, Saturday 9am–1pm.
- Borrow a telescope from the **MMSD Planetarium**. Free to Madison residents and MMSD teachers, \$5 for non-Madison users.
- Tour the grounds at **Cave of the Mounds** 9am–5pm or catch a tour on the hour starting at 10am on weekdays and every 30 minutes on the weekend.



NATURE NET

CALENDAR OF EVENTS APRIL 17-26, 2020

☎ registration is required
\$ fee or ticket price

Cut out this page and put it on your fridge!



Win a party for your winning video!



Enter our EARTH DAY VIDEO CONTEST

1. Think of a good activity for Earth Day in your home, school, park or other favorite place.

Here are some ideas for your video:

- Top 10 ways to save energy at school.
- Renewable energy — create a model or a collage of pictures with these forms of energy.
- How does your garden grow? Start seedlings for an herb or vegetable garden, or create a garden map for spring planting.
- Interview someone you know who owns an electric vehicle.

Need help?

If you would like creative help, use one of our three scripts at mge.com/earthday.



2. Create a fun video capturing your Earth Day activity.

3. Work with your teacher to submit an entry (grades 4-8).

Maybe you'll win a \$500 prize.

We will post the entries on our Facebook page so you can learn from other kids in your school and other Madison-area schools. Your teacher has all the rules for your participation.

Learn more at mge.com/earthday

Deadline for video submission is **May 1, 2020.**



Sponsored by: Madison Gas and Electric
P.O. Box 1231, Madison, WI 53701-1231

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