

PHENOLOGY CALENDAR

ARTWORK AND WRITING BY THE OWL CLASS OF 2028



Foreword

As the seventh graders at Open World Learning Community (OWL) began to explore the question, “What makes a community thrive or suffer?” their studies extended beyond the sphere of human community. Early in September, art teacher Kent Miller introduced the skills of scientific drawing. Students brought sketchbooks to fall field work adventures. As they tromped through the Minnesota prairies, deciduous forests, and coniferous forests of Belwin Conservancy, thermometers, photometers, and sketchbooks in hand, the students sought to discover what makes ecological communities thrive or suffer. In the field, we analyzed the living and non-living components of each of Minnesota’s ecosystems. Students had opportunities to get to know Minnesota’s wild species in person, and when they returned to OWL, each student began creating a 2-dimensional representation of one special species in Kent’s class.

Minnesota species artwork opened another way of knowing, keeping the learning process personal and immediate. When Kent shared the final art pieces with me, I was very impressed, and I think you will be, too.

During their ecology studies this spring, science students conducted research on the seasonal activities, or phenology, of their species. They deepened their learning by investigating how Minnesota’s climate – and seasons – are changing. To culminate their yearlong Minnesota species projects, students synthesized their learning by writing about the impact of climate change on their species’ phenology.

This calendar showcases how each seventh grader at OWL experienced climate change as a phenomenon within their local sphere –as an influencer of a Minnesota species they came to know through outdoor experiences, artistic interpretation, and scientific research and writing.

I have learned so much about Minnesota species and how climate change is affecting them; I hope you enjoy this calendar as much as we have enjoyed making it.

Dr. Megan Olivia Hall, Ph.D., NBCT



Class of 2028 at Baker Park Reserve



7th Grader Olli Liimatta on Greenline Trip for Fall Fieldwork



7th Graders at Belwin Conservancy

Special Thanks To...

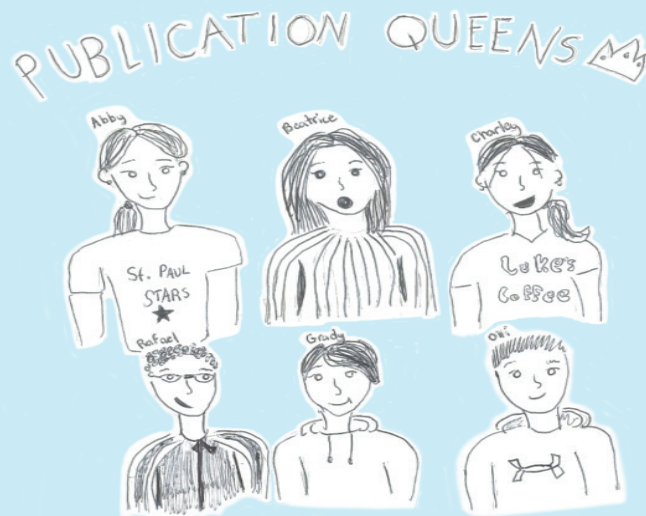
Leo Bickelhaupt, Megan Hall, Kent Miller, Dan Sullivan, Hazel Carroll and Claire Ales

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Nora Xiong

Publication Team

Charley Cheatham, Beatrice Cosgrove, Abby Horton, Olli Liimatta, Rafael Presswood, and Grady Smith



The Publication Team

Artwork by: Charley Cheatham, Beatrice Cosgrove, and Abby Horton

A Word from Kent Miller (Art Teacher at OWL) on his Experience Teaching the Minnesota Species Project



[To start this project] we practiced [the look, hold, draw method] a few times with our observational sketchbooks and then that allowed the students to have a baseline of skill to draw with accuracy the species of choice.

The main revision process was time. I gave an extreme amount of class time for students to create their drawing. How can time be a revision technique? Well, it is all about creating the mood or tone in the classroom with the students. It is important to give students the space to create and feel unencumbered by external factors, like time. As a teacher I had to trade getting through more content with doing this project with quality. So it was not a specific revision process but rather it was the space for a student to see that they wanted improvements done on the project they were creating and had the space, time, to do it.

I chose to offer different types of mediums as a way to allow for the student to feel more comfortable with their own creating process. Giving the student space to make their own choices about what medium is a way to get students creating at their highest level. When students have the autonomy to make their own choices and it directly influences their own project it increases the quality of the art project. I have seen that numerous times in my teaching career. When I have specific requirements it often reduces student creativity and increases a technical experience in visual art.

When it all comes down to it, as an art teacher I am often trading one aspect of the project for another. Like a little slider bar, when I increase freedom over here it automatically decreases something else. I just have to be aware of what things are being traded for and be okay with it. Like in the case of the MN Species Project I traded quality of project and time.

I am so very excited about the results of the MN Species Art Project and very proud of the work that students put into it.



Red-Spotted Purple Admiral Butterfly
Riley Sheffield

Bergamot flower

Eli Sletten

Wild bergamot grows in prairies and thrives in medium wet to dry soil. Although it can live in the sun-baked grounds of prairie lands, it needs water due to its mediocre ability to sustain water around its roots. Climate change changes the likeliness of soft rain showers and since rain is less common, the delay of it can lead to heavy downpours. When wild bergamot gets too much water it may not survive, so climate change poses a challenge to the species. For example, every degree of weather makes the atmosphere hold 4% more water, so if it were 68 degrees, there'd be 272% of the earth's water in the atmosphere.



JANUARY

SUN	MON	TUE	WED	THU	FRI	SAT
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Red Squirrel
Brisa Bolton-Steiner

Long-eared Owl

Grady Smith

Long-eared owls suffer from climate change because the range in the Midwest and north-east United States is being destroyed. Long-eared owls also suffer because the fish they eat in the winter are leaving due to the cold waters when they require warm waters. Additionally, the intense sun rays from the spring heat waves are too much for newborn birds. In conclusion, long-eared owls suffer from climate change because of their habitat shrinking, their food sources disappearing, and their babies being hurt by intense sunlight and heat.



FEBRUARY

SUN	MON	TUE	WED	THU	FRI	SAT
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Luther Moth
Dot Lipski Cain

Star-Nosed Mole

Leo Scoggins

Star-nosed moles are affected negatively by climate change. Star-nosed moles live in the northern Minnesota wetlands and experience many high-temperature days. That means increased floods, droughts, and severe weather. Before long, these changes will lead to a rise in the amounts of carbon dioxide in the atmosphere, loss of native species, and the number of pests and diseases will increase. In short, as the temperature rises, wetlands will become unlivable for star-nosed moles.



MARCH

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Strawberry Plant
Beatrice Cosgrove

Sparassis Crispa (Fungus)

Maisy Wall

Fungi are negatively affected by climate change; it causes them to be a part of the problem. Current rising temperatures are the cause of elements in fungi mingling throughout the fungal DNA, leading to differences in how the genes are regulated. Thanks to previous warming experiments by Stanford alumna and American ecologist Kathleen Treseder, it is also apparent that temperatures higher than what fungi are used to drive the species to release microbes into the soil, letting out carbon dioxide in the process. Seeing how the rising global temperatures and increasing amounts of carbon in the atmosphere are associated with climate change and things that have a negative relationship with fungi, my evidence proves the connection between climate change and numerous mushrooms.



APRIL

SUN	MON	TUE	WED	THU	FRI	SAT
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Red Raspberry
Cecilia Mason

Showy Lady Slipper

Olivia Trobaugh

Climate change is making the showy lady slipper suffer. The lady slipper relies on wetlands to survive, but with climate change causing more and more droughts, the lady slipper suffers. On top of that, deer affecting the MN ecosystem is not the best for the bulbs of the lady slippers as they look to them as food. With all of these things piling up on top of each other, the already endangered showy lady slipper is being heavily affected by climate change.



MAY

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Black Bear
Joseph Sierra-Zepeda

Bur Oak Tree

Louisa McAlpine

Climate change is positively impacting the bur oak tree population. Bur oak trees grow best in prairies. In the next 50 years, Minnesota's climate is likely to be similar to present-day Missouri's climate and prairies will likely remain intact though our forests are suspected to grow smaller. It will be great for bur oaks because they thrive in prairie areas. So as prairies expand, bur oak species will grow as well.



JUNE

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River Otter
Maggie Jansen

Smoky Shadowdragon (Dragonfly)

Amelia Keenan

Climate change is causing dragonflies to lose their wing pigment, causing reproduction to reduce. Scientists have found that dragonflies in colder climates have more pigmented and darker wing colors than in warmer environments. This is because as their habitat gets warmer, their extra pigment could cause them to overheat and be unable to reproduce. But, brights and more pigmented wings attract more mates and increase reproduction, and without that, reproduction in these areas is decreasing. In all, climate change is causing dragonfly reproduction rates to go down and affecting their areas of habitat negatively.



JULY

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Painted Turtle
Noah Linstad

Yellow Toadflax

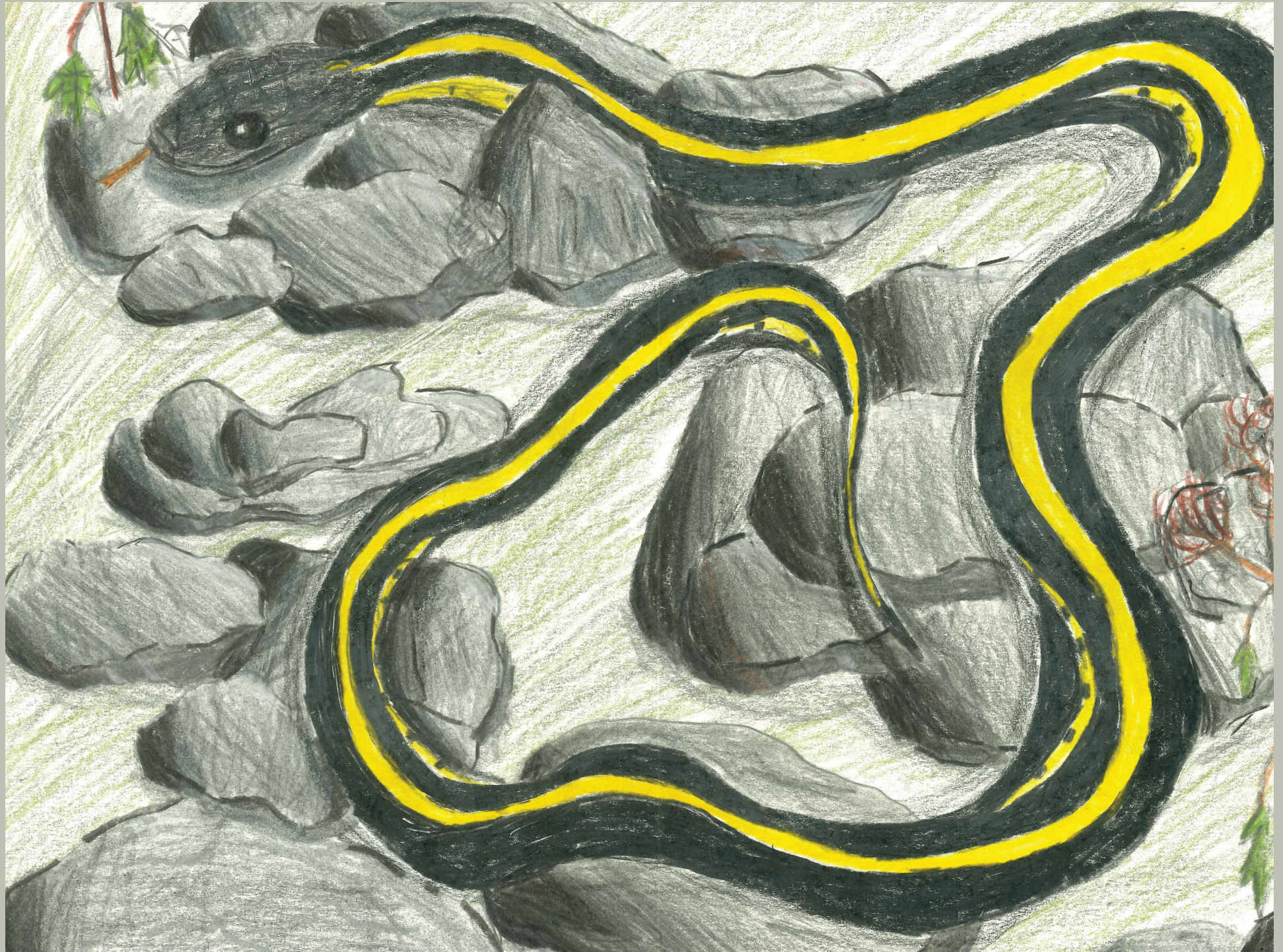
Olivia Smail

Yellow toadflax thrives with climate change. The Yellow toadflax is an invasive species and does well in areas with higher levels of carbon dioxide causing it to grow in size and produce more seeds. Another reason the yellow toadflax will thrive is that Invasive species can adapt quickly. I think the Yellow Toadflax will thrive because it can adapt quickly to change and does well with higher levels of carbon dioxide.



AUGUST

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Garter Snake
Gabe Zupfer

Artist's Conk Mushroom

Jae Lind

The Artist's Conk Mushroom, as well as other fungi, are being positively affected by climate change. The Artist's Conk and other fungi thrive in warmer weather conditions. Since climate change is increasing the heat in Minnesota summers, this is perfect for these mushrooms to thrive.



SEPTEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
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Ginkgo Tree
Abby Horton

Sky Blue Aster

Perie Schluender

Climate change is positively and negatively affecting the sky blue aster. Because a warmer climate makes dryer soil that makes sky blue aster thrive, climate change also delays the onset of fall when sky blue aster blooms. Climate change is making sky blue aster's environment better for it to thrive but is also shortening the window for them to bloom.



OCTOBER

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Blue-Spotted Salamander
Lucas Kivel

Flying Squirrel

Alexander Phoenix

Climate change is making flying squirrels suffer. It causes forest fires which reduce canopy closure and large conifer. Hardwood tree densities, reducing habitat quality and quantity. Forest fires are also decreasing the size and amount of Truffles, which are small ball-shaped mushrooms that grow near tree roots and are the primary food source for flying squirrels. With a decreasing amount of food and habitats, climate change is driving the already small population of flying squirrels to extinction.



NOVEMBER

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Eastern Bluebird
Charley Cheatham

Northern Cardinal

Tait Vossen-Nelson

Climate change is positively impacting northern cardinals in Minnesota. Many bird watchers have reported seeing cardinals farther north, but because of the warming climate, cardinals will be able to move north and stay in Minnesota. They will be gaining range and population because of the warming atmosphere.



DECEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
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22	23	24	25	26	27	28
29	30	31				



Red Fox
Emily Totushek



Timber Wolf
Tip King



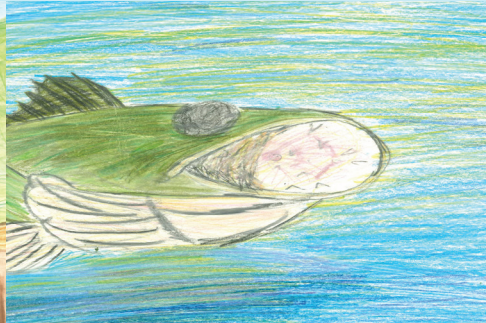
Wolf Spider
Nabella Grijalva



Coyote
Erik Imholte



White Pine Marten
Claire Oberheide



Walleye
Shae Tronnes



Red Winged Black Bird
Charles Homich



Red Oak
Tristan Thames



Bobcat
Peyton Brooks



Red-Tailed Hawk
Samir Keller



Northern Pike
Calvin Hoenisch



Raccoon
Jillian Wieck