

Snowflakes are a Complex and Interesting Subject



Tracks

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By David Markham, Communications Specialist for JCPRD

Snow. It's one of the few redeeming features of winter: seeing the beauty of it and how it transforms the landscape we know into a wintry wonderworld (but forget shoveling or driving in it).

It seems like a simple thing to understand – water vapor freezing in the atmosphere and then falling back to earth as wondrous, clean flakes. But snow and the study of it is actually a complicated topic which quickly gets into areas of mathematics, chemistry, and physics. None of which denies the fact that what makes snow crystals interesting is that they often form in beautifully symmetric and very intricate shapes.

It's Snow History

Snow and snowflakes have been the subjects of scientific inquiry for hundreds of years. The astronomer Johanne Kepler took time away from looking at the sky to write a 1611 essay titled "One the Six-Cornered Snowflake." Also, the philosopher Rene Descartes made observations of snow crystals in Amsterdam, which were published in 1637.

A Jericho, Vermont, farmer named Wilson A. Bentley made significant contributions to the study of snow in 1885 when he combined a microscope with a bellows camera and became the first person to photograph a single snow crystal. From then until the time of his death in 1931, the self-educated Bentley captured more than 6,000 snowflakes on film. In his book *Snow Crystals*, Bentley wrote "every crystal is a masterpiece of design and no one design was ever repeated."

Since then, scientists have come to understand many aspects of snow crystals by growing them in the laboratory under controlled conditions. One discovery they have made is that snow crystals grow in different forms depending on temperature and humidity, with the crystal shape depending mostly on temperature. In addition, it has been found that simpler shapes form at lower humidities and more complex shapes form at higher humidities. Also, the colder the temperature, the sharper the ice crystal tips. At warmer temperatures, ice crystals grow more slowly and smoothly resulting in less-intricate shapes

Scientists still do not fully understand why snow crystals form differently at different temperatures.

Basics of Flakes

A snow crystal is simply a single crystal of ice, and some of these can only be seen through a magnifying glass. Snowflake is a more general term which can mean a single snow crystal, or a few crystals stuck together, or a large group of crystals. Each snowflake is commonly made up of two to 200 separate crystals. Snow crystals usually form around tiny bits of dirt, dust, or bacteria that have been carried into the atmosphere and "dressed up" in ice.

Most snowflakes are less than a half inch across, but large snowflakes can measure two inches across. The largest snowflake on record fell in Bratsk, Siberia, in 1971 and measured eight inches by 12 inches.

Scientists define a crystal by the way molecules line up to form a crystal lattice. The basic form of a snow crystal is a hexagonal (six-sided) prism, in which the oxygen

(Main story continued) atoms in the water align themselves hexagonally (in six-sided configurations).

Five basic types of snow crystals have been identified. Simple six-sided *thin plates* form at cloud temperatures between 32 and 25 degrees Fahrenheit. *Long needles* form at cloud temperatures between 25 and 21 degrees. *Hollow columns* form between 21 and 14 degrees. More complex plates called *stellar plates*, which are star-like crystals with unbroken arms, form at between 14 and 10 degrees. Even more complex forms, called *dendrites*, which are the iconic six-lobed snowflake shape with side branches, form at temperatures between 10 to 3 degrees.

Scientists say it is never too cold to snow and that snow can occur even at incredibly cold temperatures as long as there is some source of moisture and a way of lifting and cooling the air. However, most heavy snowfalls occur when there are relatively warm temperatures of 15 degrees or warmer near the ground. This is because air in this range can hold more water vapor than colder air.

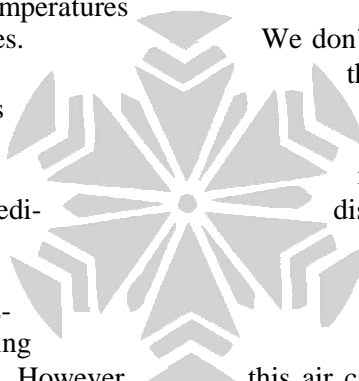
Frozen raindrops are not the same as ice crystals. These are called sleet and form as the water droplets fall. They do not form any of the elaborate patterns found in snow crystals, which form inside clouds when water vapor condenses directly into ice. Another type of winter precipitation is freezing rain, which is liquid water which freezes *after* contacting earth and often causes the dreaded ice storm.

Forecasts are better than they used to be, but snow forecasting remains

one of the most challenging areas of meteorology. One reason is that the heaviest snowfalls often fall in surprisingly narrow bands. Another difficulty is that extremely small temperature differences often define the boundary between rain and snow but make night-and-day differences in snow forecasts.

Snow a Little More

Ever wonder why snow is white? Scientists tell us it is because individual snow crystals are essentially clear. The many ice crystal surfaces in a snowbank efficiently reflect light which scatters the colors of the light we see, giving it a white appearance.



We don't often think of snow this way, but it actually makes a very good insulator. This is because fresh undisturbed snow is composed of a high percentage of air trapped at the molecular level. Because this air can barely move, temperature transfer is greatly reduced. This keeps tender plants which are covered with snow from being exposed to even colder air temperatures.

That extra air also contributes to the crunching sound made when you step on snow. Your step compresses the snow layer and as the snow compresses, the ice grains rub against each other, which creates friction and resistance. The colder the temperature, the greater the friction, and the louder the crunch.

Snow can also drastically change the way sound waves travel. When the ground has a thick layer of fresh, fluffy snow, sound waves are readily absorbed at the surface. This could be one reason people some

times remark about how quiet it is when looking at a snowy landscape. However, when the snow surface becomes smooth and hard as it ages or due to strong winds, it can actually help reflect sound waves and make sounds seem clearer and travel further.

Clean snow is certainly edible, but officials warn that snow in urban areas may contain pollutants. The good news is that these generally occur in such low concentrations that it might not matter. Still, the official recommendation is that snow eating should be restricted to "wilderness" areas.

So let it snow, let it snow, let it snow!

Nature Center News

Invasive Honeysuckle Removal

If you take a walk at Ernie Miller park this winter or spring you will notice a difference in the appearance of the plant life. A major project to remove invasive bush honeysuckle in 36 acres of the park is underway. Most of this will be along Little Cedar Creek. A recent study in the park concluded that of the 116 acres in the park, 35.4 have a dense cover of bush honeysuckle. Meaning that in these areas the cover of honeysuckle is approaching 100 percent. The removal process includes cutting down the honeysuckle plants, applying a chemical to the stems of the plant and burning plant remains. The removal of the honeysuckle will play an important part in the conservation of the park's plant life.

News continued on page 5

Nature Center Programs

For programs requiring preregistration visit www.jcprd.com or call (913) 831-3359 Voice or (913) 831-3342 TDD. Call (913)764-7759 for general program information.

SPECIAL EVENTS

Holidays for the Animals (All Ages)



The holidays are a time of gifts and generosity. Whether you're an individual, family, or a group looking to make a difference, how about contributing a gift to the animals at the Ernie Miller Nature Center? The Nature Center has ongoing needs for supplies for both the animals we keep at the center and the wild animals that come to our feeders. Please look over the following list and consider making a contribution:

Bags of black oil sunflower seed; Bags of white millet or safflower seed (no seed mixes, please); suet cakes; dried seed corn on the cob; bags of LabDiet 5001, rodent food; bags of pine bedding; bags of new clean cypress mulch; small bags of timothy hay; various sizes clear critter keeper boxes from pet stores with snap tops; ferret snacks; bleach, laundry soap, and dryer sheets.

Thanks in advance! Donors who wish to be recognized will have their names listed in the Nature Center's Tracks newsletter and in advertisement in the Spring issue of Activities, so please take time to fill out a card at the Nature Center! Donations will be accepted after Dec. 4. For more information call (913) 764-7759

History: Laura's Legacy, February 10 (Ages 5 & Older and must be accompanied by Parent/Guardian or one adult chaperone per group of 5)



Celebrate the birthday of Laura Ingalls Wilder, early Kansas pioneer. Participants will make a rag doll, experience lessons from 1800's school, and hear music from the time period. Birthday cake will be served as Laura tells favorite stories of her childhood from long ago. Participants are invited to wear pioneer clothing. Reservations are required. For reservations and more information call (913) 764-7759. \$7 (\$8 nonresidents) per person including adults. Paid at site.

FAMILY

Sunday Family Series 2 pm, Sundays, January 7, 14, 21 & 28 and February 4, 11, 18 & 25 (All Ages) Bring the family to Ernie Miller Nature Center on Sunday afternoons this winter for entertainment and educational experiences. Presentations begin at 2 pm and are approximately 45 minutes in length. \$1.75 per person (Ages 2 & under are free) Paid at site. Preregistration not required. See below for descriptions.

Birds of Prey – January 7

By day or night, out of the sky flies a rodent's nightmare, the birds of prey. Join our interpretive staff as they show why rodents fear these great birds. Using live birds, participants will see up close examples of these magnificent raptors and their special adaptations.



Wildlife Who's Who – January 14

This presentation will feature live animals, which reveal the mysteries of the food chain. Children of all ages will enjoy discovering the importance and habits of each animal and its place in nature.

Snakes Alive - January 21

Why is it that these creatures seem so terrifying? Could all the stories you have heard about snakes be true? See Kansas snakes as we explore the facts and fallacies of these legless wonders of the natural world.



Kansas Symbols – January 28

Celebrate Kansas statehood (Jan. 29)! What do the American bison, tiger salamander, and sunflower have in common? They are just a few of the natural symbols of the great State of Kansas. Learn about these and others through an interactive program with hands-on items and live animals.

Prairie Dog Dave - February 4

Venture back to the 1860's when Kansas was a frontier. Meet Prairie Dog Dave, a rather strange character, and

hear his tall tales of life on the plains and prairies.

Mother Nature – February 11

What can you do for Mother Earth? Learn about recycling, preventing pollution and protecting wildlife. Meet a relative of an endangered species. Environmental stories will be presented by Mother Nature herself.



Animal Scene Investigations – February 18

Participants will investigate a mock animal's death and solve the mystery. The clues may be strange and unusual. Could this animal's death have been caused by humans, malnutrition, age or sheer accident? Collect the evidence and test problem-solving skills. (Recommended for ages 8-12)

The Good, the Bad, and the Smelly – February 25

Take a different look at some of the not-so-glamorous animals around, spiders, snakes, and skunks. These critters may not be loveable to all, but learn why they are important to our lifestyles and environment. Live snakes and spider will be displayed.

PRESCHOOL

Breakfast With Santa—Saturday, December 9 & 16, 9-11:30 am

(Ages 3-5 with Adult Kids! Bring a parent and have breakfast followed by a visit with Santa. You will enjoy pancakes and juice. Afterwards Santa will explain the winter habits of his animal friends.



He also will help you construct a gift for wildlife. Of course, Santa will have a gift for each child and will listen to your Christmas list. Special Guest: Mr. Claus. \$12 per parent & child (\$13 nonresidents) \$6 each additional person (\$7 nonresidents), Preregistration required. Class codes:

December 9—71-2142-016-01
December 16—71-2142-016-02

Preschool Package: Winter Fun Saturdays, Jan. 20, Feb. 3 & 17, 9:30-11 am (Ages 4-5) Bring your preschooler to Ernie Miller Park this winter and enjoy nature during the chilly season! Your child will have fun while learning about natural and cultural concepts from a park naturalist. Enroll in the package for the whole winter series or choose your favorite one. \$29 (\$32 nonresidents) Preregistration required.

Class code: 71-2142-016-03 (Includes all 3 programs below)

Preschool: Winter Fun 1 - Dinosaur Delight, Saturday, January 20, 9:30-11 am (Ages 4-5)



Have fossil fun! Learn about the giants that roamed the earth a long, long time ago. Compare your footprint to a dinosaur's. Feel a smooth stone found in a dinosaur belly. How did it get there in the first place? Learn about dinosaurs – big and small. Discover and make a new dinosaur to bring home with you. 1-90 min. session - \$11 (\$12 nonresidents)

Class code: 71-2142-016-04

Preschool: Winter Fun 2 – Creepers and Peepers, Saturday, February 3, 9:30 –11 am (Ages 4-5)

Explore the world of reptiles and amphibians as you crawl like a turtle and see how a toad jumps. Live like a salamander and examine snake skin under a magnifying lens. Learn how snakes climb trees and how tadpoles turn into frogs. Make a scaly friend to take home. \$11 (\$12 nonresidents)

Class code: 71-2142-016-05

Preschool: Winter Fun 3 – Color Me Invisible, Saturday, February 17, 9:30-11 am (Ages 4-5)

Find out how some wild critters hide from their enemies, while others stand out in bold colors. Through games, stories and crafts discover the secrets behind butterflies and white-tailed deer. We will meet native Kansas animals and learn about their homes. \$11 (\$12 nonresidents) Class code: 71-2142-016-06

CAMPS

Camp: Amazing Adventures M-F, March 19-23, 9am-4pm (Ages 11-13)

If exploring wild areas, finding long forgotten trails, and learning secrets of

survival appeal to you, then join us for five days of adventure! Participants will need to bring a backpack with sack lunch, water bottle, as well as comfortable all-weather clothing. Amazing Adventure Spring Break Camp will meet every morning at the Ernie Miller Nature Center. Programmed activities will begin at 9 am and conclude at 4 pm. For convenience of working parents supervision will be provided from 7:30 am to 5:30 pm.

Day 1 - We begin our awesome outdoors odyssey with a trip to TimberRidge Adventure Center. Strength, creativity, and teamwork will shine as we make our way through a maze of challenges.

Day 2 - Experience the ups and downs of climbing, belaying, and rappelling at TimberRidge Adventure Center's new climbing tower.

Day 3 - Trim a canoe and paddle away! Canoe to a remote area to picnic and explore. Track animal movement along the water's edge.

Day 4 - We will hike a strenuous section of the Streamway Trail and practice survival skills.

Day 5 - Fishing and camp cooking will finish-off our amazing adventure.

Activities may vary due to the weather conditions. Parents will receive a detailed letter describing camp activities and a medical form which must be completed and brought to camp on Monday morning For more information call (913) 764-8580 ext.26.

Refund policy: All fees non-refundable. Preregistration required.

5 Days - \$125 (\$138 nonresidents)

Class code: 72-2205-015-01

Camp: Spring Break Adventure M-F, March 19-23, 9am-4pm

(Ages 6-10) Take an adventure this spring break at Ernie Miller Nature Center. Meet critters big and small, hike in the fresh spring air, create nature treats with newly found friends, and join



us on a field trip. Weather permitting, try your hand at catching some fish. Activities begin at 9 am and continue until 4 pm and, for the convenience of working parents, supervision will be provided from 7:30 am to 5:30 pm daily. Children should bring a nutritious sack lunch, snacks, and drink. Parents will receive a detailed letter describing camp activities and a medical form which must be completed and brought to camp on Monday morning. Enrollment is

limited to 20 campers. Refund policy: All fees non-refundable. Preregistration required.

5 Days - \$99 (\$109 nonresidents)

Class code: 72-2118-016-01

OUTDOOR ADVENTURES

Cancellation Policy: No refunds within ten business days of trip unless a replacement can be found.

Trip: Squaw Creek Birdwatching

(Ages 18 & Older) March 10, Saturday 8am-3:30pm

Join us for our late winter birdwatching trip to Squaw Creek National Wildlife Refuge. Observe the migration of ducks and geese as they fly north to their breeding grounds. Other wildlife we may observe include white tailed deer, pheasants, and the bald eagle. For lunch we will eat at Camp Rulo in Rulo, NE. We will leave Antioch Park at 8 am and return around 3:30 pm. Van transportation is included. Participants must provide own meal expenses and should bring binoculars. For more information call (913) 831-3360. Instructor: Park Ranger. 1-7 ½ hr. trip - \$31. Preregistration required.

Class code: 72-2109-011-01

For more field trips around the Kansas City area check out Burroughs Audubon Society's **Field Trips** page at <http://www.burroughs.org>

ADULT

Yoga: Yoga in Nature, Thursdays, 6:30-7:30 pm, Jan. 11, 18, 25 & Feb. 1, 8, 15, 22 (Ages 16 & Older)

The beauty of nature nourishes and calms our busy lives. Enjoy Yoga at Ernie Miller Nature Center as you relax and reflect. Energize with the many benefits of Yoga; flexibility, focus, strength and endurance to name a few. Please bring towel and mat. For more information call (913) 764-8580 x 26. Instructor: Molly Postlewait 8-60 min. sessions - \$45 (\$50 nonresidents) Preregistration required.

Class Code: 71-2103-016-01



Mud Pies



Hands-on nature activities for pre-schoolers, By Molly Postlewait

Little Cedar Reader: Children's Literature Corner

Meeting By Rachel Field

As I went home on the old wood road,
With my basket and lesson book,
A deer came out of the tall trees
And down to drink at the brook.

Twilight was all about us,
Twilight and tree on tree;
I looked straight into its great, strange
eyes,
And the deer looked back at me.

Beautiful, brown, and unafraid,
Those eyes returned my stare;
And something with neither sound nor
name
Passed between us there.

Something I shall not forget -
Something still, and shy, and wise -
In the dimness of the woods
From a pair of gold-flecked eyes.

Nature Activity

White tail deer are frequently seen at the nature center. Deer are shy creatures that seem to disappear into the forest as they blend in with the surroundings. A flash of white from the tail may be the only glimpse we get of these elusive creatures. Tracks of deer are common and easy in to point out to your child. Try playing a game of hide and seek while discussing how deer and other animals use camouflage to survive.

Winter is an excellent time to explore the woods. There is more open space with brush and leaves gone. Here are few other animal signs to look for as you take a winter nature walk:

Small holes drilled in dead trees by woodpeckers. Hole or tunnel in the ground. Whose home might it be? Squirrels' nests of leaves high up in the trees. Shells of nuts and acorns eaten by squirrels. Animal scat or droppings. Birds' nests. Feathers of birds. What other animals might be around? Name animals that crawl, animals that jump, and animals that fly. Start your own animal clues list.



Animal Tales Story Time at Ernie Miller Nature Center Wednesdays, 10:30-11:00 am

(Ages 2-6 with adult). Visit the Nature Center for stories, songs, and surprises geared to preschool children. Come listen and learn. Meet a special animal friend every time. All children must be accompanied by a paying adult. **\$1.75 per person including adults. Paid at site.**

1/10 Birds , 1/24 Furry Friends, 2/7 Snow Flakes
2/21 Bears , 3/7 Reptiles, 3/28 Farm Fun

Nature Center News (continued from page 2)

New Birdcages

Two new bird cages are currently being added to the nature center. These cages are being built in our courtyard and will allow two more birds of prey to be displayed at the nature center year round in addition to the barred owl and red tailed hawk. We are not sure what two types of birds of prey will be added, but we would like to have a great-horned owl and perhaps another type of hawk. The project is scheduled to be complete in Spring of 2007.

Volunteer Projects

A big thank you goes out to several groups that worked on special

projects at the nature center this fall. Kansas City Wildlands had a workday for honeysuckle eradication. Olathe South High School did cleaning, honeysuckle eradication and maintenance. Three different boyscout groups did projects: one planted a new butterfly garden which can be viewed from a window inside the nature center, one added a rock border around our existing bird cages and another group is working on replacing our stepping stone trail from the parking lot to the building. Also, the Timberland company came and did work on our trails.

Thank you so much!

WE WANT YOU



TO BE A VOLUNTEER!

- **Meet interesting people!**
- **Help us maintain fascinating creatures!**
- **Lead people through the wilds of Ernie Miller Park!**
- **Learn cool stuff about nature and history!**

Must be at least 18 years old.
Call (913) 764-8580 x 23 or 26 for more information.



ERNIE MILLER NATURE CENTER

909 North Highway 7
Olathe, Kansas 66061

Phone: (913)764-7759

<http://www.erniemiller.com>

Hours

Winter Hours

Monday—Saturday 9 am to 4:30 pm
Sunday 12:30 pm to 4:30 pm
(closed from 12-1 pm for lunch)

Winter hrs. run from Nov. 1 to Mar. 31

Park trails open dawn to dusk daily.



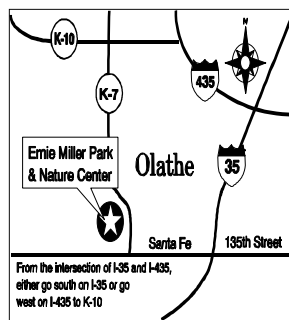
Nature

Center

Staff

Andrée Ables.....Secretary
Leon Gordon.....Park Supervisor
Bill McGowan.....Outdoor Education
Manager
Molly Postlewait...Snr. Park Naturalist
Andrea Johnson... Park Naturalist and
Tracks Editor

Johnson County Park and Recreation District does not discriminate on the basis of race, color, national origin, sex, religion, age and handicapped status in employment of the provision of programs and services.



Ernie Miller Nature Center
909 North Highway 7
Olathe, Kansas 66061
(1 mile north of 135th Street)

Nature's Corner Gift Shop at the Ernie Miller Nature Center

Looking for something
naturally unique?

Edible bug treats ❖ Books ❖ Jewelry
❖ Polished Rocks ❖ Bird Feeders

New items in stock
Plush Audubon birds with real bird
calls ❖



Discover/Mastercard/Visa accepted

Ernie Miller Nature Park