

# On T.R.A.C.K.S.

Teaching Resource Activities and Conservation to Kansas Students



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## Animal Look Alikes



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Animal look alike can be confusing. Of course, that may be the point if you are trying to resemble a bad tasting animal or a venomous one! This issue of On TRACKS is devoted to those animals, and a few plants, that may confuse us. We will look at turtles and tortoises, monarchs and viceroys, skinks and salamanders, snakes and glass lizards, and many more.

# Monarch vs. Viceroy

The **Viceroy Butterfly** (*Limenitis archippus*) has a black line across the hindwing and a single row of white dots in the black band on the edges of their wings.



The **Monarch Butterfly** (*Danaus plexippus*) is bright orange with wide black borders and black veins; both sexes have two rows of white spots on borders and the top of wings.



No doubt, the most famous two butterfly look alike in Kansas are the **Monarch** and **Viceroy**. Until recently, it was always believed that the Viceroy butterfly was a mimic of the Monarch. It gained protection from predators by looking like the bad-tasting Monarch. Monarch caterpillars eat only milkweed and store up a product (glycosides) in their bodies from the milky sap giving them a bitter taste. Birds and other vertebrate predators can become sick from eating the Monarch and quickly learn to avoid orange and black butterflies. Scientists reasoned that the Viceroy did not taste bad since it didn't eat milkweed and gained protection from predators by mimicking the Monarch. This type of mimicry is known as **Batesian** mimicry (where the mimic resembles the successful species but does not share the trait that discourages predation) and the Monarch/Viceroy pair used to be labeled as the classic example of this.

Times have changed, however, and science is always adding new information to its body of knowledge. Now it is known that Viceroy butterflies taste just as bad, or maybe worse, than Monarchs. So, who is the mimic now? Viceroy caterpillars feed on trees in the willow family (Salicaceae) and collect salicylic acid in their bodies from the leaves of willow trees. Salicylic acid is extremely bitter and upsets the stomachs of birds or other predators.

The Monarch and Viceroy butterflies are actually examples of **Mullerian** mimics. Mullerian mimicry results when the mimic resembles the successful species and shares the anti-predation attribute (such as tasting bad). After all, their bright orange and black coloration is really a warning and an advertisement for, "Do not eat me! I taste bad."



The **Coral Snake** (*Micruroides euryxanthus*) is **NOT** found in Kansas but can be found in the southeastern United States. Though highly venomous, this snake is a secretive, burrowing animal. The red bands are bordered by yellow so the ditty, “**Red on yellow, kill a fellow**” applies.

## Milk Snake vs. Coral Snake

The **Milk Snake** (*Lampropeltis triangulum*) is found throughout Kansas. It is actually a member of the kingsnake family and preys on smaller snakes, lizards, and small rodents. The red bands are bordered by black so the ditty, “**Red on black, venom lack**” holds true

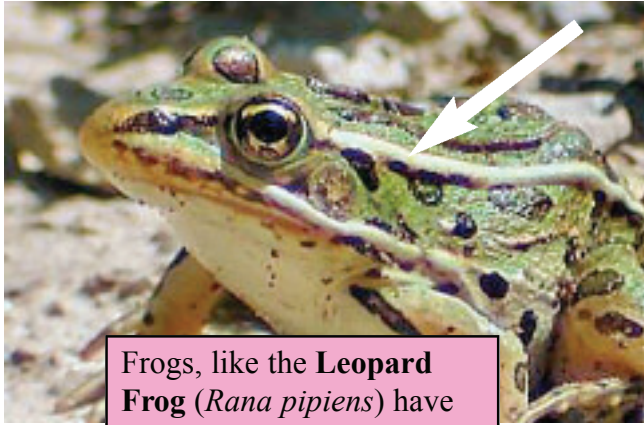


**R**emember **Batesian** mimicry from the last page-- where the mimic resembles the successful species but does not share the trait that discourages predation? This is the kind of mimicry that best describes the resemblance between the venomous coral snake (*Micruroides euryxanthus*) and the non-venomous milk snake (or scarlet king snake) (*Lampropeltis triangulum*). Both snakes are red in color with alternating bands of yellow (or white) and black. The difference lies in the order of the bands around the body. The coral snake has red bands next to yellow bands followed by black bands. Remember the ditty, “**Red on yellow, kill a fellow.**” The milk snake has red bands touching black bands followed by yellow or white bands. Here the ditty, “**Red on black, venom lack.**” applies.

So, if there are two species that look like each other, how can you determine if it is really a mimic? Researchers David and Karen Pfennig and William Horcombe set out to answer this question. They reasoned that if a species (milk snake) is really a mimic of another species (coral snake) then if you put the mimic in a habitat where the model (coral snake) doesn't exist, the defense should break down. In other words, attacks should be more frequent on the milk snake in areas where coral snakes **DO NOT** exist since predators are not aware that the alternating bands of black, yellow, and red spell danger. The researchers created 1,200 life-size models of coral and milk snakes out of plasticine and placed the copies in the wild, both within the coral snake's natural range in the southeastern United States and north of that range in central North Carolina, where they are absent. Their results indicated that various predators readily attacked the fake milk snake but only where no coral snakes lived. This team also conducted comparable experiments in Arizona with the same results. (Nature, Vol 410, no. 6826, pg 323).



# Frog vs. Toad



Frogs, like the **Leopard Frog** (*Rana pipiens*) have smooth skin and a pair of “folds” or ridges that run parallel down the back



The **American Toad** (*Bufo americanus*) has two large “kidney-shaped” parotid glands behind the eye plus “wart-like” bumps all along the skin.

**H**ow can you tell the difference between a frog and a toad? The common answer is that a frog has smooth, moist skin and a toad has warty, dry skin, but this isn't the complete answer. Both animals are amphibians and lay their eggs in water. The young hatch as tadpoles then metamorphosize into an adult that can leave the water and live on land.

Both frogs and toads are **anurans** which means “lacking a tail”. All have four legs. The hind legs, each with five toes and webbing, are longer and stronger than the forelegs, each with four toes. All anurans also possess well-developed, lidded eyes.

True toads (family Bufonidae) have a dry skin with the exception of the Colorado River Toad (*Bufo alvarius*) whose skin is moist to the touch. **ALL** true toads possess a kidney-shaped parotid gland on each side of the neck. These glands along with other wartlike bumps on the skin produce a poison that leaves a bad taste in the mouth of would-be predators. And, toads don't give warts to those who touch them! Most true toads also have cranial crests--a bony ridge on the head behind the eyes.

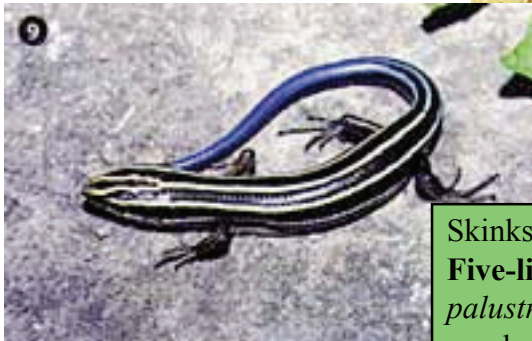
Most species of true frogs (family Ranidae) have a smooth skin and a pair of folds or ridges that run parallel down the back. Frog legs are typically longer than toad counterparts as frogs are better jumpers than toads which prefer to burrow.



# Skink vs. Salamander



The **Tiger Salamander** (*Ambystoma tigrinum*) has smooth, moist skin protected by a layer of mucus. As a result, a salamander is slimy to the touch.



Skinks, like this juvenile **Five-lined Skink** (*Eumeces palustris*) have scales and are dry to the touch.

**B**oth skinks and salamanders have four limbs of equal size and a long tail so at first glance, they may appear to be similar. Upon closer examination, it is easy to tell the difference.

A skink is a kind of lizard and therefore a reptile. Reptiles have scales on their body which are dry when touched. Kansas skinks are usually very secretive and spend most of the day hidden under rocks or debris. Skinks are interesting because, in most species, their tails can break off when grabbed and a new tail will grow back over time. In fact, young skinks usually have bright blue tails that readily break off; the bright, actively wriggling broken tail is thought to attract predators, allowing the tail-less but unharmed skink to escape.

A salamander is a kind of amphibian that has a smooth, moist skin when touched. Salamanders are also secretive and live under rocks and logs in moist environments and/or caves. A salamander does not have any claws on its toes nor scales on its body but skinks do.

Does the fact that both skink and salamander start with the letter “S” add to the confusion?



# Slender Glass Lizard vs. Snake



The **Slender Glass Lizard** (*Ophisaurus attenuatus*) is not a snake even though it has no legs. Glass lizards have eyelids and ear openings unlike snakes.



The **Common Garter Snake** (*Thamnophis sirtalis*) is a typical snake found in a wide variety of habitats in Kansas, including margins of ponds, woodlands and woodland edges and cultivated fields. Notice the absence of an ear opening.

**W**hat reptile looks like a snake but is not a snake? The answer is a slender glass lizard! You must look closely to tell this lizard is not a snake.

The **slender glass lizard** (*Ophisaurus attenuatus*) is a type of legless lizard and the largest lizard in Kansas. It lives in tallgrass prairie, sand prairie, open woodlots, and woodland edges, often times near ponds or streams. To tell this lizard is not a snake, look at its ear openings and eyelids that close. Snake do **NOT** have eyelids or ear openings.

This lizard has a very long tail-- almost two-thirds of its entire length is tail. It has the name “glass lizard” because this wonderful tail is very fragile and may break into many pieces when grabbed. Each wiggling piece of tail helps to distract a predator long enough for the lizard to escape. The glass lizard can grow a new tail but a new tail will never be as long as the original.



# Box Turtle vs. Tortoise



The **Ornate Box Turtle** (*Terrapene ornata*) is found throughout Kansas. The bottom shell is hinged to allow the turtle to close the shell completely



Tortoises are not found in Kansas but their shells have well-developed scutes raised prominently from the shell. Their hind feet are stumplike and their front feet are scraper-like.

**A**ll turtles have shells--an upper (carapace) and lower (plastron) shell connected at the sides by a bridge. The upper shell is made up of about 50 bones and the lower shell usually contains nine bones. Both shells are covered by a layer of skin containing nerves and blood vessels and large scales called scutes (or laminae) cover this skin. Both box turtles and tortoises are land dwelling turtles that have dome-shaped shells but there are several differences that separate the two.

The shell of the **ornate box turtle** (*Terrapene ornata*) is hinged, allowing the turtle to close the shell completely. The head and legs can be withdrawn into the shell before closing which provides the box turtle with the most protection. The plastron and carapace of the ornate box turtle always has radiating yellow or orange-yellow lines. Ornate box turtles are found on open prairies, fields, and pastures as well as open woodlands all across Kansas.

**Tortoises** have stumplike or elephantine hind feet and scraperlike forefeet. The bridge between the upper and lower shells is broad. The scutes on the upper shell are well-developed, raising prominently from the shell. The shell is dark brown and, in the young, each scute on the carapace may have a light center. Growth rings are easily seen on most of the scutes. Tortoises live in areas where the soil is sandy and it may dig extensive burrows for protection and nesting. There are no tortoises found in Kansas.



## Honey Bee vs. Wasp



The first segment of the abdomen in wasps is reduced to a slender waist.

Honey bees and wasps both share the vivid black and yellow bands on the abdomen. They are Mullerian mimics where each shares the same defense (stinger) and the same color pattern (black and yellow stripes).



Bees have feather-like hairs on the back between the wings.

So much of why animals look alike can be explained by mimicry. Why and how mimicry develops has to do with **aposematism** (*apo* means away and *sema* means warning). Aposematism is a means of natural defense. An organism uses a bright color, loud sound or some other method to warn potential predators away. This line of defense is secondary to the animal's primary defense whether that is the animal tastes bad, has a stinger, or is venomous. Aposematism is the opposite of camouflage and when applied to coloration, aposematism can be thought of as "warning coloration."

How does aposematism create mimicry? Predators learn through experience that a particular color pattern, say black and yellow bands, means a painful stinging sensation and they avoid any similar colored animals. We can predict that black and yellow striped animals live longer and therefore produce offspring. Now, there is a higher percentage of black and yellow striped animals in the population because they have produced young and their young are similar in color. Any other similarly colored organism will be avoided by the predator and they will live longer and reproduce also. The most protection is gained when all individuals have the same signal such as black and yellow bands. The number of individuals sacrificed in educating predators is spread out over all the species sharing the same warning pattern so the more animals that share this coloration, the better off they will all be.







## Ash Borer vs. Wasp



The **Ash Borer** (*Podosesia syringae*) is often overlooked because of its resemblance to the **Paper Wasps** (*Polistes sp.*). It is actually a type of moth that is a pest of ash, lilac, and privet. This type of mimicry is Batesian mimicry because only the wasp has the stinger.



## Drone Fly vs. Honey Bee



The **Drone Fly** (*Eristalis tenax*) is a honey bee mimic and belongs to the family of Flower Flies (Syrphidae). This is one of the largest families of flies and a popular one of collectors. This fly differs from a honey bee in that it only has 2 wings instead of 4. This is another example of Batesian mimicry.



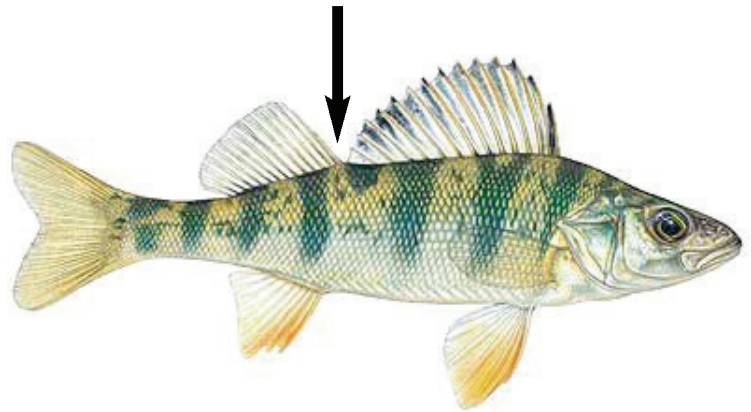
## Bumble Bee vs. Honey Bee



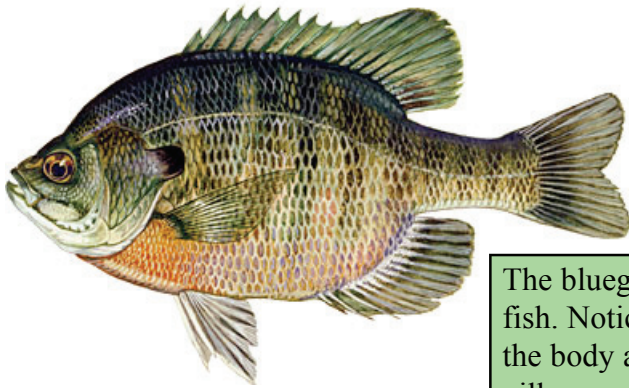
Bumble bees are big (3/4"), stout-bodied bees that live in colonies just like honey bees. Bumble bee nests are small compared to those of honey bees and they only use their nest for a year before moving on.



## Perch vs. Sunfish



Perch are torpedo-shaped fish with two dorsal fins completely separated near the middle of the back.



The bluegill pictured here is a type of sunfish. Notice the "pan" or round shape of the body and the "ear flap" covering the gills.

The confusion between perch and bluegill, or any other member of the sunfish family (Centrarchidae), really stems from an incorrect usage of the term "perch."

A **perch** is any member of the perch family (Percidae). These are torpedo-shaped fish with two dorsal fins completely separated near the middle of the back. The scales of perches are rather small and rough to the touch, unlike those of sunfishes that are slightly rough. No perches have a dark "ear" spot on the gill cover and none of them are strongly flattened from side to side as are the sunfish. The perch family in Kansas consists of wall-eye, sauger, yellow perch and 17 smaller kinds of perch known as "darters".

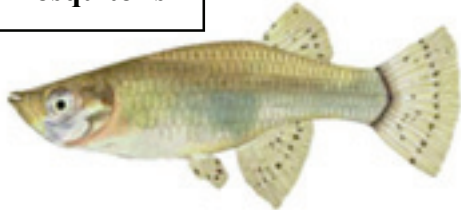
Twelve kinds of **sunfish** live in Kansas and they are divided into three groups: black basses (largemouth, smallmouth, and spotted basses), crappies (black and white crappie), and sunfishes. The sunfishes are small, compact, and often colorful with a dark spot on the "ear flap" or gill covering. They include bluegill, green sunfish, redear, warmouth, rockbass, orangespotted, and longear sunfish.

According to *Fishes of Kansas* by Frank Cross and Joe Collins, the use of the name "perch" to describe a sunfish probably goes back to the early European settlers. True perch are common in Europe but on arriving in America, settlers found very few perch. Instead, they found an unfamiliar fish that needed a name. "Perch" was probably convenient and came into common usage before anyone realized the name "sunfish" was more appropriate.

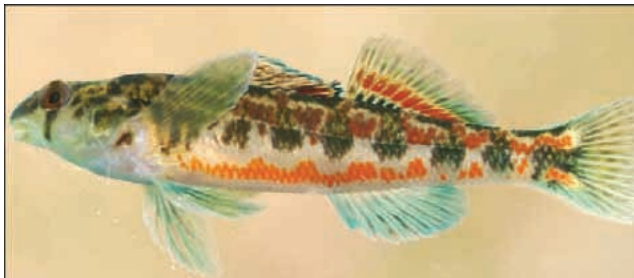


# Minnow vs. Darter

Mosquitofish



The **Common Carp** is a minnow that grows to be over three feet long! Not all small fish are minnows and not all minnows are small!



Darter

**O**ur tendency is to call any small fish a minnow but this is incorrect. Believe it or not, there really is a minnow family of fish (Cyprinidae). It is the largest family of fish in Kansas and more than a third of all the different kinds of fish in Kansas are minnows!

Not all minnows are small. Fish are placed in this family based on characteristics that the members share. Many of these characteristics are internal and not obvious to the naked eye. These include “teeth” in the throat behind the gills and specialized bones in the spine.

Size, however, is not one of those characteristics. A carp is a minnow and it grows to be over three feet. Goldfish are also minnows. A minnow remains a minnow no matter how large it grows.

Darters are just one type of small fish found in streams that people commonly call “minnows.” A darter is a type of small perch. They have colorful names such as logperch, johnny darter, orangethroat darter, and greenside darter to name a few. Other fish mistakenly called minnows can be plains killifish, brook silversides, blackstripe topminnows, and mosquitofish.



# Clam vs. Mussel



Fatmucket Mussel

Clam



Is there a difference between a clam and a mussel? Well, not really! Both clams and mussels belong to the super group (Phylum) Mollusca and the class Bivalvia which is the group enclosed by two rigid shells. Mussels, clams, and oysters are all bivalves. The bivalves are the second largest class of mollusks, with perhaps 20,000 species. They live in both fresh and saltwater. Some creep on the bottom, others attach to solid objects, and many burrow in sand or mud. Because they are filter feeders (removing organic matter suspended in the water), they are important filters of water. As such, they can also be early indicators of pollution in systems when large numbers disappear.

A common distinction between a mussel and a clam for those of us who live in Kansas, is that a mussel (genus *Anodonta* and *Unio*) lives in freshwater and a clam lives in saltwater. So, if you are walking along a river or lake in Kansas and find some empty shells along the shoreline, think mussel!



# Slime Molds vs. Fungi



Slime molds are really weird organisms and not truly a mold! Neither plant nor animal, they are peculiar members of the **Protist** kingdom! Bizarre as it may seem, they can literally travel across the ground.



Fungi are members of a separate kingdom. Mushrooms, molds, and yeast are types of fungi. Fungi do not make their own food as green plants do.

**W**hat is a slime mold? Is it a creature from a bad science fiction movie? A slime mold is a primitive microorganism that can actually flow or move across plants or soil. It can form a mass of protoplasm up to several inches in diameter and may be rather spectacular in color-- white, purple, orange or brown. They live on wood or other decaying vegetation in damp places on land.

When mature, the spore masses become powdery and break apart easily when knocked around by rain or foot traffic. The spores survive in soil or organic debris, waiting to germinate during the next spell of warm, wet weather.

So is a slime mold plant or animal? It definitely sounds like a plant if it produces spores that must wait to germinate. On the other hand, it sounds like a primitive animal if it moves across soil. What is a slime mold? The answer is they are peculiar **protists**. A protist is a diverse group of organisms that are neither plant nor animal but are given status as one of the five kingdoms of living organisms.

The slime molds should not be confused with true molds, which are actually fungi. A **fungi** is a member of another kingdom of living things. Yeasts, molds, and mushrooms are examples of fungi. Fungi are heterotrophic (consumers) and digest their food externally, absorbing nutrient molecules into their cells.



# Moss vs. Lichen



Moss



Lichen

**W**hat grows on the north side of a tree? Is it a moss or is it a lichen (pronounced *liken*)? Aren't they the same thing? No, these two organisms are very different!

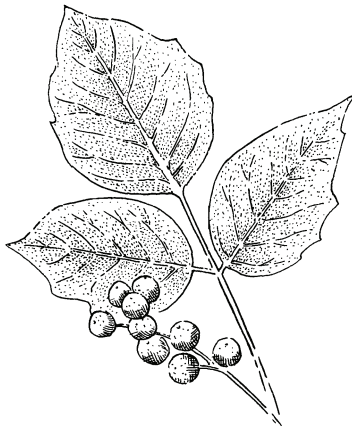
Mosses are small, soft plants that are usually less than 4 inches tall. They do not have roots, but instead have a rhizome. They do not need a substrate to grow, but absorb water and nutrients from the atmosphere. Moss relies on living in dense mats to obtain enough water and nutrients. They do not have flowers or seeds but at certain times they produce spore capsules held up on thin stalks. Most importantly, they are green plants that utilize photosynthesis to make their own food.

Lichens are actually a combination of a fungus with an algae or some partner that can photosynthesize. Usually, the partner is either green algae or blue-green algae (cyanobacteria). The green algae is needed to produce food from sunlight for the lichen since fungi do not contain chlorophyll. The fungus part of the lichen provides the algae with water and minerals that the fungi absorbs from whatever the lichen is growing on. Lichens take the shape of the fungus since the fungus most commonly forms the lichens bulk.

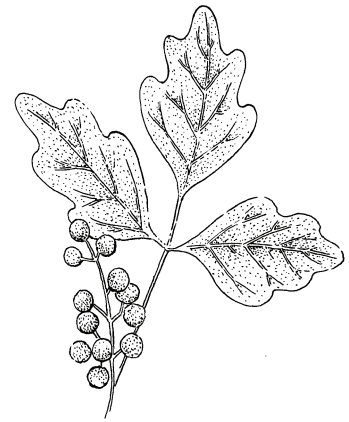
By the way, moss really does grow on the north side of a tree! Moss requires a cool, moist environment. In our hemisphere, the sun shines predominately on the south-facing sides of trees. This means that the south sides are warmer and drier and the north sides are cooler and moister. Where areas are moist all the time like bogs and deep inside forests, you can see moss growing on all sides of a tree.



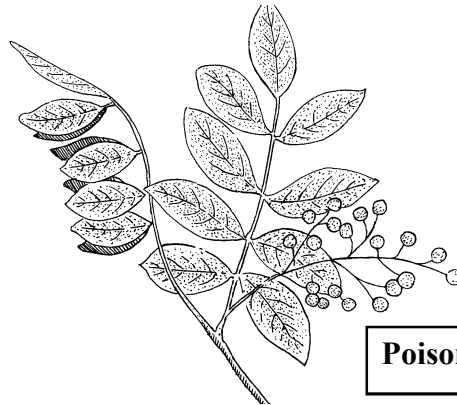
**Poison Ivy  
vs.  
Poison Oak  
vs.  
Poison Sumac**



**Poison Ivy**



**Poison Oak**



**Poison Sumac**

**H**ave you ever developed a case of poison ivy? Has anyone ever told you to watch out for the poison oak or poison sumac? In Kansas, poison ivy is the **only** one of the three present so don't worry about poison sumac (*Rhus vernix*) or poison oak (*Rhus diversilobum*)!

Poison ivy (*Rhus radicans*) should be well-known by anyone who lives in Kansas! It grows in a variety of habitats and it takes many different forms. It may climb to 60 feet as a vine; it may be a shrub up to 1 foot tall with no branches or a thicket of shrubs over 3 feet tall with many branches or it may be a low growing plant fond of field edges and stream borders. In all of its various forms, be aware of the saying, "**Leaves of three, let it be!**" Contact with any part of the plant may cause a severe irritation to the skin.

The reaction is caused by the oil urushoil found in the plant. Only about 10-25% of the population never reacts to urushoil. It is the oil urushoil bonded to proteins in the skin cells that causes such a fierce reaction by the body's immune system. It usually starts 1-2 days after contact as a red area or an area of tiny scattered blisters. As it spreads, the itching is at its worst and it may last up to five days. Then the reaction will die down and in a few days, the skin should return to normal. Washing the oil off with a good scrubbing, as soon as possible, can help prevent a reaction.

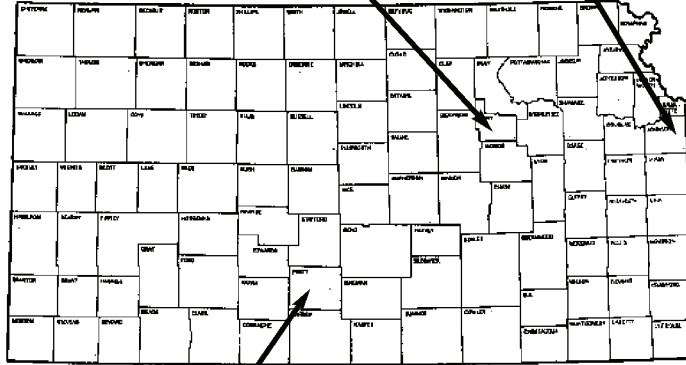


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The purpose of On TRACKS is to disseminate information and educational resources pertaining to the natural, historic, and cultural resources of the prairie, emphasizing Kansas ecology. Information is presented from the perspective of current scientific theory.

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