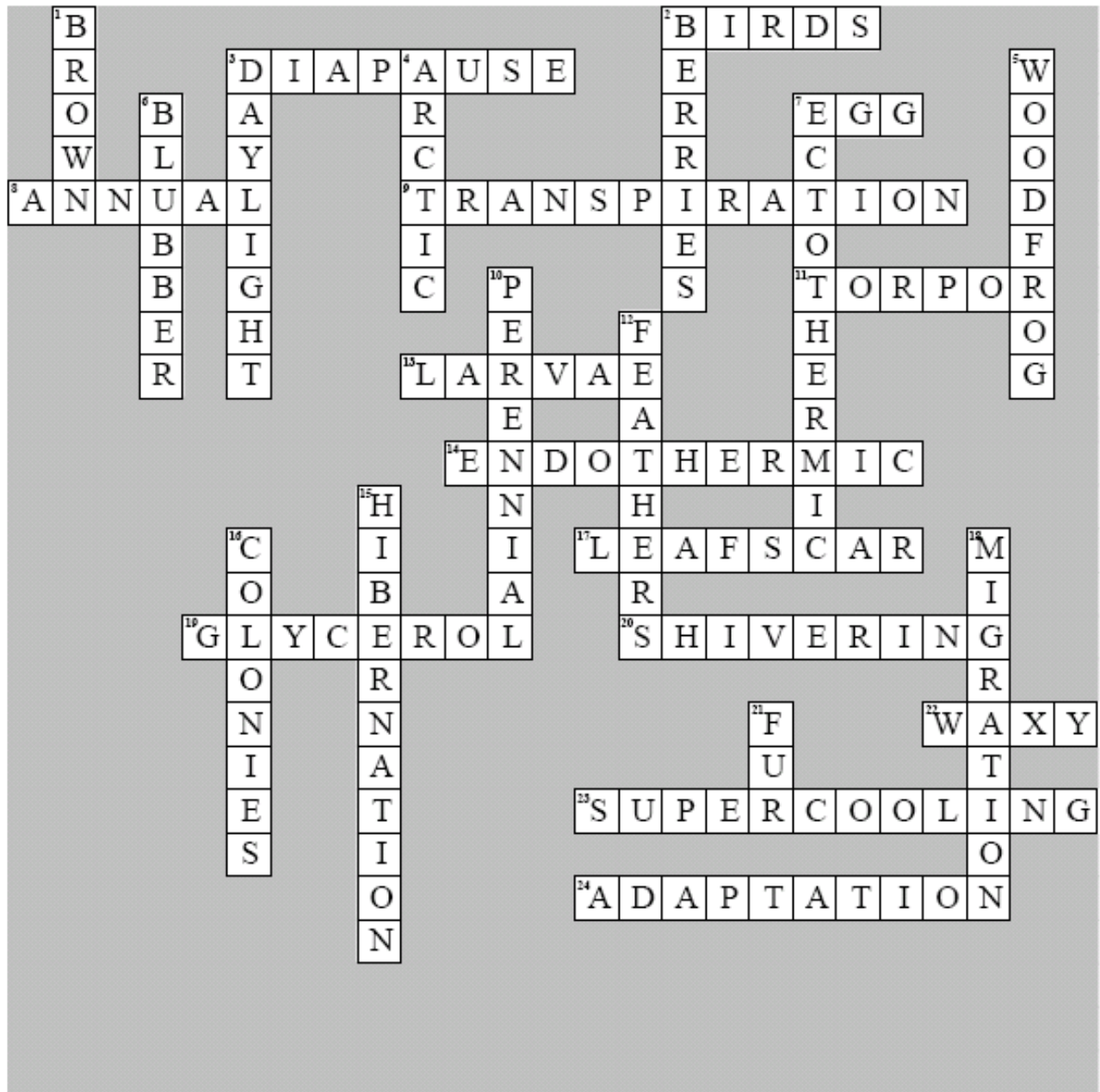


Catawba Lands Conservancy
Winter 2009 Crossword Puzzle
Winter Survival



ACROSS

- 2** **BIRDS** *Some utilize counter-current heat-exchange system, warming cool vein with arterial blood*
The lack of insulation on birds' legs makes them a site of potential heat loss. To minimize such loss, the arteries and veins in the legs of many birds lie in contact with each other and function as a countercurrent heat exchange system to retain heat. Arterial blood leaves the bird's core (trunk) at body temperature, while venous blood in the bird's foot is quite cool. As the cool blood returns toward the core, heat from the warm arteries warms cool veins.
- 3** **DIAPAUSE** *State of dormancy with specific triggering and releasing conditions*
Diapause is a physiological state of dormancy with very specific triggering and releasing conditions. It is used to survive predictable, unfavorable environmental conditions, such as temperature extremes, drought or reduced food availability. Of primary importance is that diapause is induced in an organism by specific stimuli. Once it is initiated, only certain other stimuli are capable of releasing the organism from this state - essential in distinguishing diapause as a different phenomenon from other forms of dormancy such as hibernation.
- 7** **EGG** *Some insects over-winter in this form*
Insects spend the winter in various life stages: egg, nymph, larvae, pupae, or adult. Many overwinter as eggs. Aphid eggs can be found in the bud scales of woody plants. Bagworms hang out as eggs inside this year's bags. Tent caterpillars spend the winter as egg masses on branches.
- 8** **ANNUAL** *Flowers in the summer, dies in the winter*
Annual flowers are those that complete their life cycle in just one growing season. It matures from a seed, grows foliage, flowers, seeds and then the plant dies, all in the same year. Annual flowers tend to bloom from spring until autumn frost.
- 9** **TRANSPIRATION** *Process of losing water through leaves*
Land plants lose water through their leaves by a process called transpiration. Apart from the problem of a shortage of available water during the winter, photosynthesis in the leaves would also be difficult because there are only a few hours of very weak sunlight. Many plants therefore, overcome these problems by 'shutting down' almost completely.
- 11** **TORPOR** *Short-term state of decreased activity, reduced body temperature*
Torpor is a short-term state of decreased physiological activity in an animal, usually characterized by a reduced body temperature and rate of metabolism. Animals that go through torpor include birds and some small mammals such as bats. During the active part of their day, these animals maintain normal body temperature and activity levels, but their body temperature drops during a portion of the day - usually night - to conserve energy. Torpor is often used to help animals survive during periods of colder temperatures, since it allows the organism to save the amount of energy that would normally be used to maintain a high body temperature.
- 13** **LARVAE** *Some insects over-winter in this form*
Some insects overwinter in the larval or immature stage. Turf feeding grubs overwinter deep in the soil as beetle larvae. European corn borers survive as full grown larvae. Others, such as cecropia moths and swallowtail butterflies, overwinter as pupae in cocoons or chrysalis.
- 14** **ENDOTHERMIC** *Generate body heat internally*
In biology, an endothermic animal species is one whose members maintain thermal homeostasis; that is, they keep their body temperature at a roughly constant level, regardless of the ambient temperature. This involves the ability to cool down or produce more body heat. Warm-blooded animals mainly control their body temperature by regulating their metabolic rates.

- 17 LEAF SCAR** *Point of attachment where a deciduous plant drops their leaves*
In their own kind of hibernation, deciduous trees enter a conservation mode during winter. They drop their foliage to prevent water loss through the pores of the leaves. Changes in sunlight and air temperature trigger these plants to produce a layer of scar tissue between their branches and the stems of their leaves. This leaf scar ensures there is no tree flesh open to the cold winter air once a leaf drops to the ground.
- 19 GLYCEROL** *"Antifreeze" in blood of some insects*
Most insects use a form of antifreeze to survive freezing temperatures. As the temperature drops, their cells produce glycerol, which prevents water crystals from forming within the cells.
- 20 SHIVERING** *Reflex to create warmth by expending energy*
Shivering is a bodily function in response to early hypothermia in warm-blooded animals. When the core body temperature drops, the shivering reflex is triggered. Muscle groups around the vital organs begin to shake in small movements in an attempt to create warmth by expending energy.
- 22 WAXY** *Coating on evergreen needles*
Evergreen trees often have narrow, needle-like leaves and a thick waxy coating, and these adaptations help them to conserve water during winter.
- 23 SUPERCOOLING** *Some insects remain motionless, cooling body liquid slowly to prevent crystallization*
Insects that cannot tolerate the formation of ice within their bodily fluids need to implement strategies to depress the temperature at which their bodily fluids will freeze. Supercooling is the process by which water cools below its freezing point without changing phase into a solid, due to the lack of a nucleation source. Water requires a particle such as dust in order to crystallize and if no source of nucleation is introduced, water can cool down to -42°C without freezing.
- 24 ADAPTATION** *Enables organisms to cope with environmental stresses*
Adaptation is the change in living organisms that allow them to live successfully in an environment and cope with environmental stresses and pressures. Adaptations can be structural, behavioral or physiological.

DOWN

- 1 BROWN** *Type of fat that generates heat*
Specialized fat, called brown fat, is produced during the food-rich seasons and expended during cold seasons. This is also the kind of fat that most hibernators use for arousal and many migrators use for fuel. Brown fat has a high concentration of mitochondria which "burns" fuel and releases heat instead of producing ATP. In contrast, white fat is primarily for insulation and storage of triglycerides
- 2 BERRIES** *Plump, juicy portals for seeds, transported by animals*
Brightly colored berries are visually obvious, eaten by animals that transport seeds to more distant locales.
- 3 DAY LIGHT** *One signal to drop leaves*
Leaves start falling in autumn when the days start to get shorter. Actually, the important thing is not that the amount of light has *decreased*; it's that the amount of dark has *increased*.
- 4 ARCTIC** *Coldest place inhabited by land mammals*
It is vital for a mammal, being a 'warm-blooded', vertebrate, to keep warm in order to maintain its body at a constant temperature.. The Arctic is the coldest place inhabited by land mammals and these have very thick fur, which insulates the body by trapping air. They also have a layer of stored fat under the skin which gives additional insulation.

- 5** **WOOD FROG** *Native frog that can partially freeze with no tissue damage*
Sixty-seven percent of the wood frog's body can freeze solid, but not the inside of the cells. As the frog slowly freezes over several hours, he pumps large amounts of glucose anti-freeze into his cells. Gradually he stops breathing, his heart stops, his brain activity ceases but his cells don't freeze. He stays this way for two or three months. Come spring, when the land thaws, so does his body.
- 6** **BLUBBER** *Thermal insulator of marine mammals*
Blubber is the primary location of fat on most marine mammals, and is essential for storing energy. It is particularly important for species which feed and breed in different parts of the ocean. During these periods the species are operating on a fat-based metabolism. Blubber is different from other forms of fat tissue in its extra thickness, which allows it to serve as an efficient thermal insulator, making blubber essential for thermoregulation. Blubber is also richer in blood vessels than other fat tissue.
- 7** **ECTOTHERMIC** *Rely on external sources to provide body heat*
Ectotherms generally obtain heat from their external environment. Their body temperature varies, corresponding at any time with the temperature of their external environment. Invertebrates, fish, amphibians, and reptiles are generally ectothermic.
- 10** **PERENNIAL** *Plant that loses leaves and stems*
A perennial is a plant that lives for more than two years. When used by gardeners or horticulturalists, this term applies specifically to perennial herbaceous plants. Scientifically, woody plants are also perennial in their habit. Perennials, especially small flowering plants, grow and bloom over the spring and summer and then die back every autumn and winter, then return in the spring from their root-stock rather than seeding themselves as an annual plant does.
- 12** **FEATHERS** *Birds use these to trap warm air near body*
Birds have multiple layers of feathers that help them withstand the cold and maintain body temperature. When birds fluff up their feathers in the winter weather, that can double a bird's effective feather quantity, letting their plumage trap an insulating layer of warm air next to their bodies. It is as if you placed a quilt over your body.
- 15** **HIBERNATION** *State of inactivity and metabolic depression*
Hibernation is a state of inactivity and metabolic depression in animals, characterized by lower body temperature, slower breathing, and lower metabolic rate. Hibernating animals conserve energy, especially during winter when food is short, tapping energy reserves, body fat, at a slow rate. Hibernation may last several days or weeks depending on species, ambient temperature, and time of year. The typical winter season for a hibernator is characterized by periods of hibernation interrupted by sporadic times when body temperature is restored to typical levels.
- 16** **COLONIES** *Ladybugs share warmth living in these*
Many insects spend the winter as adults in protected areas such as under loose tree bark and in fallen leaves. Ladybugs overwinter in herds under fallen tree bark or firewood. Asian multicolored lady beetles look for a warm spot in our homes to wait for spring.
- 18** **MIGRATION** *Seasonal movement to a new location*
Migration is seasonal or periodic movement of animals in response to changes in climate or food availability, or to ensure reproduction. Migration most commonly involves movement from one area to another and then back again. This round-trip, or return migration, may be of a seasonal nature, as in the spring and autumn migrations of many birds. Or it may require a lifetime to complete, as in various species of Pacific salmon that are born in freshwater streams, travel to ocean waters, and then return to the stream where they were born to breed before dying.
- 21** **FUR** *Mammals use this to trap warm air next to skin*
Fur insulates the body by trapping warm air next to the skin. During winter months, fur typically grows in more thickly.