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THE DRAGONFLY - A FLYING MARVEL

by Lanny and Marilyn Johnson

"Mom, look at all the dragonflies flying around our pond," Mary called out.

Mrs. Jones and young son Billy joined Mary and spent several minutes watching the dragonflies flying in all different directions. Billy became so excited at their flying antics that he would squeal out, "Awesome" every time a dragonfly would make a new maneuver.

"You're right Billy, dragonflies are amazing creatures," Mrs. Jones said. "You know, Mary, you need to write about something for one of your school lessons, and I think the dragonfly would be a good subject."

A few days later, Mary was ready to read her report to the family: "The Dragonfly – A Flying Marvel, by Mary Jones. Dragonflies are fascinating insects. They come in many different colors including red, green, yellow and blue. Their wingspans range from a mere 7/10 inch (17 – 18 mm) to 6.3 inches (16 cm). Fossil dragonflies have been found with wingspans of 27.6 to 29.5 inches (70 – 75 cm)!¹

"Dragonflies begin their life in water. After the female dragonfly lays her eggs in, or near the water, the eggs hatch into *nymphs* (or *larvae*).

The nymphs will live in the water from two months to five years, depending on the species. During this stage, dragonfly nymphs actively eat mosquito larvae, tadpoles, minnows and other small underwater creatures. When the nymph is ready to change into an adult, it climbs out of the water, waits for its outside (*exoskeleton*) to dry and crack open, and then crawls out as an adult dragonfly (Picture A).²

"The adult dragonfly's body is made of three segments: head, thorax and abdomen. The thorax, which is between the head and the abdomen, carries the wings and legs. The thin, long, flexible abdomen stabilizes the dragonfly in flight and holds the digestive and reproductive systems. Like all insects, dragonflies have six legs, but they aren't the best at walking. When flying, they tuck their legs close to their bodies to minimize wind resistance. Sometimes, in order to catch their prey they will hold their legs out in front of themselves forming a basket. Most of their prey includes other insects, such as gnats and mosquitoes, but dragonflies have been known to eat cicadas, flies, moths, butterflies and even smaller dragonflies.³

"Dragonflies are excellent flyers. Not only are they some of the fastest flying insects in the world, they can move in six directions; forward, backward, upward, downward, and side to side. They can also hover and take off at speeds up to 35 mph (56 km/h).⁴

"Four wings, which can move independently of each other, enable dragonflies to perform incredible maneuvers. By bending and twisting their wings, little whirlwinds are created. This forces the air to move faster over the top of the



wing, creating a difference in pressure. The low pressure above the wing and the higher air pressure underneath it produce lift. This helps the dragonfly because it doesn't have to flap their wings as often. A dragonfly flaps its wings at a rate about 30 beats per second. Bees, on the other hand, do so at a rate of 300 beats per second.^{5,6}

"Igor Sikorsky (1889-1972) got the idea for the development of the helicopter by observing dragonfly wing patterns. He designed the four adjustable blades of the helicopter similar to that of dragonfly wings. However, the flight of a dragonfly is a hundred times more agile than a helicopter, and absolutely silent.^{5,6,7}



"The wings of a dragonfly are thinner than paper and transparent. They are strengthened and braced by many hollow tubes (*veins*) that perform many functions. Not only are these tubes used to carry blood fluid (*haemolymphes*), they serve as data cables of the nervous system, they also supply oxygen and remove carbon dioxide. The wings serve other purposes too, such as aiding in competition for a mate, absorbing warmth from the sun, balancing and providing a sharp defensive system.⁸



"The two large, round compound eyes of the dragonfly are very interesting. Each eye is made up of 30,000 smaller eyes (*ommatidia*) that have six sides and their own tiny lenses. By seeing 200 blinks of light per second, each of these smaller eyes send information to the brain at the same time, giving the dragonfly super-sensitive motion detection. By rotating its head, the dragonfly has nearly 360-degree vision and can



see moving objects up to 132 feet (40 m) away.^{9,10}

“These are just some of the fascinating designs of a dragonfly. Some might say that everything about the dragonfly happened by chance and accident. However, the dragonfly’s marvelous design clearly points to a Creator!”

“Wonderful job, Mary,” Mrs. Jones responded. “I especially like your conclusion. The dragonfly truly is a flying marvel.”

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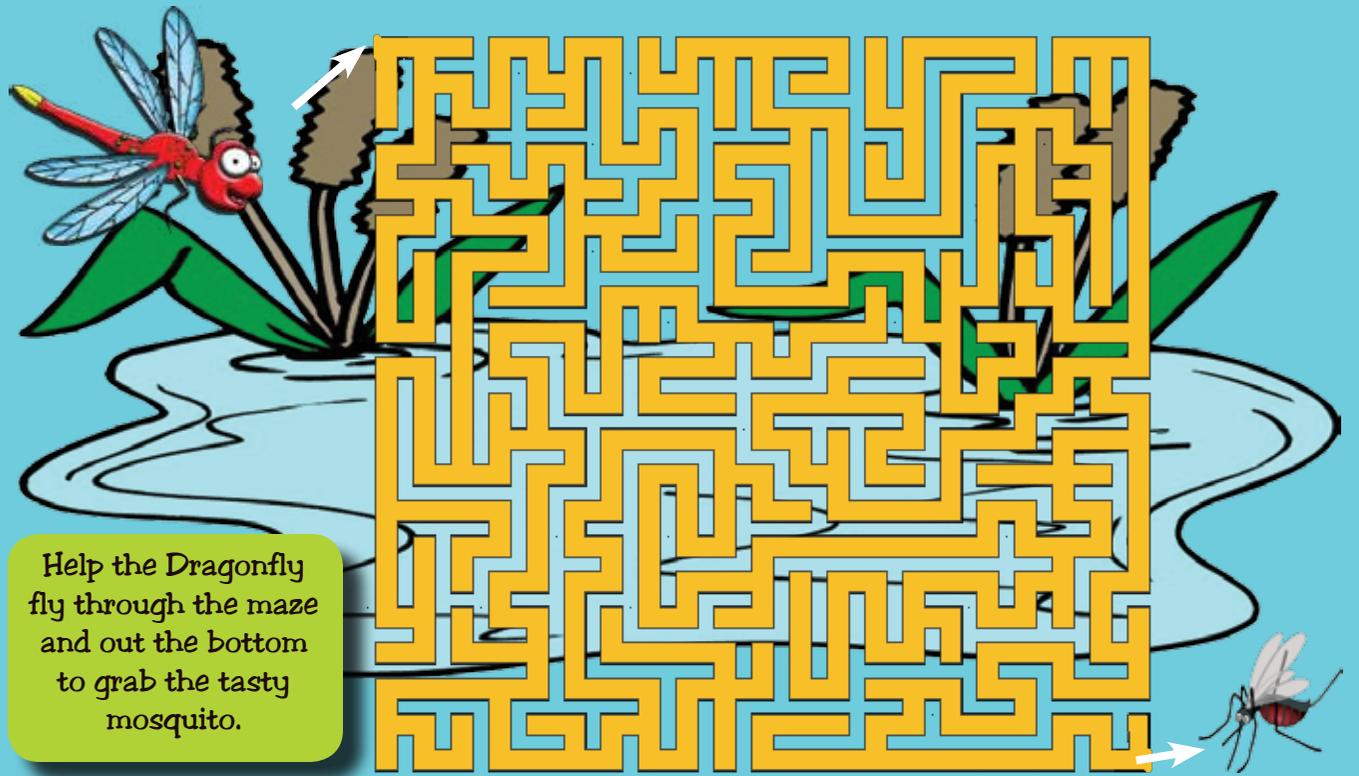
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WORDSEARCH
Look for the words from the **WORD LIST** below. The hidden word might be up, down, sideways or slanted, but not backwards.

Word List
ABDOMEN ADULT
BACKWARD COMPOUND
CREATOR DOWNWARD
DRAGONFLY EYES FLYERS
FORWARD GNATS HEAD
HELICOPTER MARVEL
MOSQUITOES NYMPH SIDE
THORAX UPWARD VEINS
WINGS

C	R	E	A	T	O	R	B	A	C	K	W	A	R	D
Y	X	Q	L	Q	C	W	I	N	G	S	T	S	A	R
R	C	U	Q	H	H	A	M	O	S	N	H	T	Z	Z
T	D	I	Q	S	E	T	V	E	X	E	O	R	B	L
A	T	R	W	N	X	L	O	E	L	G	R	X	M	D
U	P	W	A	R	D	T	I	Q	I	D	A	Y	A	C
E	P	F	K	G	I	E	M	C	R	N	X	P	R	O
B	T	W	I	U	O	A	Y	A	O	O	S	B	V	M
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O	P	S	J	B	J	N	F	K	S	H	T	B	L	O
Y	O	N	D	D	W	Q	T	L	E	N	I	E	Q	U
M	M	A	Y	O	H	U	I	D	Y	V	B	G	R	N
U	E	D	D	M	Y	J	I	F	O	R	W	A	R	D
H	F	L	Y	E	R	S	L	G	N	A	T	S	Y	F
L	U	B	T	N	Y	M	P	H	X	C	Q	B	V	L