Name: _____ Date: _____

The Clever Octopus

Circle group

An octopus has no bones, no shell, and no backbone. Still, it is one of the smartest animals in the ocean. Octopuses can unscrew jar lids and find their way through mazes. They can even tell one person from another.

An octopus's body is not built like ours. It has three hearts. Two of them pump blood through the gills. The third sends blood to the rest of the body. Its blood is blue. That is because it uses a molecule with copper in it to carry oxygen. Our blood uses one with iron. Most amazing are its nerve cells, called neurons. About two out of three are in its eight arms, not its head. So each arm can taste, touch, and make simple choices on its own.

An octopus has no skeleton. So it can squeeze through any hole bigger than its hard beak, which is shaped like a parrot's. A grown octopus can slip through a hole not much bigger than a coin. Some aquariums have found their octopuses out at night, so they shut the lids with care.

An octopus can also hide by changing how it looks. Special cells in its skin can change color in less than a second. Other cells raise bumps and ridges so it looks like rocks or coral. If that fails, it may squirt dark ink to confuse an attacker and jet away.

Yet most octopuses live only one to a few years. No parents teach them. They learn almost all on their own. So scientists wonder how such a smart mind can grow.

Questions

1. How many hearts does an octopus have? What does each one do?

_____

_____

2. Why is an octopus's blood blue?

_____

_____

3. How can an octopus fit through a tiny hole?

_____

_____

4. Where are most of an octopus's neurons, and what can its arms do because of that?

_____

_____

5. What do scientists wonder about in the last paragraph?

_____

_____

Words to know

neuron: a cell that carries messages in the nervous system
skeleton: the bones that support the body

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Clever Octopus

Triangle group

An octopus has no bones, no shell, and no backbone, yet it is one of the most intelligent animals in the ocean. Scientists have watched octopuses unscrew jar lids, find their way through mazes, and recognize individual people.

The octopus has a body plan unlike our own. It has three hearts: two pump blood through the gills, and a third sends blood to the rest of the body. Its blood is blue, because it uses a copper-based molecule to carry oxygen instead of the iron-based one in our blood. Most remarkable of all is its nervous system. About two-thirds of an octopus's neurons are not in its head but in its eight arms, so each arm can taste, touch, and make simple decisions on its own.

Because it has no skeleton, an octopus can squeeze through any opening larger than its hard, parrot-like beak. A full-grown octopus can slip through a hole not much bigger than a coin. Aquariums often have to fasten their tank lids carefully after discovering their octopuses wandering at night.

An octopus also defends itself with disguise. Special cells in its skin can change color in a fraction of a second, and other cells can raise bumps and ridges to match rocks or coral. If disguise fails, an octopus may squirt a cloud of dark ink to confuse an attacker and then jet away.

Despite these talents, most octopuses live only one to a few years. They do not have long childhoods in which parents teach them, so scientists wonder how such complicated thinking can develop in an animal that learns almost entirely on its own.

Questions

1. How many hearts does an octopus have, and what does each do?

_____

_____

2. Why is an octopus's blood blue?

_____

_____

3. How can an octopus squeeze through a very small hole?

_____

4. What is unusual about where an octopus keeps its neurons, and what does that allow?

5. What puzzle do scientists have about the octopus in the final paragraph?

Words to know

intelligent: good at learning, solving problems, and understanding
neuron: a cell that carries messages in the nervous system
skeleton: the bones that support the body
disguise: a way to change how you look so you are not recognized
remarkable: worth noticing because it is unusual or impressive

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Clever Octopus

Square group

Although an octopus possesses no bones, no shell, and no backbone, it is widely regarded as one of the most intelligent creatures inhabiting the ocean. Researchers have watched octopuses unscrewing the lids of jars, navigating their way through laboratory mazes, and even distinguishing among individual human beings.

The octopus's anatomy differs fundamentally from our own. It has three hearts. Two circulate blood through the gills, while a third distributes blood to the remainder of the body. Its blood is blue, because it relies on a copper-based molecule to transport oxygen rather than the iron-based molecule that circulates in human blood. Most extraordinary of all is its nervous system. Approximately two-thirds of an octopus's neurons reside not in its head but in its eight arms, which means that each arm can independently taste, touch, and make elementary decisions.

Lacking a skeleton, an octopus can compress its body to pass through any opening larger than its rigid, parrot-like beak. A full-grown octopus can slip through an aperture scarcely bigger than a coin. Aquariums have frequently learned to secure their tank lids meticulously after discovering their octopuses wandering about at night.

The octopus also defends itself through camouflage. Specialized cells in its skin can alter its coloration in a fraction of a second, and other cells can raise bumps and ridges that imitate the texture of surrounding rocks or coral. Should camouflage fail, an octopus may discharge a cloud of dark ink to disorient an attacker before propelling itself rapidly away.

Despite these remarkable capabilities, most octopuses survive only one to a few years. Because they experience no extended childhood during which parents instruct them, scientists continue to puzzle over how such sophisticated cognition can develop in an animal that learns almost entirely independently.

Questions

1. Describe the octopus's circulatory system, including the function of each heart.

_____

_____

2. What accounts for the blue color of octopus blood?

_____

_____

3. What anatomical feature enables an octopus to pass through remarkably small openings?

_____

_____

4. What is distinctive about the distribution of an octopus's neurons, and what capability does it produce?

_____

_____

5. Explain the scientific puzzle presented in the concluding paragraph.

_____

_____

Words to know

intelligent: good at learning, solving problems, and understanding
neuron: a cell that carries messages in the nervous system
skeleton: the bones that support the body
remarkable: worth noticing because it is unusual or impressive

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: The Clever Octopus

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: The Clever Octopus

Easier · 263 words · Flesch-Kincaid grade 3.7

1. Three. Two pump blood through the gills. The third sends blood to the rest of the body.
2. It uses a molecule with copper in it to carry oxygen. Our blood uses one with iron.
3. It has no skeleton, so it can squeeze through any hole bigger than its hard beak.
4. About two out of three are in its arms, so each arm can taste, touch, and make simple choices on its own.
5. Octopuses live short lives and have no parents to teach them, yet they are very smart. Scientists wonder how that happens.

Triangle: The Clever Octopus

This passage · 275 words · Flesch-Kincaid grade 8.7

1. Three. Two pump blood through the gills and the third sends blood to the rest of the body.
2. It uses a copper-based molecule to carry oxygen, rather than the iron-based molecule in human blood.
3. It has no skeleton, so it can fit through any opening larger than its hard beak.
4. About two-thirds are in the arms, so each arm can taste, touch, and make simple decisions on its own.
5. Octopuses live short lives and have no parents to teach them, yet they can think in complicated ways. Scientists wonder how that intelligence develops.

Square: The Clever Octopus

Harder · 296 words · Flesch-Kincaid grade 12.5

1. It has three hearts. Two circulate blood through the gills, and the third distributes blood to the rest of the body.
2. It transports oxygen with a copper-based molecule instead of the iron-based molecule in human blood.
3. It lacks a skeleton, so it can compress itself through any opening larger than its rigid beak.
4. About two-thirds of its neurons are in its arms rather than its head, so each arm can independently taste, touch, and make simple decisions.
5. Octopuses live only a few years and have no parents to instruct them, yet they show sophisticated thinking. Scientists do not yet know how that intelligence develops.