

The Smart Swarm

Have you ever seen hundreds of ants moving in an orderly line along a sidewalk? How do so many ants find their way to a spill of soda? They have no sergeants, yet they march like trained soldiers, all focused on a single task. Scientists call this ability to work effectively in large groups *swarm intelligence*.

Think about a good sports team. When team members work well as a group, the team has more success than a team that does not work together. Certain animals also have more success when they work in groups. These animals rely on the work of the group to carry out a number of tasks, including finding food and avoiding predators.



Weaver or tailor ants make an ant bridge to get to their feeding grounds.

Trail Building

When an ant goes to forage, or find food, it leaves a faint trail of a chemical called a *pheromone* along its path. The pheromone has a scent or taste that other ants recognize. When other ants follow the path, they also leave a scented trail. Then the path most traveled becomes the path that is paved with the most pheromone. It is the trail that is easiest to follow and it tends to be the best route to the best food, thanks to the work of the group.



Evasive Moves

When a flock of birds or a school of fish darts away from a predator, it is using the skills of the group to keep it safe. If an individual separates from the group, it would be easy prey. But if the group sticks together, the predator has difficulty focusing on an individual to attack. Swarm intelligence works when one member sees a predator and changes direction. Others in the group immediately react and move together to avoid the predator. The action of the group keeps the animals safe.



A school of blue-striped grunt

Learning from Animals

Scientists are looking at ways to apply swarm intelligence to fleets of robots that can choose the best route through a crowded or dangerous area. Business leaders are using swarm intelligence to determine the best delivery routes. Their truck drivers don't leave a trail of chemicals along the road, but they do share the information about the routes with other drivers, and together they choose the best route. The next time you find yourself in a moving crowd, watch how the group chooses the best route. You might find that people are a bit more like ants than you realized.



Flocks of the red-billed quelea, an African bird, often number in the hundreds of thousands.