



How does Ants Inspire me?

- Ants are social insects that have been living on Earth for many centuries.
- They are found everywhere predominantly in Europe, USA, Far East and South East Asia.
- It has been estimated that there are *ca.* 11,880 species of ants! Many species remain undescribed.



(Fuminori, 2020; Animal Corner, 2020)

We as humans can learn a lot from how animals interact and work together to apply the same way when interacting with other people and animals too.

Objectives

To review the key facts about ants.

To analyse the anatomy and physiology of the ant.

To discuss key characteristics that humans can learn from ants

Summary

Key facts about Ants

- **SCIENTIFIC NAME:** *Formicidae*
- **TYPE:** Invertebrates **DIET:** Omnivore
- **SIZE:** 0.08 to 1 inches/ 2 – 25 mm
- **WEIGHT:** The weight of all ants in the colony exceed a human.
- **COLOUR:** Vary in colour, red, black, metallic lustre.
- **HABITAT:**
 - They live in nests (colonies) made of soil and plant matter.
 - The species determine the habitat i.e. underground, plants, trees, woods or ground level. Some species form stable super-colonies.



Types of Ants



Queen Ants

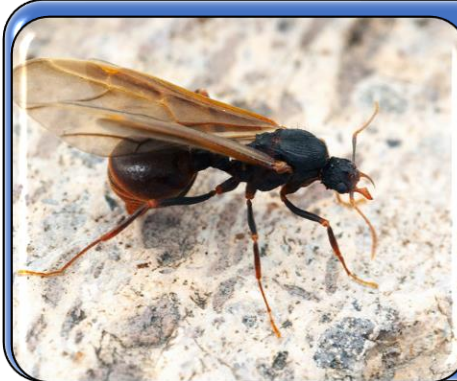
They are the largest ants.

- FEATURES They have wings which break after mating.
- ROLE Reproduce eggs
- LIFE EXPECTANCY 30 years.



Female Ants

- Smaller than the queen.
- FEATURES: No wings Sterile. Produced from fertilized egg.
- LIFE EXPECTANCY: 3 year.
- OCCUPATIONS:
 - - WORKERS – take care of eggs and the queen, build/repair nest, find/store food, clean the nest.
 - - SOLDIERS - protect the colony. Some attack colonies to take eggs to eat or raise as workers

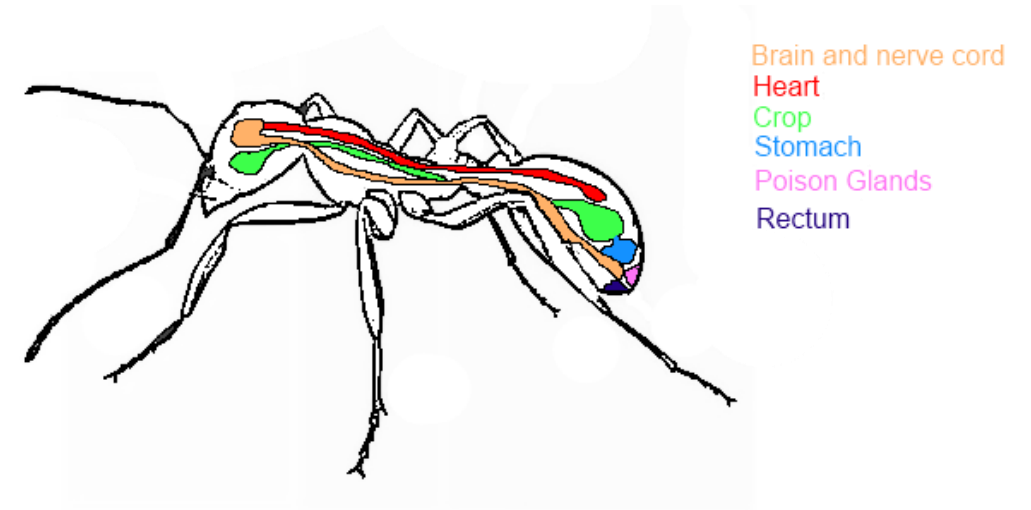
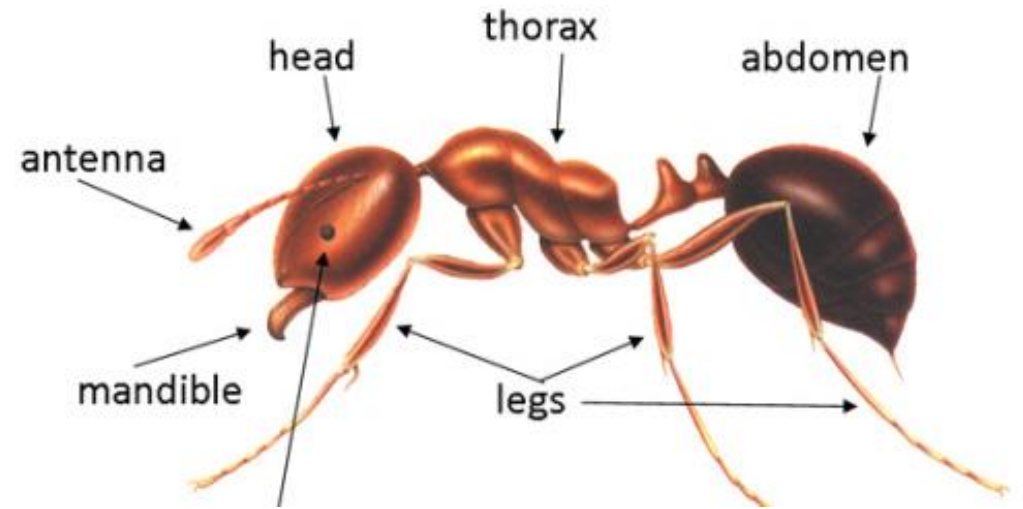


Male Ants

- Smaller than female ants.
- FEATURES: They have wings, fertile to mate with the queen and Longer antennae than females.
- LIFE EXPECTANCY: They leave the colony for one day for mating and usually die 10-14 days later.

Anatomy and Physiology of Ants

- The ant's body is divided into three: HEAD, THORAX and ABDOMEN/GASTER
- **ABDOMEN:** All vital organs and reproductive.
- **EXOSKELETON:** It surrounds the body and is made of a hard, waterproof armour made of chitin.
- **VISION:** It has a large head with two compound eyes. Antennae recognize mates and those who harm.
- **MOVEMENT:** 6 legs each with three joints attached to thorax.
- **FOOD:** They emit pheromones to sense food trails and have strong jaws to grab, cut and eat food. It has a Crop to store food.
- **HEART:** It carries colourless blood from head to the body and back to the head again.
- **POISON GLAND:** It secretes formic acid as disinfectant.
- **SPIRACLES:** It holes around its body to breath.
- **NERVOUS SYSTEM** – It has a long nerve cord from head to rear with branches.



(Japanese Ant Database, 2003; National Geographic, 2020)

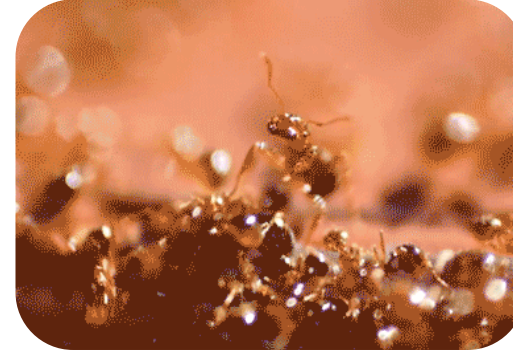
Key Skills Humans can learn from ants



Social



Communication



Team working



Organised



Brave



Goal-orientated



Help others



Hardworking

Social behaviour and communication

- Some ants are **SOCIAL** and live with their families to build nests, find food via pheromones and raise off-springs.
- Colonies regulate searching activity, retain memory and discuss profitable locations for resources.
- Cues: navigate light(sun), visual views, odours, step-counting.

(Animal Corner, 2020; Hollbrook, 2020; National Geographic, 2020)

- Stroeymeyt *et al.* (2018) conducted a study and discovered that when there is a pathogen, the ant's behaviour change and become less interacted with other groups to prevent spores.



Team working

Ants are good team workers who have good relations with one another to get the task done.

Service/Helping others



- **Ants help one another with an aim.**
- **For instance, if a fungal disease broke out throughout the colony. They would:**
 - A) Help by licking to remove as much as possible from one another before fighting it off effectively with their own immune system.**
 - B) Divide into groups - Foragers (old ant workers) interact with other foragers (Jackson and Ratnieks, 2006).**
 - Young workers/nurses contact with other nurses to care for the eggs.**

Brave - Prevent epidemic

- They produce formic acid in its poison gland to:
 - a) Clean themselves before entering their home – **DISINFECTANT**.
 - b) They clean their nests - The poison does not affect the offspring/cocoon (Pull *et al.* 2018).
 - c) Protect themselves from predators.
 - d) Change their behaviour and organization to reduce risk of spreading to the whole colony (Brutsch *et al.* 2017).





Organised

- They divide their time between work and rest.
 - **INACTIVE** in WINTER - hibernate to conserve energy.
 - **ACTIVE** - summer - to gather their food.
 - They operate as a single entity.
 - **QUORUM SENSING** – regulation of gene expression within bacteria.
 - Ants use quorum sensing to make decisions on their feet to estimate the average value of a resource.
- HOW?*
- A new nest is determined by ants accumulating within it. if it is high quality they will stay and leave when it is poor. (Franks *et al.* 2015)



Goal-Orientated and Hardworking

- They have meet their goals by working hard via the input of **TIME** and **ENERGY** to increase chances of **SUCCESS**.
- They know their weaknesses and limitations.
- They take responsibilities they can handle.
- They learn rapidly, work hard with a good memory and highly resistant to extinction. (Piqueret *et al.* 2019).

Summary

- Ants are really inspiring.
- We as humans can learn from their intelligence, positive traits especially how they work as a team.
- Its size is SMALL, but it thinks BIG and works hard to contribute to the society.



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