

STRUCTURAL AND GENERAL APPEARANCE OF A MARTIAN LIVING CREATURE

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Objective:

to find out what the animal will look on the outside (we won't be focusing on the internal components of the alien) for a study done at 9th grade level (we can remove metabolism and homeostasis) and conclude that there are 7 main characteristics of living organisms

7 main characteristics of living organisms:

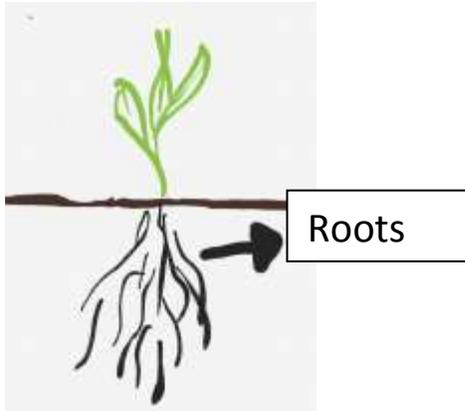
- 1 Movement** - they can move and change their position.
- 2 Reproduction** – they can make more of the same kind of organism as themselves.
- 3 Sensitivity and response to stimuli** – they can detect or sense stimuli and respond to them.
- 4 Growth** - they can permanently increase their size or dry mass by increasing the number or size of their cells.
- 5 Respiration** – they can create chemical reactions that break down nutrient molecules in living cells to release energy.
- 6 Excretion** – they can excrete toxic materials, waste products of metabolism, and excess substances (note that excretion is not the same as egestion).
- 7 Nutrition** - they can take in and absorb nutrients such as organic substances and mineral ions. These nutrients contain the raw materials or energy needed for growth and tissue repair.

Observations:

Based on Nutrition:

There have been many compounds found on mars but as of now, we haven't seen signs of life. Hence the alien must be autotrophic, like a plant. So the nutrition must be done with raw materials like sunlight, co2 and other compounds like sodium, potassium, chloride and magnesium in the soil. therefore the creature requires:

1. Roots; as they are the most likely method of obtaining nutrients from the soil.



Since roots anchor a plant, the Martian organism won't be able to move, and if the nutrition system is somewhat same as the one in the plants on earth then we will; notice that abundant water is not available on mars for photosynthesis. therefore the energy produced may be relatively lesser. Hence it is best if the Martian organism doesn't move for the most of its life

2. Less movement

Based on Movement:

Based on movement we can take in consideration the physical features of mars:

Its surface is rocky, with canyons, volcanoes, dry lake beds and craters all over it. Mars, like earth, also has seasons, except their seasons are harsher and hence a Martian creature is better off following locomotion movement like animals and unlike the tropic movement of plants, to survive. The alien can be a stationary plant but then when they reproduce, there is not much scattering possible and hence reproduction may be a problem. But the alien also has to absorb nutrients from the soil, so moving about is also a problem. The mode of movement can be very tricky but I still conclude that the alien must have a mode of locomotion but shall not move unless it is necessary.

Mode of locomotion:

Due to the absence of habitable water bodies, the alien shall not have fins and due to the thin atmosphere, the presence of wings on the alien is highly unlikely. Therefore the Martian creature is most likely to move with:

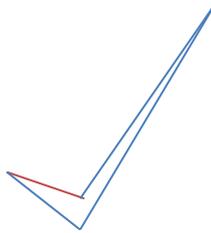
1. limbs: as in legs or hands



2. Or they can match serpentine locomotion and their body type can match that of almost all legless animals, such as some lizards, the caecilians, earthworms, and others.



But, as the energy produced in nutrition may be relatively lesser. Therefore
The method of movement will most likely be walking with limbs and not serpentine locomotion because serpentine locomotion requires more energy.



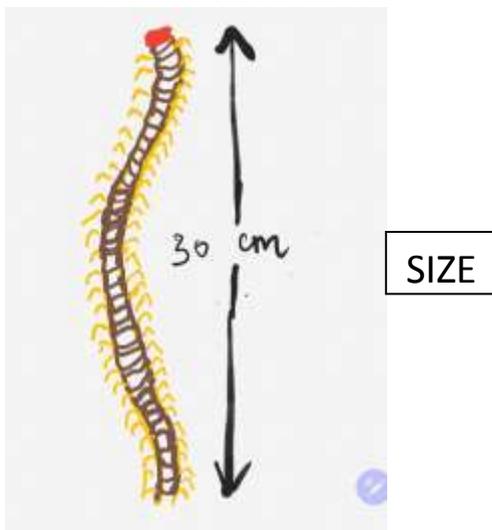
Based on Growth:

A Martian creature is most likely to have an:

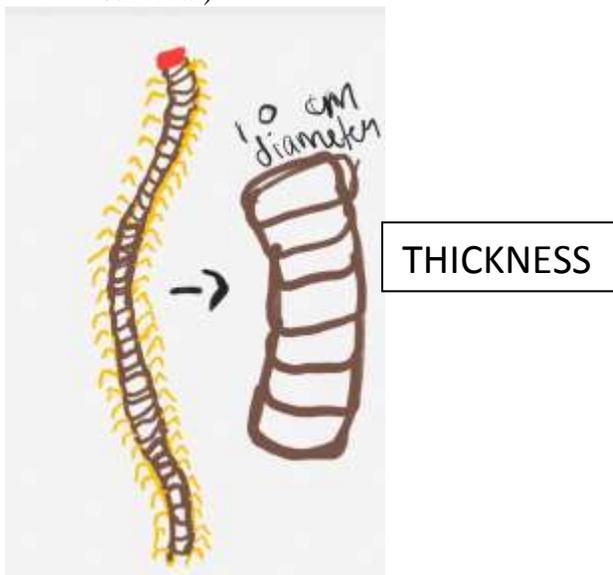
1. **Exoskeleton** to help it in mobility and reduce the loss of any water that it may have.



2. To maintain a good ratio between the sunlight absorbed and the minerals absorbed, the creature should have its maximum size around that of a **full grown centipeder**.



3. given the cold climate of mars, the alien should have a **thick layer of fat** or something under its skin. (the alien would also be cold blooded, so as to not waste any energy in survival)



Based on Sensitivity and response to stimuli:

Assuming that the aliens will be the only species on mars, they don't have to hide from predators unless they are cannibals, which is not possible as they will be autotrophs. Along with touch, their other sensing abilities will be required to predict the weather, identify their surroundings etc. how creatures respond to stimuli can have a great impact on their appearance. Therefore keeping in mind the survival needs, a Martian creature can have:

1. Echolocation; to have a map of their surroundings



ECHOLOCATION

Based on Respiration:

We need to keep in mind that mar doesn't have oxygen, hence creature will have to breathe like plant but also make enough energy to move like an animal. Therefore the exchange of gases can occur with a system of tubes, somewhat like that of a cockroach, with the help of spiracles.



SYSTEM OF SPIRACLES

Based on Excretion:

It is best for the alien to have an anus and follow guanotelism as its form of excretion because this form of excretion requires little to no water.

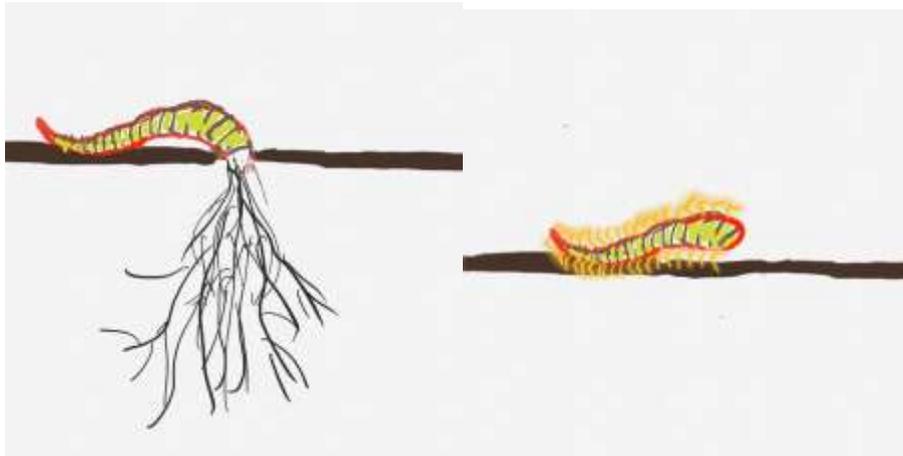


ANUS

FINAL STRUCTURE:

STRUCTURE WHEN
CREATURE IS STATIONARY

STRUCTURE WHEN
CREATURE IS IN MOTION



ADDITIONAL TRAIT: REGENERATION

As we mentioned above, the creature has roots as well as limbs, hence making locomotion impossible. Therefore, after the Martian has gathered enough nutrients from the soil, it can leave its root and a portion of its body behind in order to move. Similar to how a lizard leaves its tail

STEPS OF REGENERATION USED FOR LOCOMOTION

