

## Inventing an Alien Life Form

In this activity, you are going to create a form of animal life that might have evolved on a planet (or satellite) that is probably not like Earth. Rolling a die will simulate the role of chance in the evolution of your extraterrestrial creature. Each roll of the die represents a result of millions of years of chance variations that were successful in the extraterrestrial's environment.

In your group, roll the die and follow the instructions for the 23 adaptations below. When you are finished, take a minute to talk within your group about what sort of creature you have created, and what environment it would need.

On your own draw or describe your creature. Give the species a name. Write a paragraph about your creature, addressing the following points:

- \* Describe the environment your creature needs to survive.
- \* Where in our solar system would you be most likely to find such a creature?
- \* What sort of food source might your creature need?
- \* Is your creature alone in its environment? If not, how does it coexist with other species.

1. Skin: If you roll a ... then your creature has ...

- 1, 2 or 3: scaly skin, like a snake.
- 4 or 5: mucus covered soft skin, like a slug.
- 6: leathery skin, like a cow.

2. Openings: People have different openings or holes in their bodies to breathe, get rid of waste, and eat. Some animals, like anemones, use one opening for several of these purposes. How many openings does your creature have, and what does it use them for?

- If you roll a ... then your creature has ...
- 1 or 2: 1 opening (like a sea anemone)
  - 3 or 4: 2 openings (like an earthworm)
  - 5 or 6: 3 openings (like a frog)

3. Body Shape: If you roll a ... then your creature ...

- 1, 2, 3 or 4: is longer than it is wide.
- 5 or 6: has some other shape.

4. Segments: If you roll a ... then your creature ...

- 1, 2 or 3: is divided into segments (like a centipede). Go to 5: appendages for segments.
- 4, 5, or 6: has no segments (like a toad). Go to 6: appendages for no segments.

5. Appendages for Segments: Roll one die two times and add the numbers together to find the number of segments your creature has. Your creature has two appendages on each segment, so multiply by two to get the number of appendages. (example: 3 segments X 2 = 6 appendages) Go to 7: Hard Parts.

6. Appendages for No Segments: Roll one die. This is the number of appendages your organism has. Go to 7: Hard Parts.

7. Hard Parts: If you roll a ... then your creature ...

- 1, 2 or 3: has hard parts on the outside of its body (like a lobster). Go to 8: Outside hard parts.
- 4 or 5: has hard parts on the inside of its body (bones, like you). Go to 9: Large Sizes.
- 6: has no hard parts. It gets around by wiggling (like a worm). Go to 10: Small sizes.

8. Outside Hard Parts: If you roll a ... then your creature ...

1 or 2: has a hard shell (like a snail). Go to 10: Small sizes.

3 or 4: has a protein, armor-like covering (like a beetle). It must shed this covering in order to grow. Go to 10: Small sizes.

5 or 6: has a protein, shell-like covering (like an insect). It doesn't need to shed this covering to grow. Go to 9: Large sizes.

9. Large sizes: Roll one die for the range of your creature's weight. If you roll a ... then your creature weighs between

...

1: 6-9 pounds, like a cat.

2: 10-49 pounds, like a bobcat.

3: 50-99 pounds, like a German Shepherd.

4: 100-199 pounds, like an alligator.

5: 200-999 pounds, like a pig.

6: 1,000-100,000 pounds, like a dinosaur.

Go to 11: Feeding the Cells of Large Animals.

10. Small sizes: Roll one die for the range of your creature's weight. If you roll a ... then your creature weighs between ...

1 or 2: 0 and 1 pound, like a mouse.

3 or 4: 1 and 2 pounds, like a rat.

5 or 6: 2 and 5 pounds, like a chicken.

Go to 12: Feeding the Cells of Small Animals.

11. Feeding the Cells of Large Animals: We take in air and food from our environment. Our blood absorbs oxygen from the air and nutrients from the food. Our hearts pump the blood through our bodies, carrying the oxygen and nutrients to every cell. Roll one die to find out how your creature gets oxygen and nutrients to its organs.

If you roll a ... then your creature ...

1, 2, 3 or 4: has one heart to pump blood, like you.

5 or 6: has multiple hearts, like an octopus. Roll one die for the number of hearts.

Go to 13: Moving Around.

12. Feeding the Cells of Small Animals: Like people, earthworms take in oxygen and food from their environment. The oxygen and food nutrients are absorbed in the worm's blood. Five small hearts pump blood through the body to give oxygen and nutrients to all the cells. Other small animals get food and oxygen to their cells in different ways. Roll one die to find out how your small animal gets oxygen and nutrients to its cells. If you roll a ... then your creature ...

1 or 2: has oxygen and food in the blood, and only one heart, like a mouse.

3 or 4: has oxygen and food in the blood, and multiple hearts, like an earthworm. Roll one die for the number of hearts.

5: has oxygen and food in the blood, which sloshes around inside, bathing all cells, like a lobster.

6: is only a few cells thick. It absorbs oxygen and food directly through its skin, and has no blood, like a flatworm.

Go to 13: Moving Around

13. Moving Around: If you roll a ... then your creature ...

1: crawls on land, like a snail.

2: walks on land, like a centipede, beetle, lizard or ostrich.

3: swims in water, like a fish.

4: drifts in water, like a jellyfish.

5: has jet propulsion in water, like a squid.

6: flies in the atmosphere (if larger than 100 pounds, roll again), like a bird or a bat.

14. Sensing Vibrations: People use their ears and sense of touch to feel vibrations in the air and the ground. What does your creature use to sense vibrations? If you roll a ... then your creature ...

1, 2 or 3: has organs, like ears, to sense vibrations in the air (like a mole) or in the water (like a dolphin).

4, 5 or 6: has small hairs scattered over its body to sense vibrations in the air or water, like some fishes or spiders.

15. Chemical Senses: People have sensors that detect chemicals in the air, food or water. They are in your nose and

tongue, but chemical sensors are not always in noses or tongues. Spiders have them on the soles of their feet. Where are your creature's sensors located? If you roll a ... then your creature's sensors are located ...

1, 2 or 3: in one place, like a spider.

4, 5 or 6: in two places, like you.

16. Number of eyes: If you roll a ... then your creature ...

1 or 2: has no eyes, like a blind cavefish.

3 or 4: has two eyes, like you.

5 or 6: has more than two eyes, like a spider.

17. Eating: If you roll a ... then your creature ...

1, 2, 3 or 4: is a plant-eater, like a cow. Needs something with which to snip and grind plant parts. Go to 18: Plant-Eater.

5: is a meat-eater, like a tiger. Needs to have meat tearers, like claws and sharp teeth. Go to 19: Predator.

6: is both a meat-eater and a plant-eater, like a bear. Needs to have both grinders and tearers. Go to 19: Predator.

18. Plant-eater: Your organism must protect itself against predators. Go to 20: Protection---Defensive Structures.

19. Predator: How does your creature catch its prey? Roll one die twice and add the numbers to get one adaptation.

Repeat to get a second adaptation. If you roll a ... then your creature ...

2: chases prey, like a cheetah.

3: hits prey, like a hawk.

4: suffocates prey, like a python.

5: blinds prey, like a spitting cobra.

6: spears prey, like a harpoon worm.

7: injects poison, like a scorpion.

8: makes a trap, like a spider.

9: lures prey with a treat, like an angler worm.

10: shocks its prey, like an electric eel.

11: stuns its prey with vibrations, like a dolphin.

12: works together with others of the same species, like wolves.

20. Protection---Defensive Structures: If you roll a ... then your creature ...

1 or 2: has spines, like a porcupine.

3 or 4: has thick, protective covering, like a turtle.

5 or 6: has horns, like a triceratops.

21. Protection---Poison as a Defense: If you roll a ... then your creature ...

1, 2, 3, 4 or 5: is not poisonous. It has camouflaged coloring, so it blends in with the planet's most common plant color, like a grasshopper.

6: is poisonous to eat, or has a venomous sting. It has a coloring that warns other animals to leave it alone by standing out against the plant color, like a poison arrow frog.

22. Protection---Defensive Behaviors: If you roll a ... then your creature ...

1: runs away, like an antelope.

2: hides, like a prairie dog.

3: freezes (stands very still), like a pheasant.

4: fights, like cats and dogs.

5: pretends its bigger than it really is, like a scared cat.

6: works together with other of its species, like a musk ox.

23. Reproduction: If you roll a ... then your creature ...

1, 2 or 3: is asexual. Your creature reproduces without sex by budding off a piece of itself, which grows into another organism, like a sea anemone. Go to 27.

4, 5 or 6: is sexual. Your creature reproduces by sex (two or more organisms share their adaptations, and make babies a little different from themselves), like cats.

24. Sexual Reproduction: If you roll a ... then your creature's species ...

1 or 2: has two sexes: A and B. Every individual has only one sex, like people and other mammals.

3 or 4: has two sexes: A and B. Every individual has both sexes, but two individuals are required to mate, like earthworms.

5 or 6: has three sexes: A, B and C. Every individual has one sex, and three individuals are required to mate. There are no examples like this on Earth.

25. Mating: Because your species needs to gather all the sexes to mate, they need a way to find each other. If you roll a ... then your creature uses ...

1 or 2: a mating call, like a song sparrow.

3 or 4: bright colors, like a male pheasant.

5: mating dance, like a male peacock.

6: mating smell, like big moths.

26. Babies: If you roll a ... then your creature ...

1: lays many eggs, and doesn't take care of any babies, like fish.

2: lays few eggs, and takes care of eggs and young, like birds. Whichever sex takes care of the eggs and young must be camouflaged.

3: gives live birth, and cares for the young in some sort of nest, like rabbits. The young must be camouflaged.

4: gives live birth, and cares for the young in a pouch, like kangaroos.

27. Evolution is finished! Describe your creature.