



Pre-Field Trip Lesson Plan: Roll the Dice for Animal Adaptations

Goal: Students will gain an understanding of how climate and environmental changes affect animals and force them to adapt to their new surroundings.

Objectives:

1. Students will be able to, in their own words, provide an accurate explanation of the changes that could happen to an animal in response to climate or environmental changes.
2. Students will create new animals based on assigned adaptations and will describe how these animals find success in their respective environments.

Science TEKS: 6th Grade – 6.5.B, 6.5.F, 6.5.G, 6.13.C

(5) Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:

(B) identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;

(F) analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems; and

(G) analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.

(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:

(C) describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.

7th Grade – 7.5.B, 7.5.F, 7.5.G, 7.13.D

(5) Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:

- (B) identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
- (F) analyze and explain the complementary relationship between structure and function of objects, organisms, and systems; and
- (G) analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.

(13) Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:

- (D) describe and give examples of how natural and artificial selection change the occurrence of traits in a population over generations.

8th Grade – 8.5.B, 8.5.F, 8.5.G, 8.13.C

(5) Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:

- (B) identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
- (F) analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems; and
- (G) analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.

(13) Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:

- (C) describe how variations of traits within a population lead to structural, behavioral, and physiological adaptations that influence the likelihood of survival and reproductive success of a species over generations.

Materials:

- “Roll the Dice to Build Your Animal” 3-page packet
- Colored pencils, markers, and/or crayons

Introduction/
Background:

1. In preparation for our field trip to the Dallas World Aquarium, we are going to discuss animal adaptations. Specifically, we will talk about how animals adapt over time to be able to survive climate and environmental changes.

2. Animals must be strong to survive, but sometimes luck plays a role. Imagine a bird has a MUTANT gene that changes it in a way that makes it easier for it to survive. Imagine it is a bird who eats seeds and nuts. The bird with the mutation ends up with a stronger beak, which makes it easier to break the shells of nuts.

3. This bird will likely be able to break more nutshells than a bird without the mutation. And because this bird can eat more nuts with expending less energy, this bird will be successful. If this bird mates and has babies, it is possible the “strong beak” trait will be passed down to the offspring.

4. Over time, there will be more “strong beaked” birds in the population because these birds will be more successful than those with regular beaks. Strong-beaked birds will evolve to take advantage of the changed environment in which they currently live.

5. Here is another scenario. There is a species of dolphin who normally feeds on small fish who live near the surface. These dolphins are rarely seen more than 10 feet under the surface of the water.

6. The same small fish this dolphin eats are a favorite of humans, who harvest them with nets. Over time, there are very few of these fish left in the ocean. The surface-dwelling dolphin must find another prey item to survive. What mutation might help?

Discussion: Diving deeper might reveal other fish they could eat. But diving deeper means holding your breath longer. These dolphins aren't used to that. What mutation might help a dolphin in this group?

7. One more scenario. There is a species of mole with small, short legs and tiny eyes who spends time both above and below the ground. The rains have been heavy and constant. This is unlikely to stop as the climate is changing and rain is likely to continue in the area.

8. What adaptation might help this mole be successful in an environment where being underground will become difficult if not impossible?

Discussion: Living exclusively on land means you need to be equipped. A mutation of longer legs or larger, better eyes would benefit this mole. These adaptations would allow them to find food and avoid predators better than those with tiny legs and eyes.

9. The Earth is always changing. Climate change results in temperature fluctuations and sea level rise. Natural disasters have been known to wipe out portions of or entire ecosystems. This means that animals must adapt to

survive these changes. Staying the same doesn't allow an animal to be successful in a new environment.

10. There are so many animals with amazing adaptations that allow them to live in places in which you may believe nothing can survive. Animals take advantage of what they can wherever they end up.

11. To demonstrate how adapting over time helps animals, you are going to design brand new animals. Based on a roll of the dice, you will be assigned specific traits for your animal, and you will need to decide how your animal lives and survives in its environment.

Directions:

1. Distribute one "Roll the Dice to Build Your Animal" packet to each student.

2. Give each student a die to use for the activity. Explain to the students that they will be creating their own unique animal. To determine their animal's characteristics, they will need roll the dice.

3. The students will roll the die for each of the following characteristics/adaptations: mouth, limbs, body covering, senses, and defense. Once they obtain a number from the die, they should circle the number and the corresponding adaptation for that category. The teacher will facilitate the roll for each of the categories.

4. Once the students have each of their five characteristics/adaptations circled, ask the students to think of one more "wild card" adaptation. This is something special their animal has or can do to aid in survival. This can be anything, providing it helps their animal be successful and survive.

5. Ask the students to refer to page 2 of the packet. Ask them to look over their assigned adaptations (as well as their wild card adaptation). Invite them to use colored pencils, markers, and/or crayons to draw their animal. Ensure they include the adaptations in the drawing.

6. When the students complete their drawings, ask them to think of a name for their animal. Tell them to write the name of their animal above their drawing.

7. Next, ask the students to take time to answer the critical thinking questions on page three of the packet.

Wrap-Up/
Discussion:

1. Ask the students what might happen if their animal had to compete with another animal for food. Ask them to share their thoughts if their animal had to compete with the following:

- An animal who can move around undetected without a sound.
- A huge animal with gigantic, sharp teeth and brute strength.
- A fast animal who can jump and attack with speed and grace.
- A small animal with a very potent venom.
- An animal with excellent eyesight who can also see in the dark.

Assessment:

Comprehension of concepts will be evaluated through student participation in lesson discussions as well as the illustration and answers to the questions on the Roll the Dice to Build Your Animal worksheet packet.

Modifications:

- For students with visual or motor impairment, you could pair the student with another student to talk through and assist with the dice roll activity. You could also replace the drawing portion of the activity with a written or oral description.

Extension
Activity:

“Fish Body Shapes” activity

Students learn about different fish body shapes, and work to invent their own fish species with each of the different body shapes.
Worksheet included.