

Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their "Everything We Think We Know About..." list. It might also be helpful to review the list by marking each entry with a "+" or "-" to show which facts were correct and which were incorrect.

Discussions that ensue from thought-provoking questions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion questions.

1. Discuss with students why mammals never look exactly like their parents, while animals that reproduce asexually do.
2. A frog can lay thousands of eggs at once, while elephants give birth to only one baby at a time. Discuss the benefits and disadvantages of these reproductive methods for different species.

Follow-up Activities

- The life cycles of animals are best studied by using live creatures that have a short life span. Mealworms, milkweed bugs, butterflies and fruit flies are all good subjects to study in the classroom, and can be easily obtained through a materials catalog.
- Have interested students research Gregor Mendel's detailed studies of the genetics of pea plants in order to explain the history of his studies on heredity.
- The life cycles of parasites are very interesting to students due to their specific peculiarities. Have students choose a parasite at random to research and report back to the class with information about their chosen creature's stages of development.

Internet Resources

- www.scrtec.org/track/tracks/f01604.html
This site contains a month-long lesson on exploring the life cycle of mealworms and has links to other interesting sites spotlighting the growth and development of animals.
- www.cf.adfg.state.ak.us/geninfo/research/genetics/kids/salstory.htm
This site developed by the Gene Conservation Laboratory explains the interesting life cycle of salmon with text and illustrations appropriate for middle school students.

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- www.mesc.usgs.gov/butterfly/butterfly-life-cycle.html
The Midcontinent Ecological Science Center developed this Children's Butterfly Site with illustrations of each stage in the life cycles of butterflies and moths.
- compassion.elehost.com/About_Elephants/Life_Cycles/life_cycles.html
This page is dedicated to understanding the life cycle of elephants, and it makes some comparisons of these stages with those of humans.

Suggested Print Resources

- Fleisher, Paul. *Life Cycles of a Dozen Diverse Creatures*. Millbrook Press, Brookfield, CT; 1998.
- Kalman, Bobbie. *What Is a Life Cycle?* Crabtree Publishers, New York, NY; 1998.
- Stalio, Ivan. *Life Cycles*. Raintree/Steck-Vaughn, New York, NY; 1998.

TEACHER'S GUIDE CONSULTANT

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Animal Life Cycles

Grades 5-8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers for these grades need all the help they can get! This guide has been designed to help science teachers in grades 5-8 by providing a brief synopsis of the program, pre-viewing and follow-up questions, activities, vocabulary and additional resources.

Before Viewing: Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create a "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

After Viewing: Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.



Program Summary

A life cycle is a series of growth stages that an animal goes through during its lifetime, from its initial development, through its birth and growth, and then into a mature stage when it can reproduce and create a new generation. The nature of the life cycle stages suits the needs of each species and increases the likelihood of survival, at least long enough for a given animal to reproduce.

Keeping the species going and creating a new generation is the major survival goal for all animals. The need to reproduce at maturity is naturally programmed in an animal. The drive to reproduce, and even the cues about when to mate, are all instinctive behaviors. Because reproduction passes hereditary information contained in the genes from the parents to the offspring, each successive generation closely resembles the previous one. Gregor Mendel, a 19th-century Austrian botanist, was the first person to discover how heredity works.

There are two main types of reproduction: asexual and sexual. In asexual reproduction, a single organism creates the next generation through budding (corals produce bud-like projections that break off to grow into exact copies of the parent) or through fragmentation (a flatworm's body splits in half, and each half grows the missing parts). Sexual reproduction requires two parents, mixing their genes through the union of a sperm and an egg cell. For some species, like salmon, fertilization occurs outside the female's body; for others, like humans, it occurs inside the female. However, fertilization can only occur between two animals of the same species.

In most animals, behavior is mainly determined by instinct, although in more highly developed animals, the young are nurtured and taught the behaviors that they will need in life. Upon reaching maturity, animals attain their full size and adult form, enabling them to reproduce in order to start the life cycle all over again.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

life cycle — A series of stages that all living things go through that includes birth, maturation, reproduction and eventually death.

life span — The amount of time that an animal lives (e.g. humans have an average life span of 75 years).

metamorphosis — Extreme physical changes that occur during different stages of an animal's life cycle. The four life cycle stages of fruit flies are: egg stage, larva stage, pupa stage and adult stage.

egg stage — The first stage of an animal's life; after fertilization, the single egg cell splits in two, and those cells divide as the animal begins to grow within the egg.

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larva stage — The immature, wingless and often wormlike stage that insects and some other animals enter after hatching from an egg.

pupa stage — The intermediate stage of an insect when it is covered by a cocoon and transforms into an adult.

adult stage — The last stage of an animal's life cycle when it is fully mature and capable of reproduction.

reproduction — The creation of new organisms — or offspring — from adult organisms of the same species. Mammals reproduce when a male and a female cell unite inside the mother and begin to grow.

instinctive behavior — An action that is genetically inherited and not learned, such as migration.

learned behaviors — An action that must be taught to the young by adults.

heredity — The science that studies the genetic resemblance of offspring to their parents.

Gregor Mendel — (1822-1884) A 19th-century Austrian botanist and who studied heredity using pea plants and developed the foundation for the science of genetics.

sexual reproduction — The production of offspring by two animals of the opposite sex of the same species. Sexual reproduction involves the fertilization of an egg cell with a sperm cell.

asexual reproduction — The production of offspring by a single member of a given species, usually accomplished through budding or fragmentation.

budding — A form of asexual reproduction in which a new individual develops from the specialized area of a parent organism. Sponges, jellyfish and anemones can reproduce by budding.

regeneration — A type of asexual reproduction that involves the growth of an entire organism from a fragment. Some worms and sea stars can regenerate from fragments.

fertilization — The act in which the male and female sex cells unite during mating, either outside or inside of the female of the species.

maturation — The process of growing to adulthood.

Pre-viewing Discussion

Before students generate their list of "Everything We Think We Know About..." for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

1. What are the basic stages of an animal's life cycle?
2. How do animals reproduce?
3. What are "instincts"? Do humans have instincts?

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After the class has completed their "Everything We Think We Know About..." list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

1. What is the difference between an animal's life cycle and life span?
2. What are the stages of the human life cycle?
3. How does the life cycle of an insect differ from a mammal's?
4. Why is reproduction considered to be the most important goal of every species?
5. What is instinct?
6. Identify some examples of instinctive behavior.
7. Do humans have instincts?
8. What is learned behavior?
9. What are some examples of learned behavior?
10. Who was Gregor Mendel? What was his contribution to science?
11. What is hereditary information?
12. What is the function of genetic material?
13. What are the two types of reproduction?
14. How does budding work in corals and sea anemones?
15. What does it mean to say that an animal reproduces through fragmentation?
16. What is the major difference between asexual and sexual reproduction?
17. What is the definition of fertilization? Which two cells actually unite?
18. What are the two types of fertilization?
19. What is an example of an animal species that uses external fertilization in reproduction?
20. What types of animals use internal fertilization to reproduce?
21. What are the life cycle stages of the milkweed bug as shown in the investigation sequence?
22. Are donkeys and horses members of the same species? How do we know this?
24. Why is it that as an animal matures, its chances of survival increase?