Where is the Tooth Fairy?

Science Standard of Learning Objective

2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes as they mature and grow. Key concepts include
a) **animal life cycles**; and
b) plant life cycles.

Objective: To compare life cycles of the Virginia White-tailed Deer and Second Graders through the loss and eruption of teeth; and to understand how scientists use teeth and other aging methods to learn about the life cycles of different species.

Materials:

- Jawbones from white tailed deer
  - Jawbones are collected each winter from deer by hunters and mailed to the Virginia Department of Game and Inland Fisheries biologists who record the age of each deer harvested. After the jawbone age data has been collected for analysis, the bones will be made available to schools. Contact the DGIF Wildlife Education Coordinator in Richmond suzie.gilley@dgif.virginia.gov, for jawbones.
- Pictures of deer jawbones of various ages (included in activity)
- Tooth eruption chart for children (available from a dentist or online)

Background:

All living organisms, both plant and animal, have a genetically predetermined life cycle.

In plants; seeds grow, flower, produce seeds, and eventually die. Some plants such as corn, live one season, others such as an oak tree will live a couple of hundred years or more.

Animal life cycles vary in length also. For example; insects may live for a season, year or as long as 17 years such as the cicada. Mammals such as humans and elephants may live 70 or more years.

Animals may have a metamorphic life cycle as demonstrated in amphibians and some families of insects, such as butterflies, moths and beetles. In most animal species, young resemble their parents when born or hatched and do not go through a metamorphic change.

Scientists study life cycles of plants and animals to better understand the health and structure of a population. Knowing how many individuals are in each age class helps scientists make informed decisions needed to manage the population. When a particular age class is missing from a population it can affect the success of the population to survive over time.

For example, if most of the fish in a lake are older larger fish, with fewer smaller younger fish there may not be enough prey for the older fish. When this occurs, fishery biologists may provide additional cover for the smaller fish to hide so more will survive, introduce younger fish into the population, remove some of the larger fish or a combination of these practices.

For many fish species, age can be determined by examining the growth rings on a scale, similar to counting the rings on a tree. Mammals are frequently aged by examining their teeth. For some species, such as the black bear,

scientists will pull and then cut a tooth using a special saw so they can examine the "rings" under a microscope. In deer species, teeth erupt at certain ages and will wear down at known rates. This activity compares the growth of teeth in white-tailed deer with that of second graders.

White-tailed deer teeth erupt and are lost at known ages based on data collected during deer harvest or hunting season. The jawbones are collected to determine the age structure of the local herd of deer as a management tool.

Fawns are born with their incisors (front teeth) in place. A deer's lower jaw has 8 incisor-like teeth: 6 incisors and 2 incisiform canines that are used to bite and tear the plants they feed on. Deer have no upper incisors. By 4 weeks of age, two premolars are present and by 10 weeks the third premolar has erupted.

Deer have their first permanent molar by 7 months and second molar by 13 months. By 20 months all the deer's "adult "or permanent teeth are in place. This pattern of tooth eruption and wear is used to determine the age structure within a herd of deer.

Children's teeth erupt more slowly beginning at 8-12 months. There are 20 primary or "baby" teeth that will erupt in the first 3 years of life and begin to be replaced around the age of 6 years. The primary teeth hold spaces for the adult teeth that are forming in the jaw. It is important that children take care of these teeth and eat healthy so that the "adult" teeth are also healthy.

The front incisors are usually the first teeth lost by children. Deer are born with 4 of their incisors; these and the other incisors are replaced by the time the deer is 11 months old.

Activity:

On the black board create a table to track the loss of teeth by students. You may need to identify each tooth and what it is called. Share with students a tooth development chart and show what ages they can expect to lose other teeth. Explain this is part of their life cycle and all humans loose teeth. Create a graph showing how many students have lost their teeth, how many have been replaced and how many are currently loose.

Tooth	*# loss*	*# replaced*	*# currently loose*
Upper Teeth			
Central incisors			
Lateral incisor (left)			
Lateral incisor (right)			
Lower Teeth			
Lateral incisor (left)			
Lateral incisor (right)			
Central incisors			

Discuss what it feels like when one is growing in, how they lost it, even the importance of eating healthy to have nice teeth.

Human Primary Teeth Development Chart

Upper Teeth	**When tooth emerges**	**When tooth falls out**
Central incisor	8 to 12 months	6 to 7 years
Lateral incisor	9 to 13 months	7 to 8 years
Canine (cuspid)	16 to 22 months	10 to 12 years
First molar	13 to 19 months	9 to 11 years
Second molar	25 to 33 months	10 to 12 years
Lower Teeth		
Second molar	23 to 31 months	10 to 12 years
First molar	14 to 18 months	9 to 11 years
Canine (cuspid)	17 to 23 months	9 to 12 years
Lateral incisor	10 to 16 months	7 to 8 years
Central incisor	6 to 10 months	6 to 7 years

Ask students what other animals may lose teeth as they grow or the teeth change as the animal grows. Many may mention their pets especially the sharp teeth of puppies and kittens. Puppy and kitten teeth also fall out but this usually happens while the animal is eating and the teeth are swallowed. A local vet may be willing to provide information on domestic pets and maybe visit the class.

Share the jawbones of White-tailed Deer and make observations about the teeth without naming the animal. They may notice the distance between the front incisors and the molars and think that teeth are missing. Point out that there are no "holes" for teeth between the incisors or molars so none are missing. Discuss what the animal may have eaten, some may recognize that the canines are missing and know the jaw is from an herbivore.

Ask if they notice any difference between the number and shape of the molars in the jawbones, you may need to tell them that all the jawbones are from the same species. Have the students count the molars in each jaw bone and make inferences as to which animal is older. Since deer wear out their teeth you can see the dentine lines widen as the deer ages in the photos.

Show the students a picture of a fawn and adult deer. Discuss foods that the deer may eat. Ask how they think the deer eat, especially since they don't have upper incisors. When students lose their front incisors, can they eat an apple? Deer have a hard pallet and when they bite into an apple or a bush they use the pallet to help hold the food and tear. If possible, look along the edge of a field where deer may be feeding. Close examination will show that the plants tips have been torn not cleanly cut indicating a deer was feeding in the area.

Assessment:

Students draw the life cycle of their family pet showing significant changes in the animal's life. For example, dogs often turn gray as they age.

Cleaning of jawbones:

You may need to clean the jawbones before you use them with your students. Place the jawbones in warm soapy water and scrub with a brush or cleaning pad. Rinse and place in sun to dry. Once completely dry put a drop of super glue where each tooth sets in the jawbone so they don't fall out while being handled.

White – tailed Deer - Six month old jaw bone

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White – tailed Deer - 1 year 5 month old

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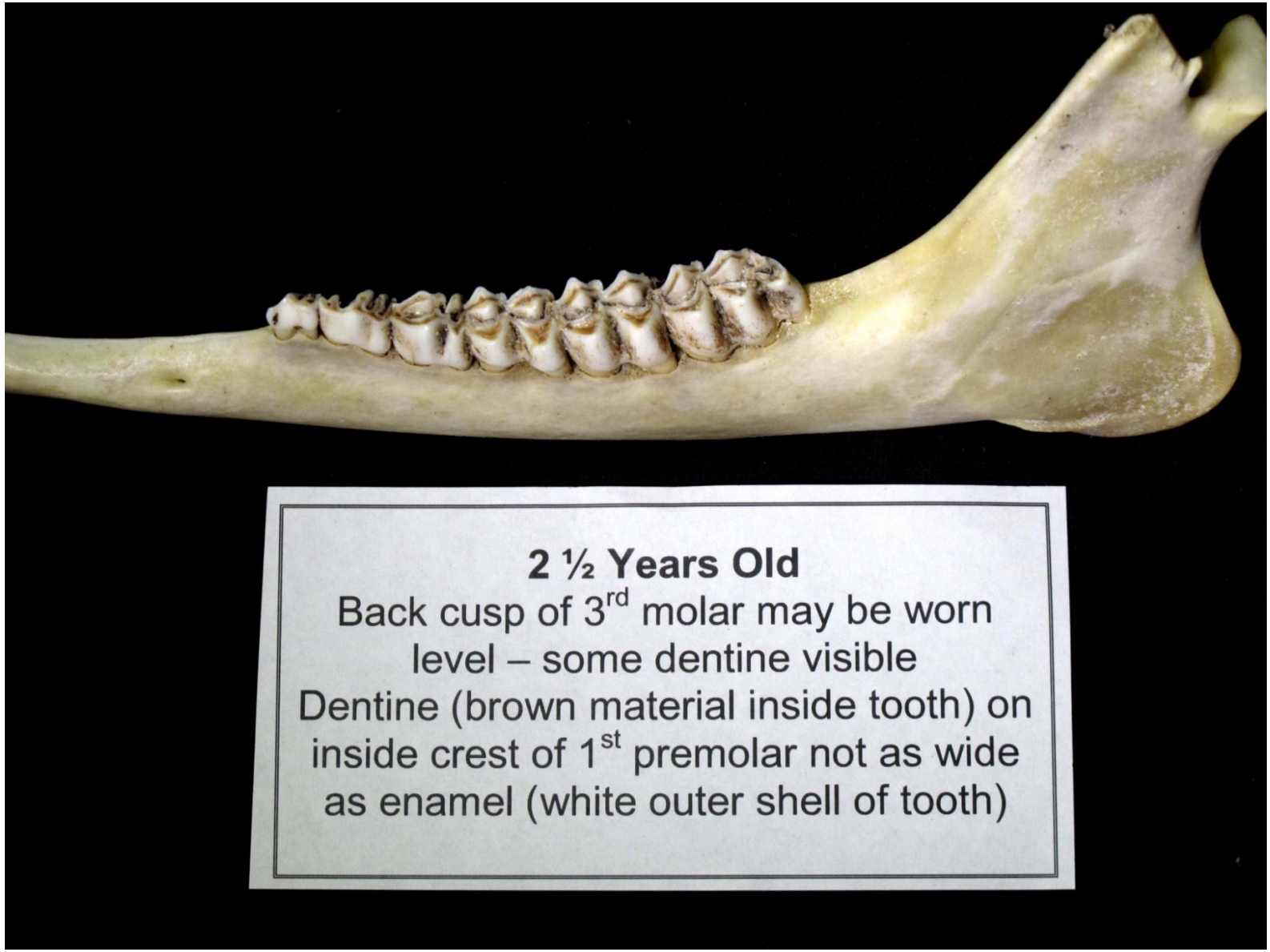
White – tailed Deer 2 ½ year old jawbone



White – tailed Deer 3 ½ or older jawbone

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Front view of jawbone showing incisors

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