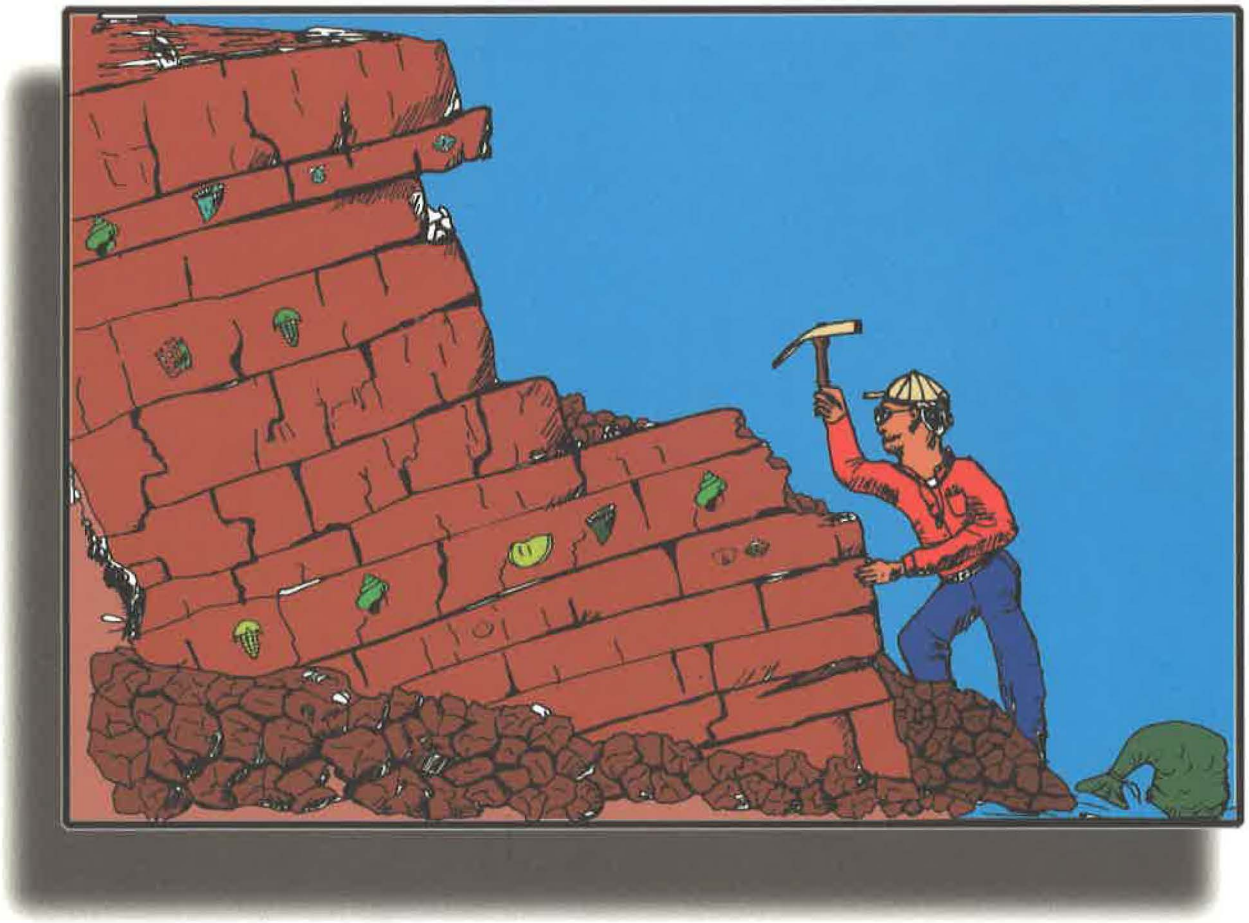
MARYLAND'S
Ancient Sea Creatures
Coloring and Activities Book

Educational Series No. 8



presented by
The Maryland Geological Survey
Maryland Department of Natural Resources
Parris N. Glendening, Governor
Kathleen Kennedy Townsend, Lt. Governor

A MESSAGE TO CHILDREN

Welcome to a journey back through time as we introduce you to animals that lived long, long ago! Did you know that in many of the rocks in our State we can see the remains of many of those animals? Their shapes and forms are preserved in the rocks. We call them fossils.

The most common fossils are of animals that lived in ancient seas, which covered Maryland millions and even hundreds of millions of years ago. We can find fossil clams, snails, corals, and many other types of fossil animals in the rocks of Maryland.

By learning to recognize the basic shapes of the fossils in this book, you can more easily recognize fossils when you find them in rocks. We hope you will find this book as much fun as it is educational.

Sincerely,

Parris N. Glendening

Parris N. Glendening
Governor of Maryland

from the author:

This book is intended for Maryland's young citizens to help them recognize some of the more common types of animals that once lived in our seas millions of years ago, and can be found today as fossils. To collect fossils you first must be able to recognize them. That is the purpose of this book. For our youngest citizens, coloring these shapes, may be the only way to remember them. Somewhat older students can read about how these ancient animals lived, their shapes, and learn more by using the activities in the back pages.

Fossils can be collected in many places in western, central and eastern Maryland. Those fossils found in western Maryland are older than those found in eastern and central Maryland and lived 500 to 300 million years ago. Those fossils found in central and eastern Maryland, such as at Calvert Cliffs, lived in an ancient ocean 10 to 20 million years ago. As you travel through Maryland, keep in mind that the rocks you are seeing might contain fossils.

David K. Brezinski
Geologist
Maryland Geological Survey

this book belongs to:_____ _____

Department of Natural Resources

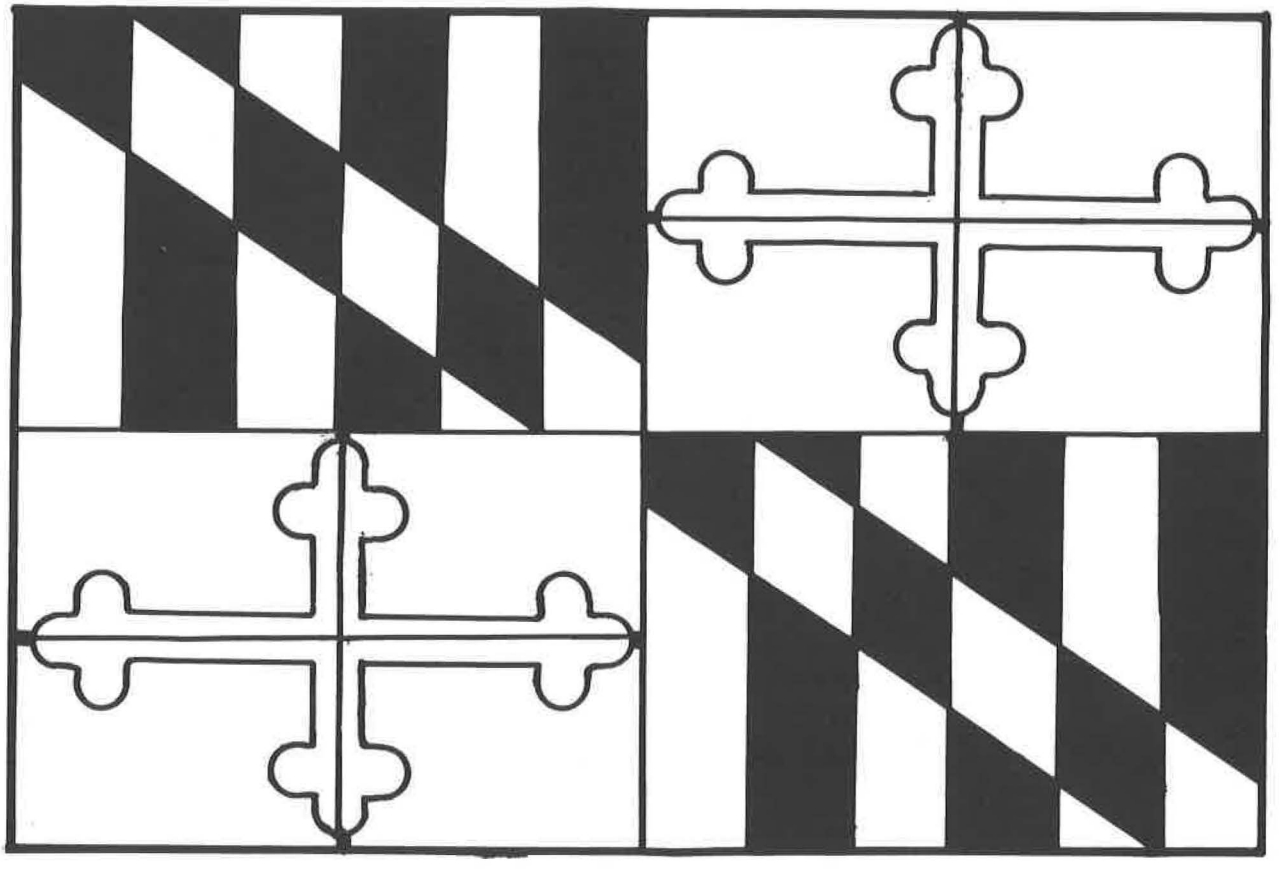
This is the seal of The Maryland Department of Natural Resources.

From the seal on the inside front cover, color the seal on this page

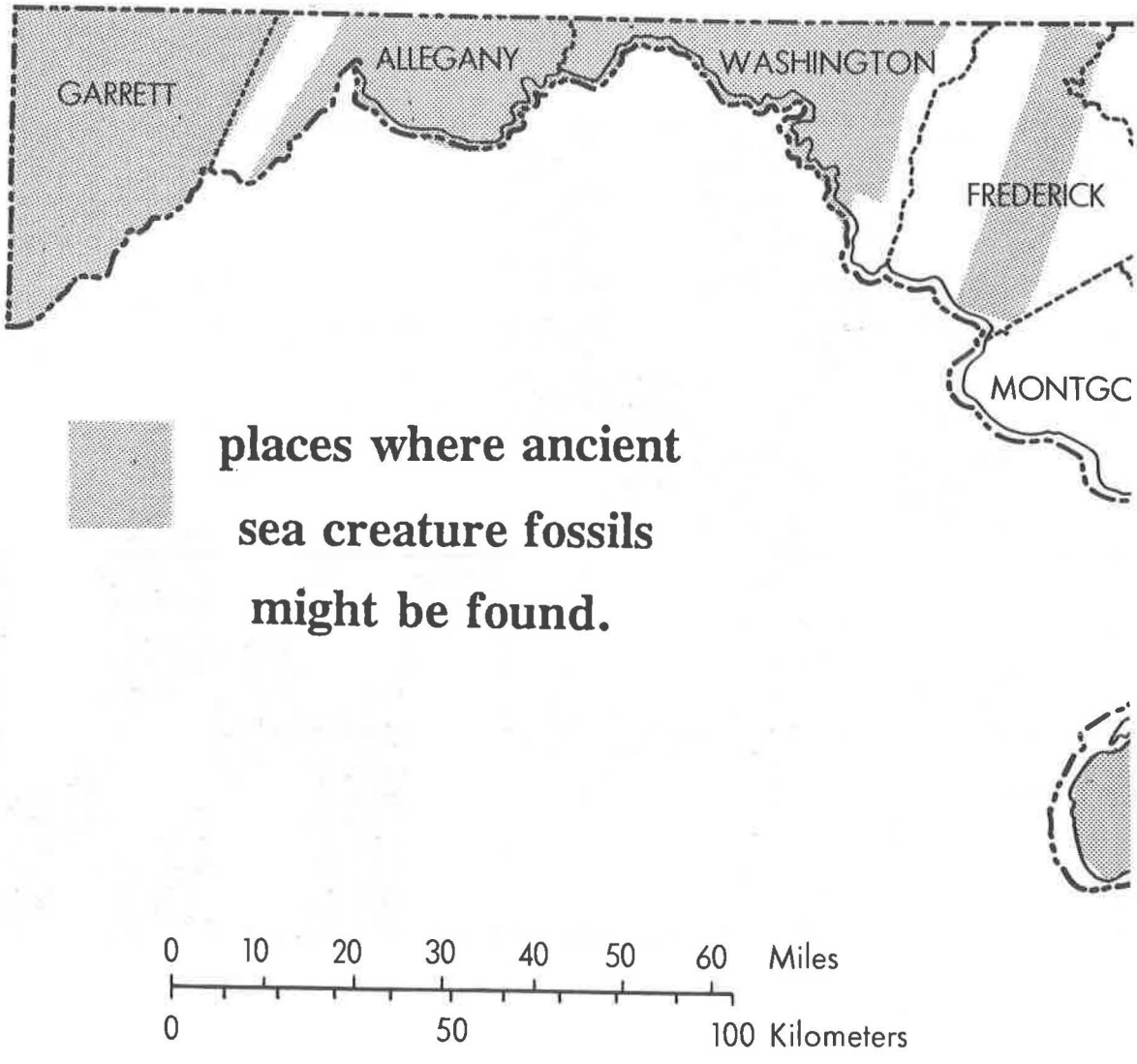
Maryland State Flag

Maryland has a colorful State flag, as shown on the back cover.

Color the flag below using a yellow and red crayon.



On the map of Maryland on these two pages, color each of the counties. How many counties are there? _____. Now put an X where you live.

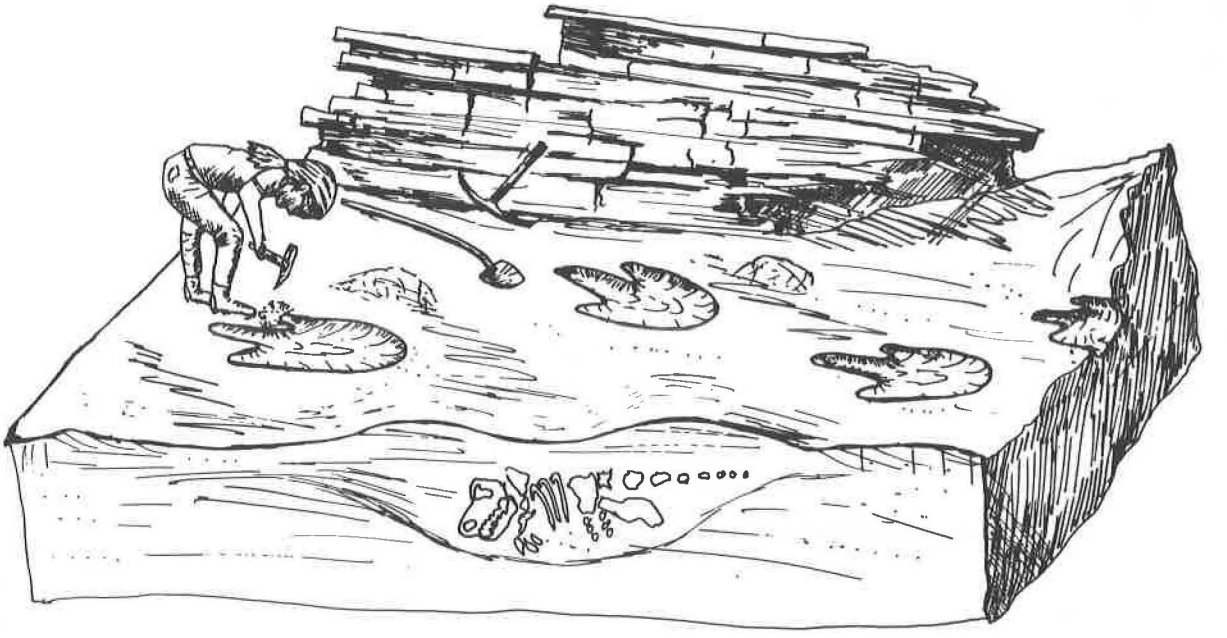



CARROLL
HARFORD
CECIL
ERICK
BALTIMORE
HOWARD
KENT
ONTGOMERY
ANNE
ARUNDEL
QUEEN
ANNES
CAROLINE
PRINCE
GEORGES
TALBOT
CALVERT
CHARLES
DORCHESTER
WICOMICO
ST. MARYS
WORCESTER
SOMERSET

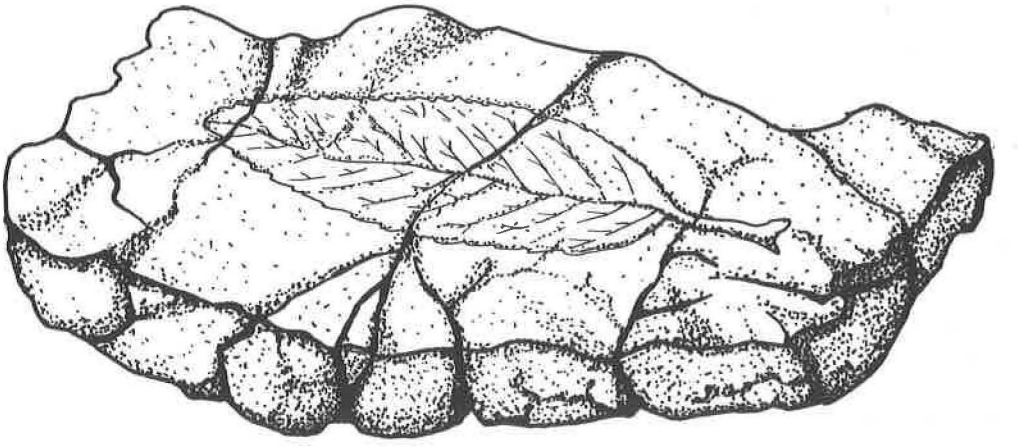
What is a fossil?

A fossil is any remains, track, or trace of ancient animals or plants that are preserved in rocks.

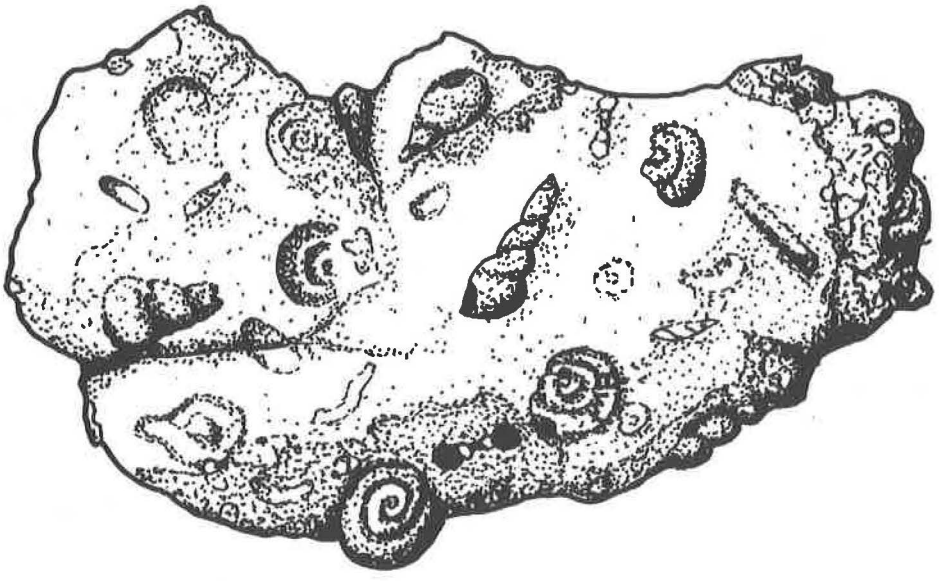
A. Dinosaur tracks are fossils because they are preserved in rock.



B. Traces like leaf imprints are fossils if they are preserved in rocks.

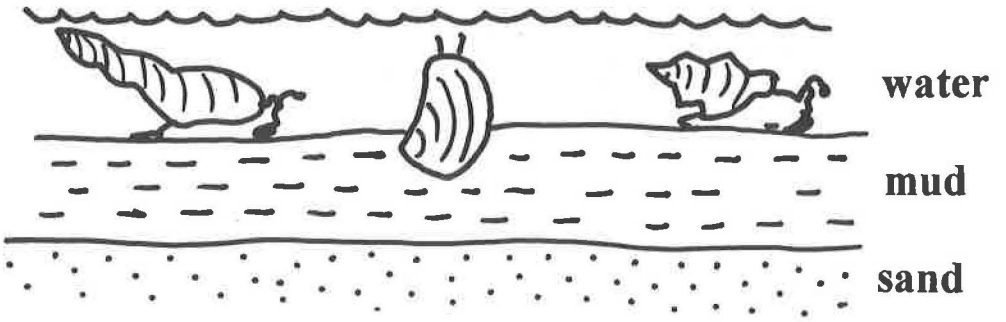


C. Remains like snail shells preserved in rocks are fossils.

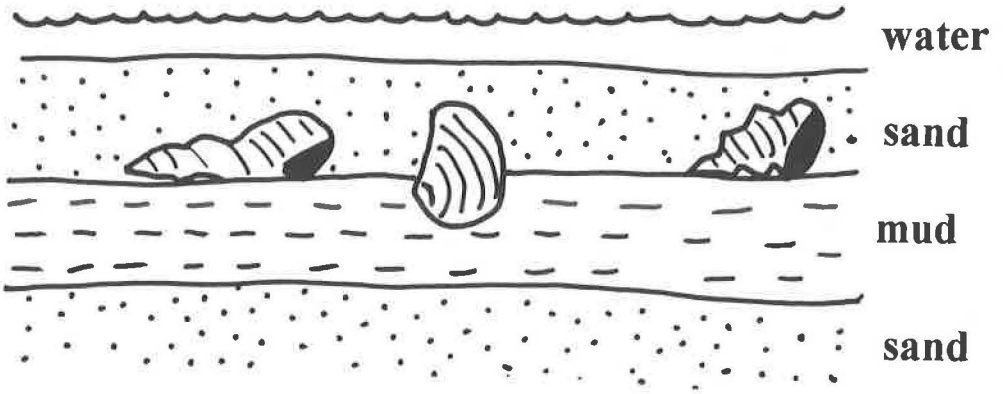


D. Sea shells that you collect at the beach are not fossils. Do you know why?

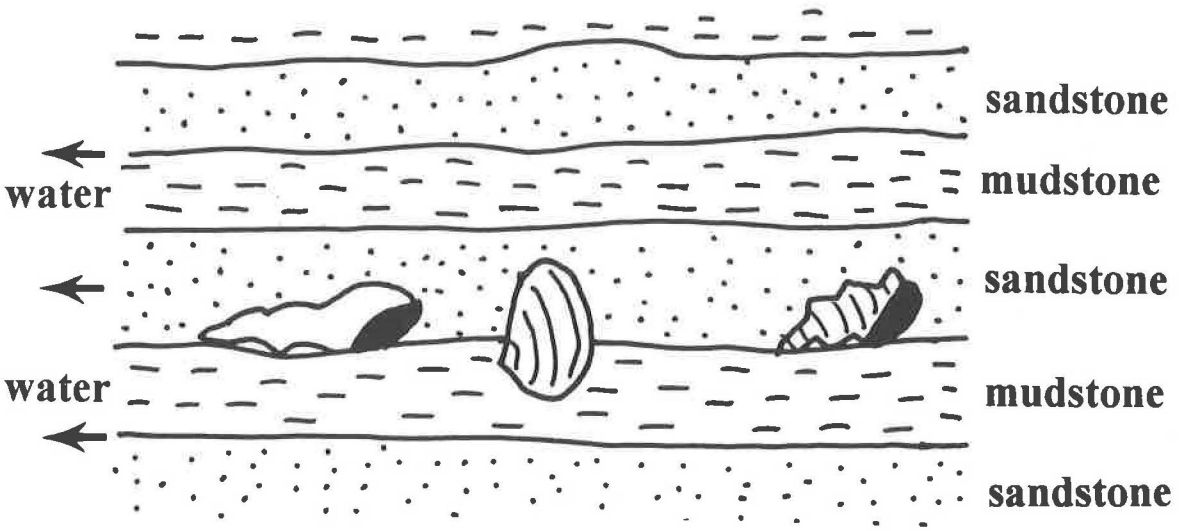
How are fossils formed?



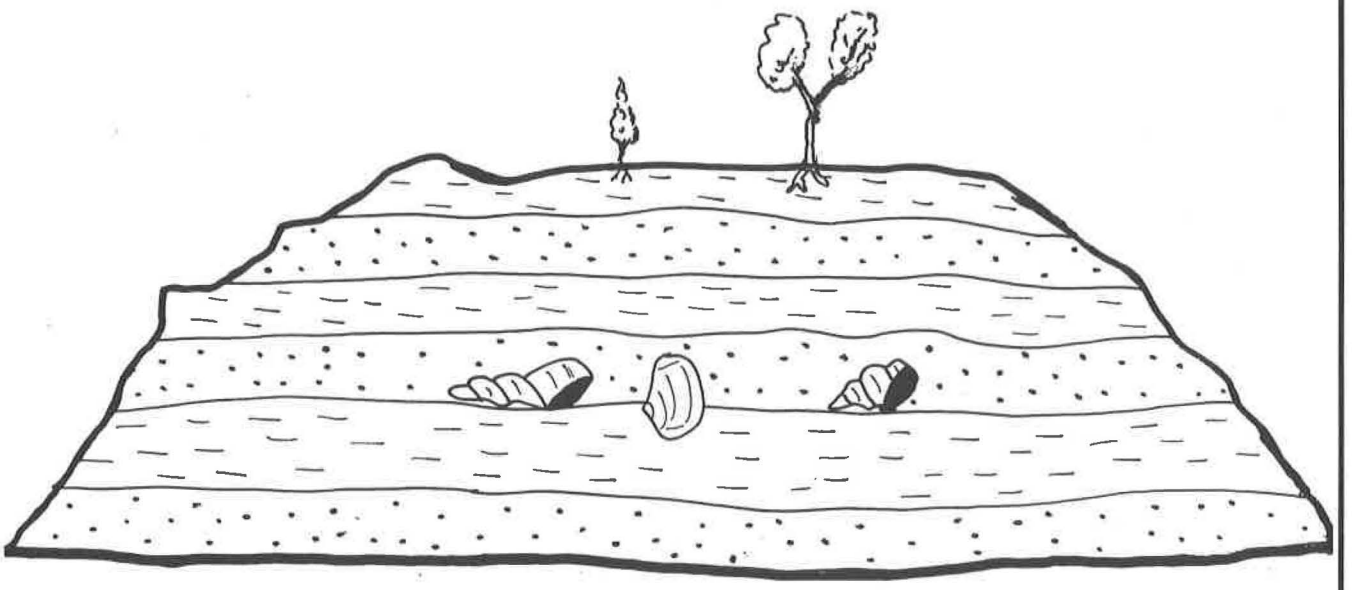
A. Creatures live on a muddy sea floor.



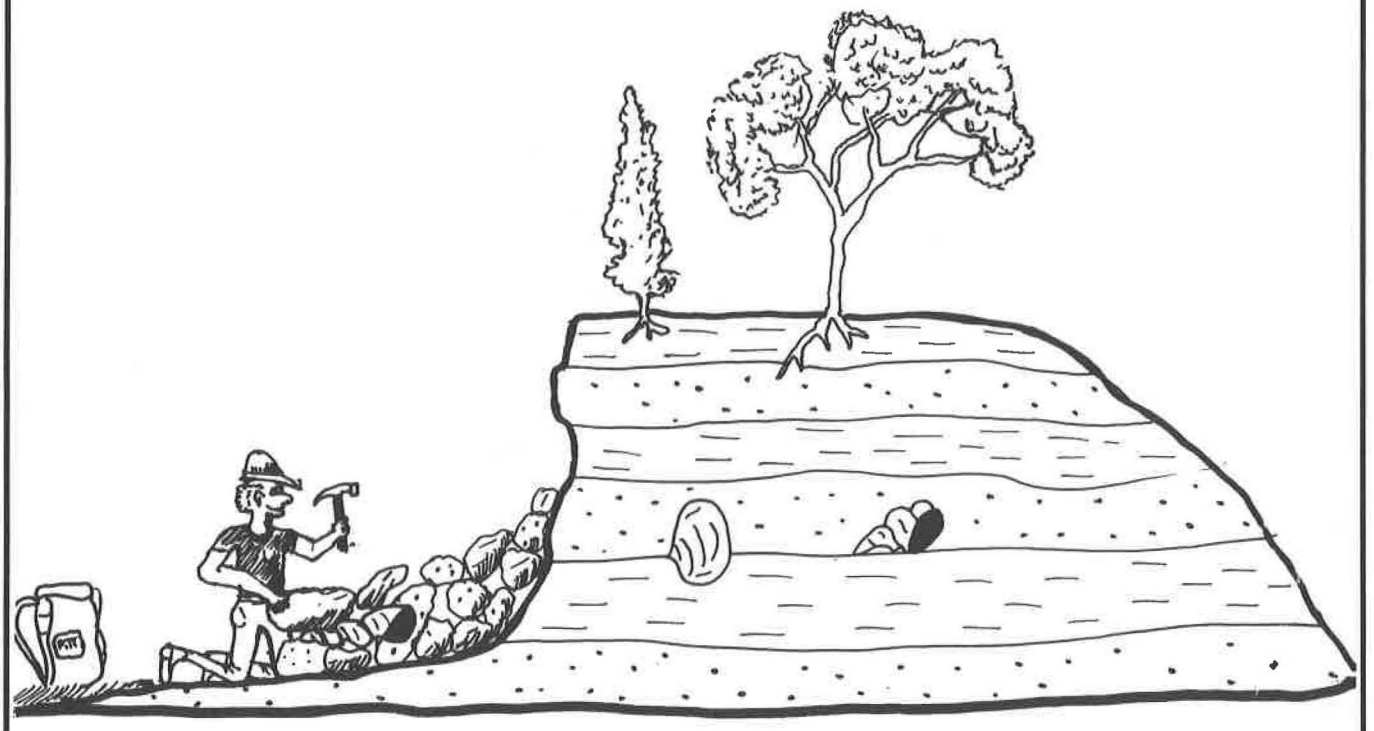
B. Creatures die when buried by sand.



C. Many layers of sand and mud are stacked up. This squeezes out all water, making the mud and sand harden into rock, and preserves the sea creatures as fossils.



D. These rocks are often uplifted above the sea floor and may even form mountains.

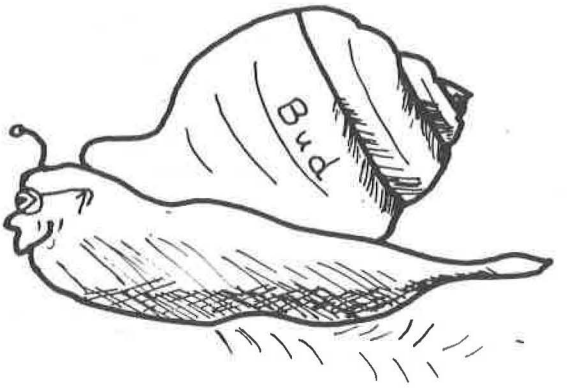


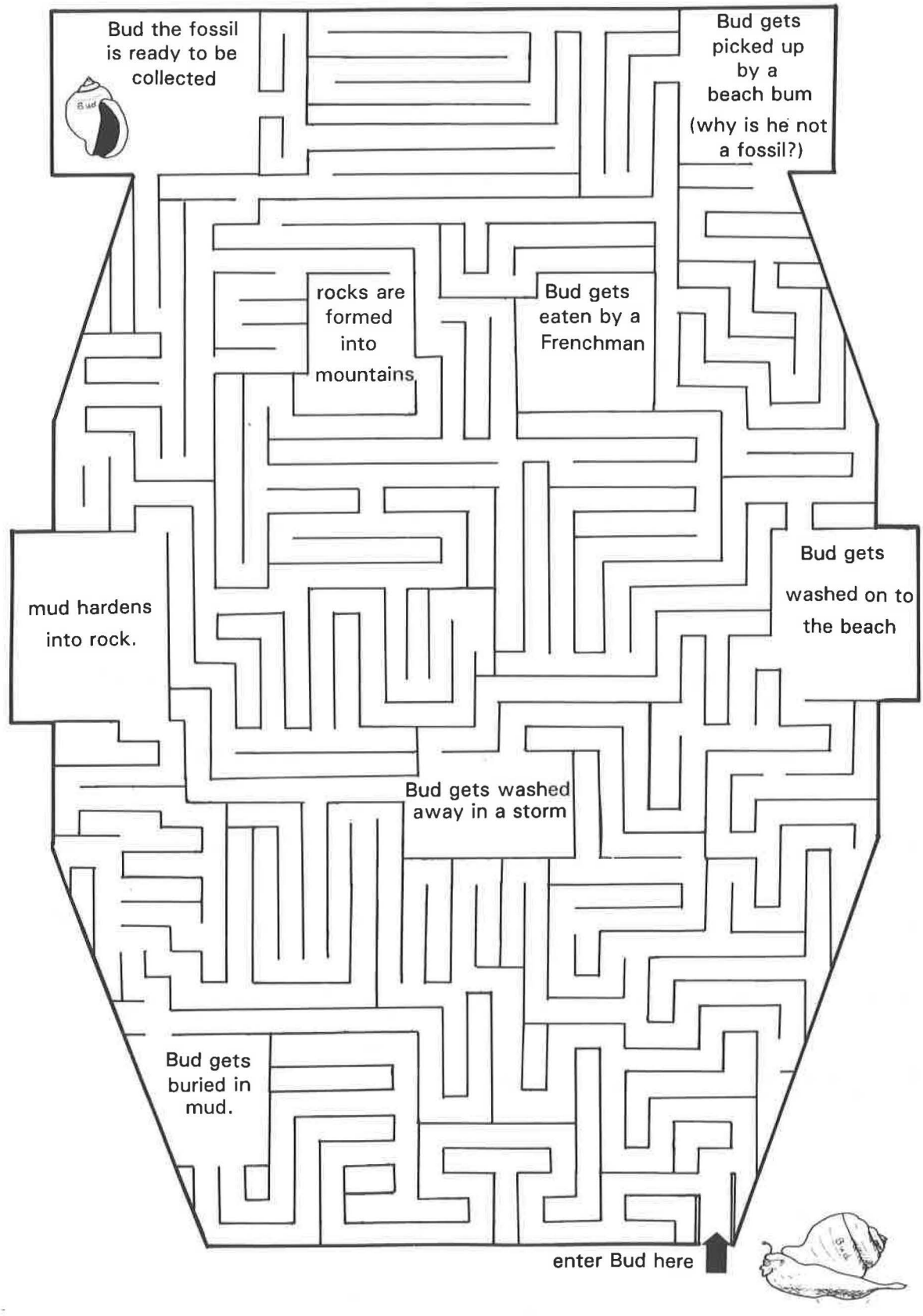
E. Erosion of the rocks exposes the hidden fossils that then can be collected. Can you find the eroded fossil before the fossil collector does?

Make a fossil out of Bud.

On the next page find the route to make Bud, the snail, a fossil that can be collected. Be careful not to make Bud go the route that will either destroy him or have him collected before he becomes a fossil in rock.

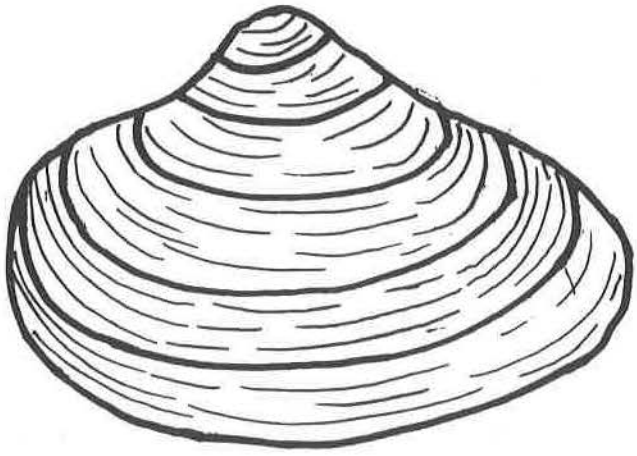
Hint: There are more ways than one to make Bud, the snail, a fossil.

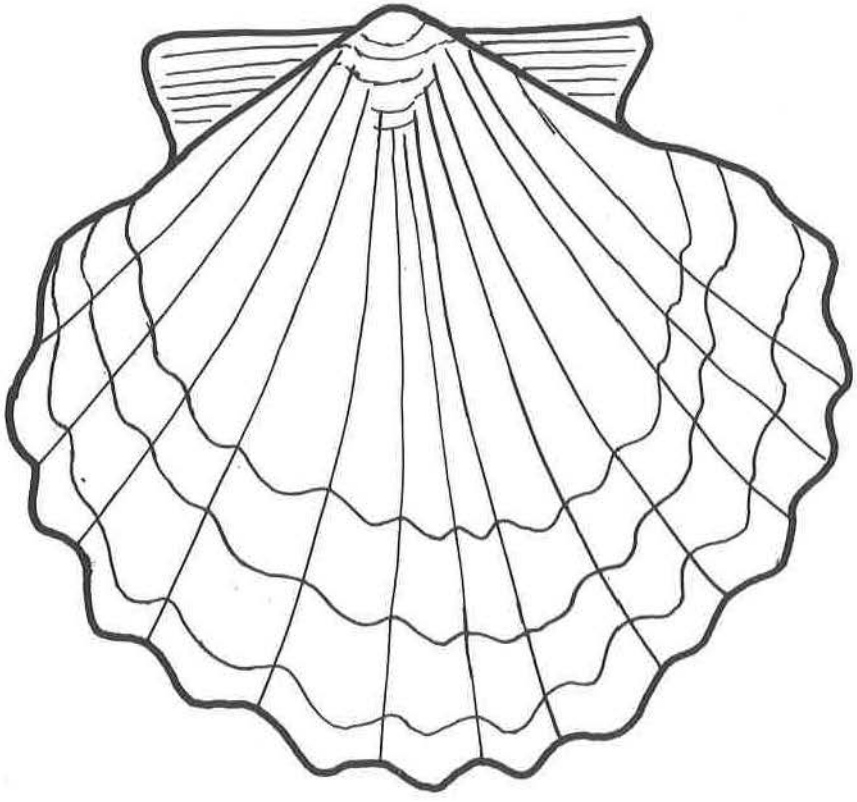



Bud the fossil is ready to be collected
Bud gets picked up by a beach bum (why is he not a fossil?)
rocks are formed into mountains
Bud gets eaten by a Frenchman
mud hardens into rock.
Bud gets washed on to the beach
Bud gets washed away in a storm
Bud gets buried in mud.
enter Bud here

Clams

About clams: **Clams are one of the most abundant types of more recent fossils. Many types are still with us today and you can see them at the beach. These animals have two shells that almost look the same. Most clams live on or are buried in sand and mud along the sea shore. One type called a scallop can even swim by flapping its two shells together. Most clams live sitting on the sea bottom and eat by pumping water through their shells to strain out tiny food particles.**

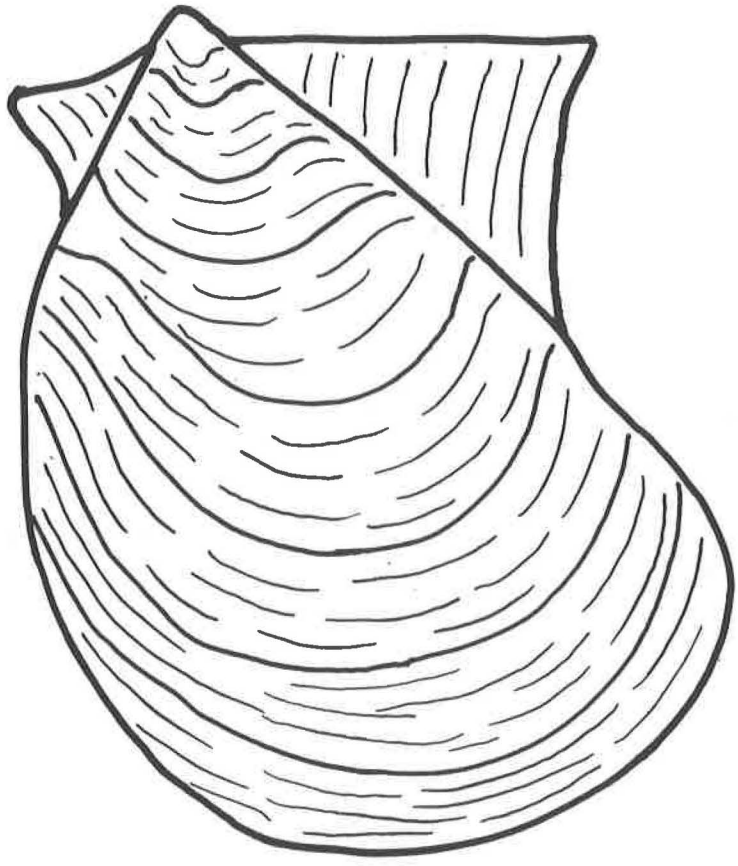


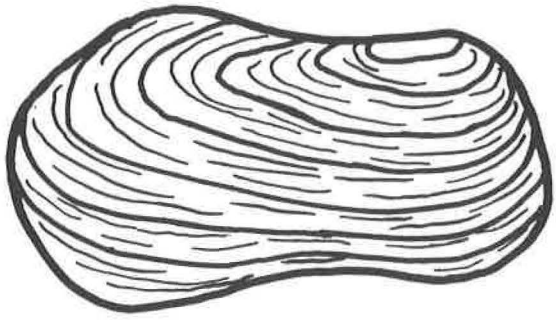


and more clams

Did you know: The rings on a clams shell are called growth rings, and can tell you the age of a clam?

In the space below try drawing a clam shell.

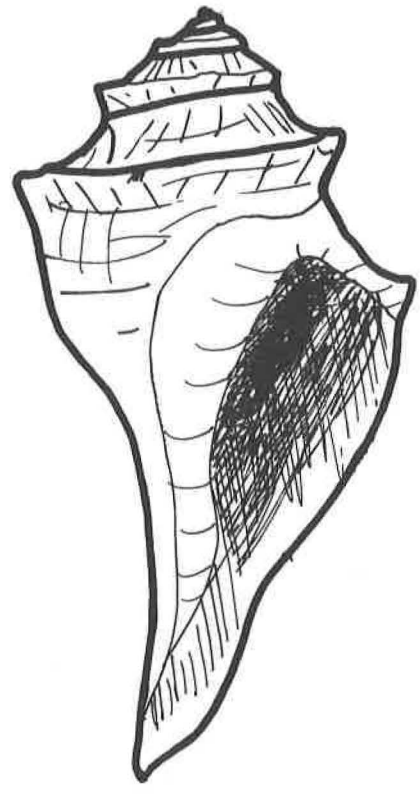


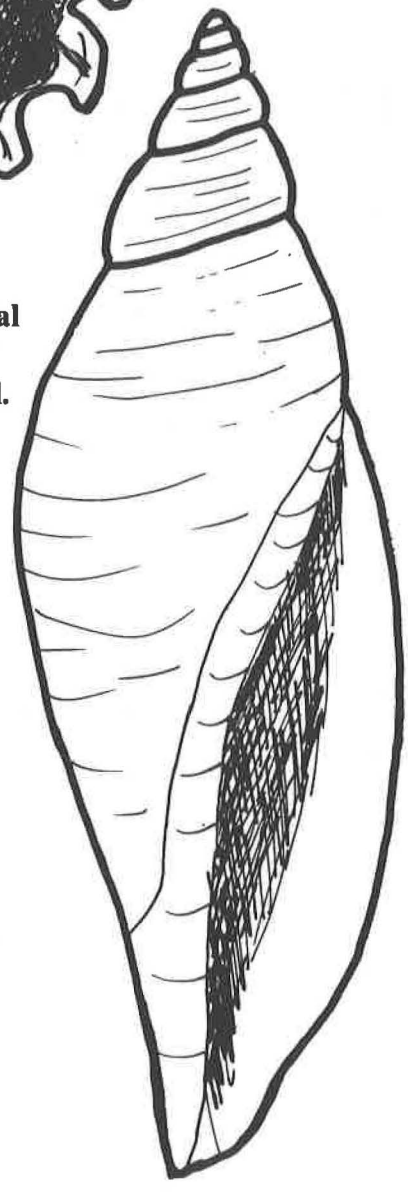


Snails

About snails: **Snails are one of the most common and prettiest types of fossils of Maryland. In Maryland's most ancient times, snails were not as common as they are today. Snail shells are really skeletons but serve as the snail's house. As the snail animal grows it needs more space, and so it adds onto the opening or door. This causes the shell to grow in a screw-like way, giving the snail shell its cone shape. Snails live on the sea floor, slowly crawling about eating tiny plants like algae that grow on the sea bottom.**

The official Maryland State fossil shell is a snail. Its name is *Ecphora* (pronounced Ek - for - a).





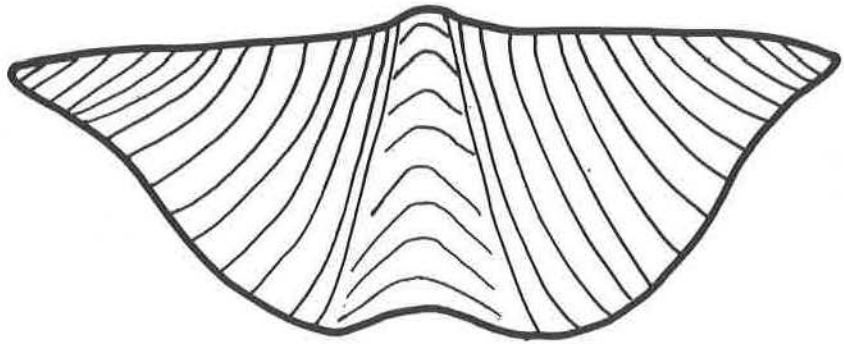
This is *Ecphora* , the official

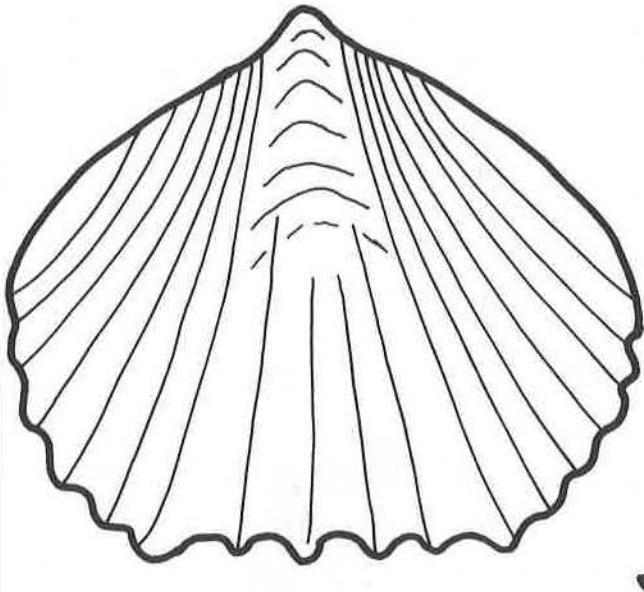
Maryland State fossil shell.

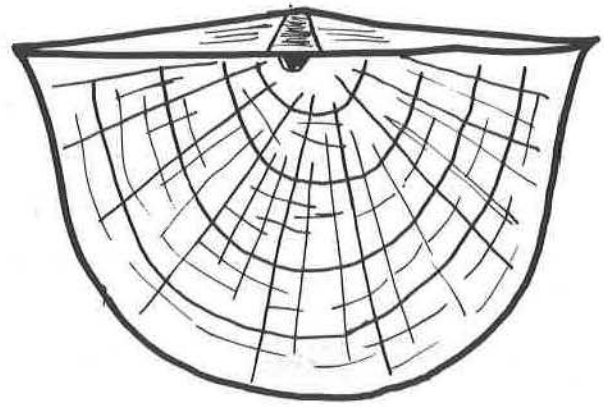
Brachiopods

pronounced - **brack - ē - ō - pods.**

About brachiopods: **Brachiopods look a lot like clams, but are not closely related to clams. Brachiopods also have two shells like the clams, but the brachiopod's top and bottom shells do not look the same. Brachiopods lived in a variety of ways. Some cemented themselves to rocks on the sea floor; others held on to the sea bottom by a strong muscle. Most just sat unattached on the sea floor and strained out food particles from the sea water, which they moved through their shells by flapping thousands of tiny hairs. Brachiopods are very common, in rocks formed in Maryland's very ancient seas, but today most of them have died off.**



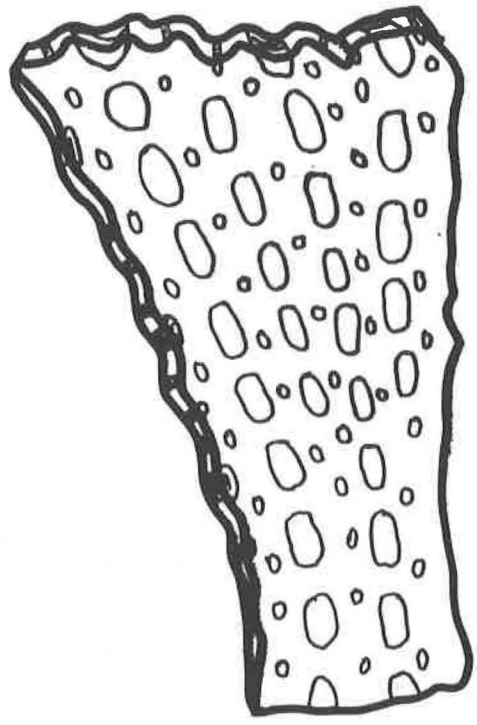




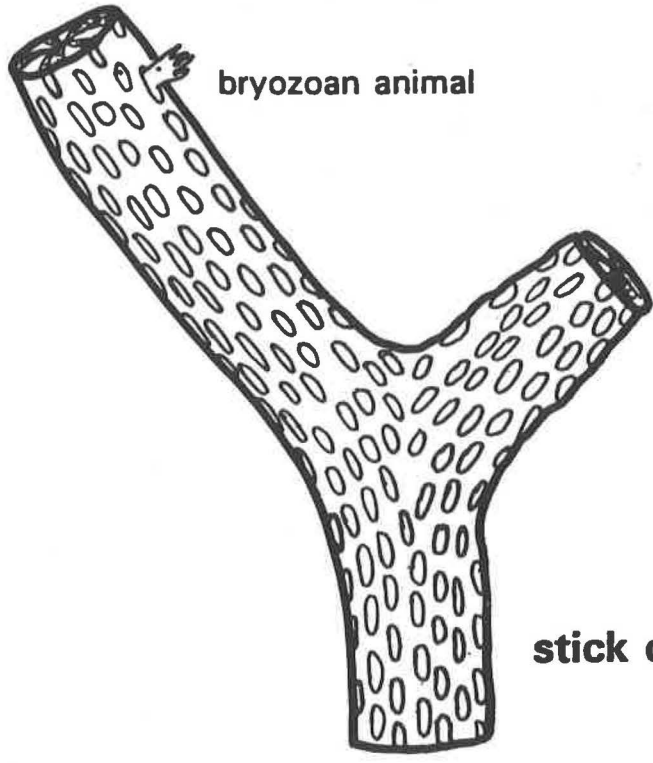
Bryozoans

pronounced - **bry - ō - zō - ans.**

About bryozoans: **Also known as moss animals, bryozoans once were abundant in Maryland's seas. Today the waters of Maryland are too cold for most bryozoans to live here, but bryozoans still live in warmer waters in other parts of the world. Bryozoans are tiny animals that live crowded together in what are called colonies. In the drawing to the right, each hole is the home of a single bryozoan animal. The colonies are like large hotels housing hundreds or even thousands of animals. Each animal strains food particles out of the sea water. The colonies have a variety of shapes like broad lacy blankets and branches or sticks.**



lacy colony

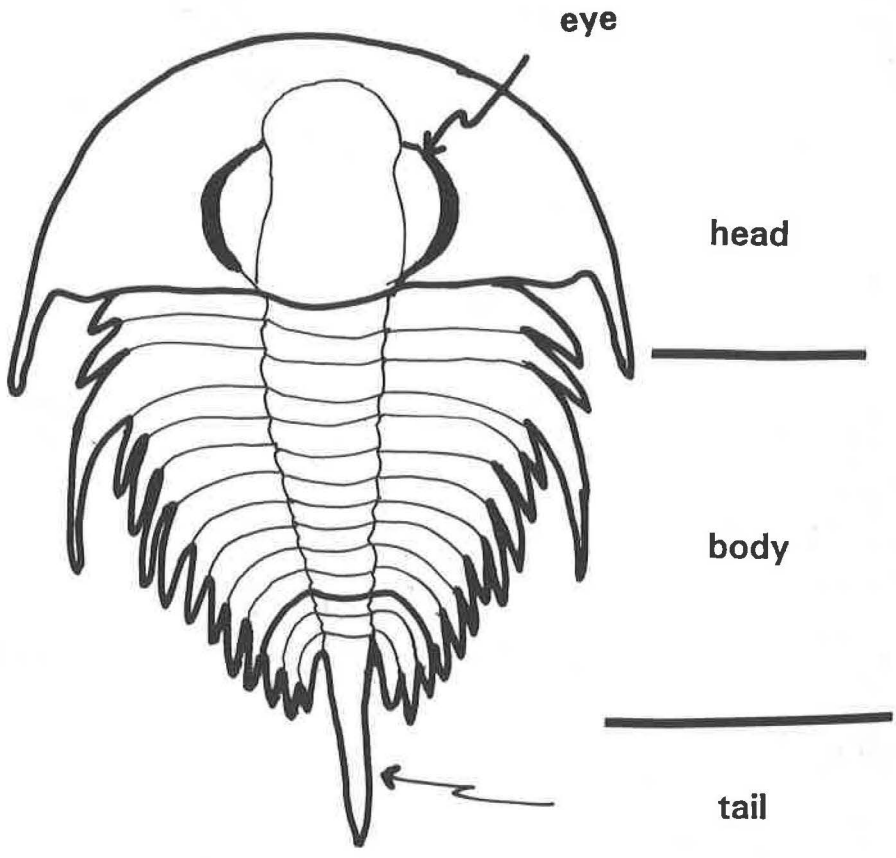


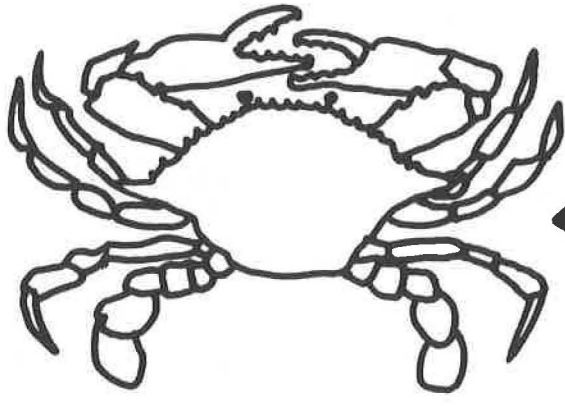
stick colony

Trilobites

pronounced - **try - low - bites.**

About trilobites: **One of the most ancient types of fossils in Maryland's past are the trilobites. Trilobites are now extinct, which means that they have died off. Trilobites are distant relatives of our present-day crabs. They lived on the sea floor, crawling about, sifting through mud and sand, removing and eating food particles that they found and even scavenging on dead animals. Some special types of trilobites swam through the water and preyed upon other creatures.**

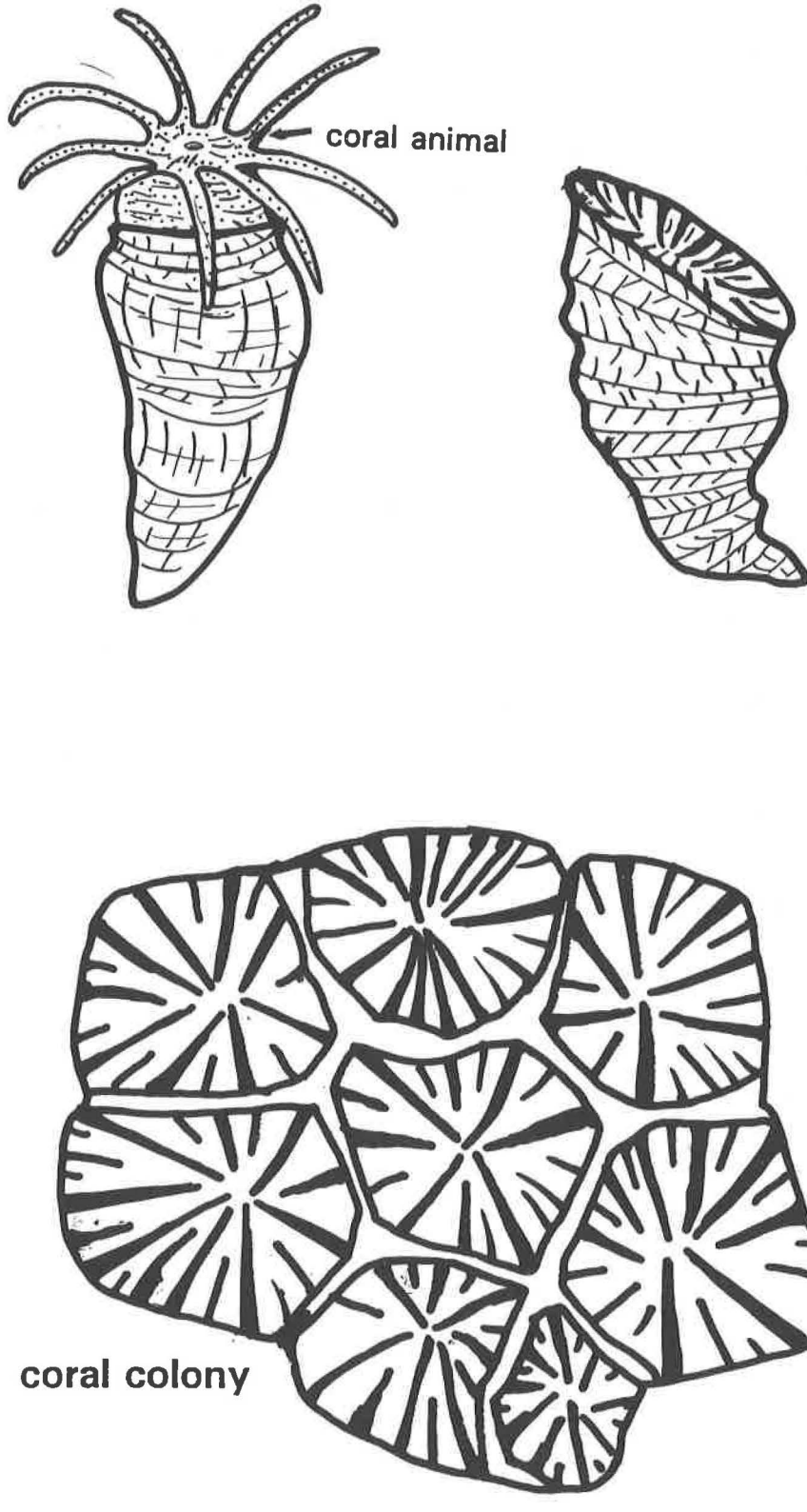




the present day Chesapeake blue crabs are distant relatives of the ancient trilobites

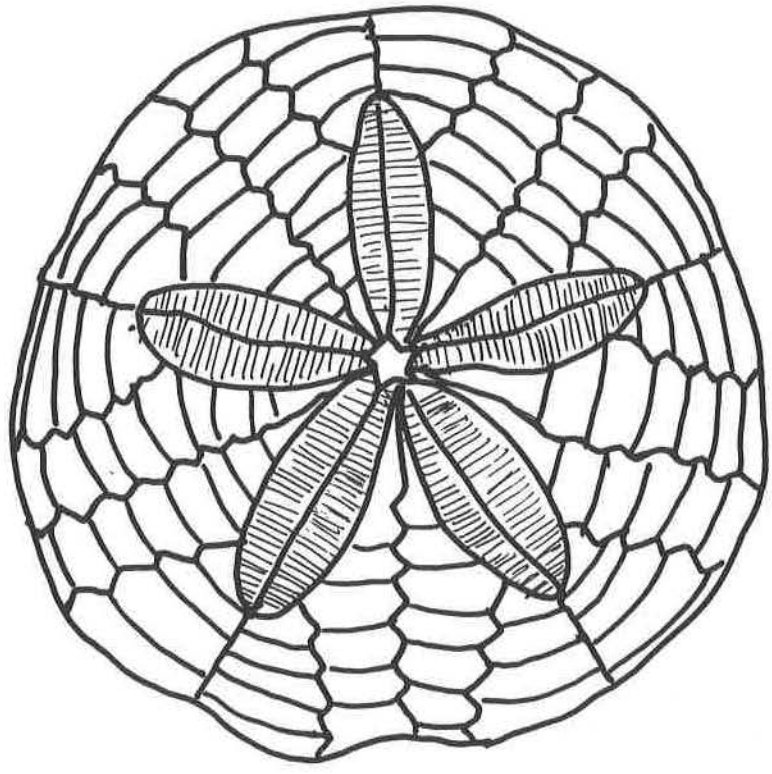
Corals

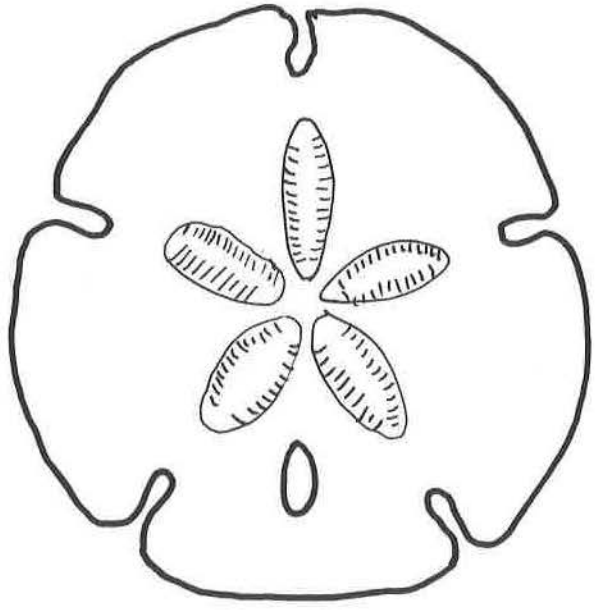
About corals: **Although Maryland is currently too far north to have corals growing in its waters, millions of years ago corals were common in the warm tropical waters of Maryland's seas. Ancient corals of Maryland lived either as single animals as in the top two examples at the right or in crowded colonies as below. These animals lived in one place on the sea floor and sorted out tiny food particles from the water. In some of the rocks of western Maryland, small ancient reefs are made up of fossil corals. Do you know how many coral animals lived in the colony to the right?** **See page 40 for the answer.**


coral animal
coral colony

Sand Dollars

About sand dollars: **Sand dollars get their name because many are about the size and shape of a silver dollar. Sand dollars are relatives of the spiny sea urchins, and even distant relatives of crinoids. Their skeletons are made up of many pieces or plates that are welded together to form a shell. Unlike crinoids, sand dollars do not live attached to the sea floor, but live buried in soft sand. They feed on tiny food particles in the sea water. In the drawings to the right the top picture shows a sea urchin's skeleton; the bottom picture shows a sand dollar.**

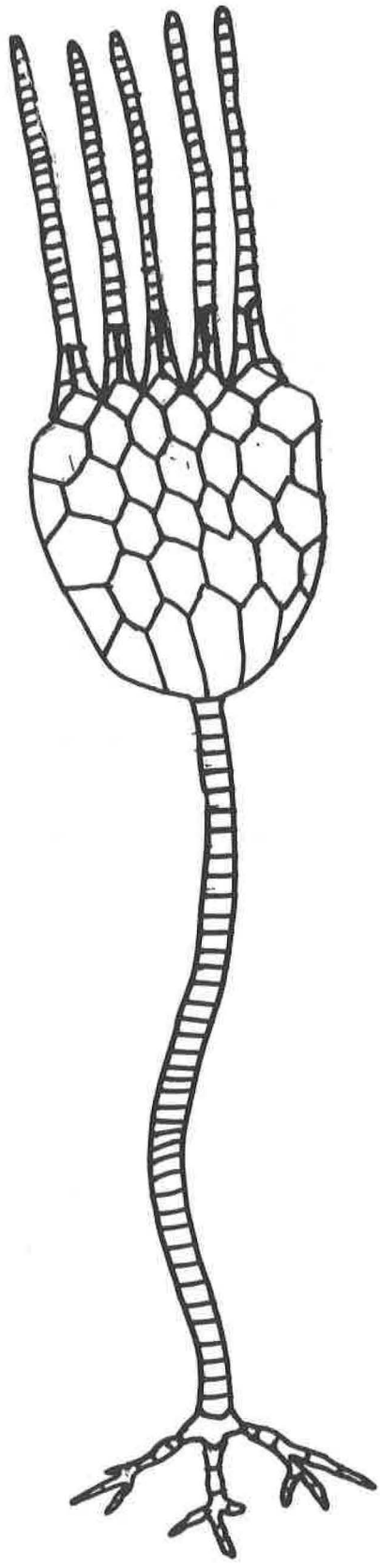




Crinoids

pronounced - **cry - noids.**

About crinoids: **Crinoids, also called sea lilies because they look like flowers, are really animals and not flowers at all. Crinoids are relatives of the sand dollar and sea urchin, but lived anchored to the sea floor by roots. Their arms and heads were situated above the sea floor on top of a stalk or stem. They relied on waves and currents to bring small food particles past their arms. The arms caught the food and transferred it to the mouth which was located on top of their head. In Maryland's ancient seas crinoids were once so plentiful that parts of their skeletons can make up entire rocks. Today crinoids are very rare, and are only found in warm waters where coral reefs grow.**



arms

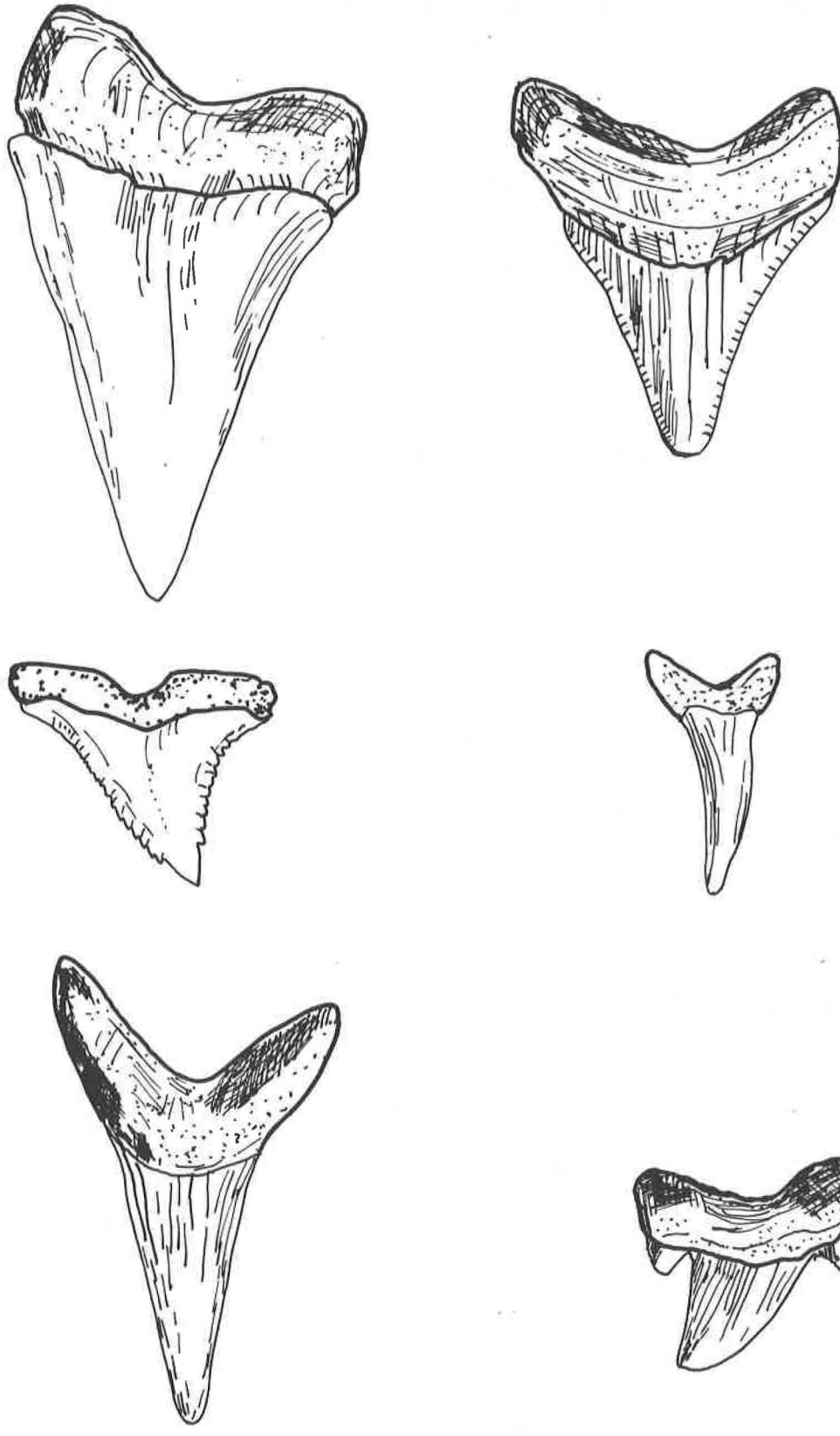
head

stem

root

Sharks

About sharks: **Because sharks do not have a hard skeleton they are not easily preserved as fossils. But teeth of sharks are very hard and are commonly preserved in rocks as fossils. Sharks have lived in Maryland's ancient seas for millions of years. Shark teeth can be found in rocks more than 360 million years old. The oldest sharks were just like today's; they swam around looking for other sea creatures to eat. Fossil shark teeth can be as small as ¼ inch or as large as 4 inches long.**



What the sea floor might have looked like in Maryland's most distant past.

(match the letter with the type of animal)

_____ **Brachiopod**

_____ **Coral**

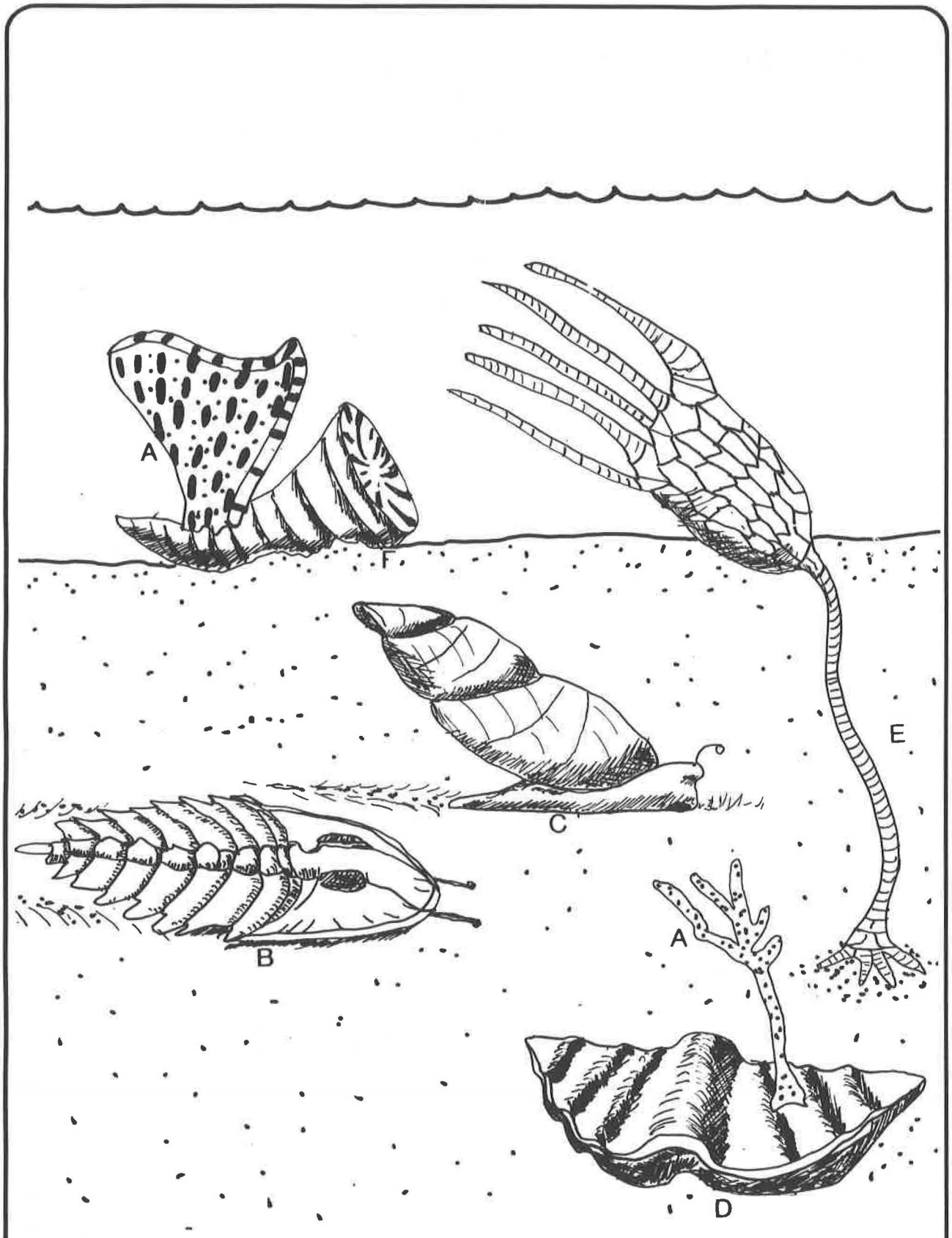
_____ **Crinoid**

_____ **Snail**

_____ **Trilobite**

_____ **Bryozoan**

(see page 40 for answers)


A
F
E
C
B
A
D

What the sea floor might have looked like in Maryland's more recent past.

(match the letter with the sea creature)

_____ **Clam**

_____ **Bryozoan**

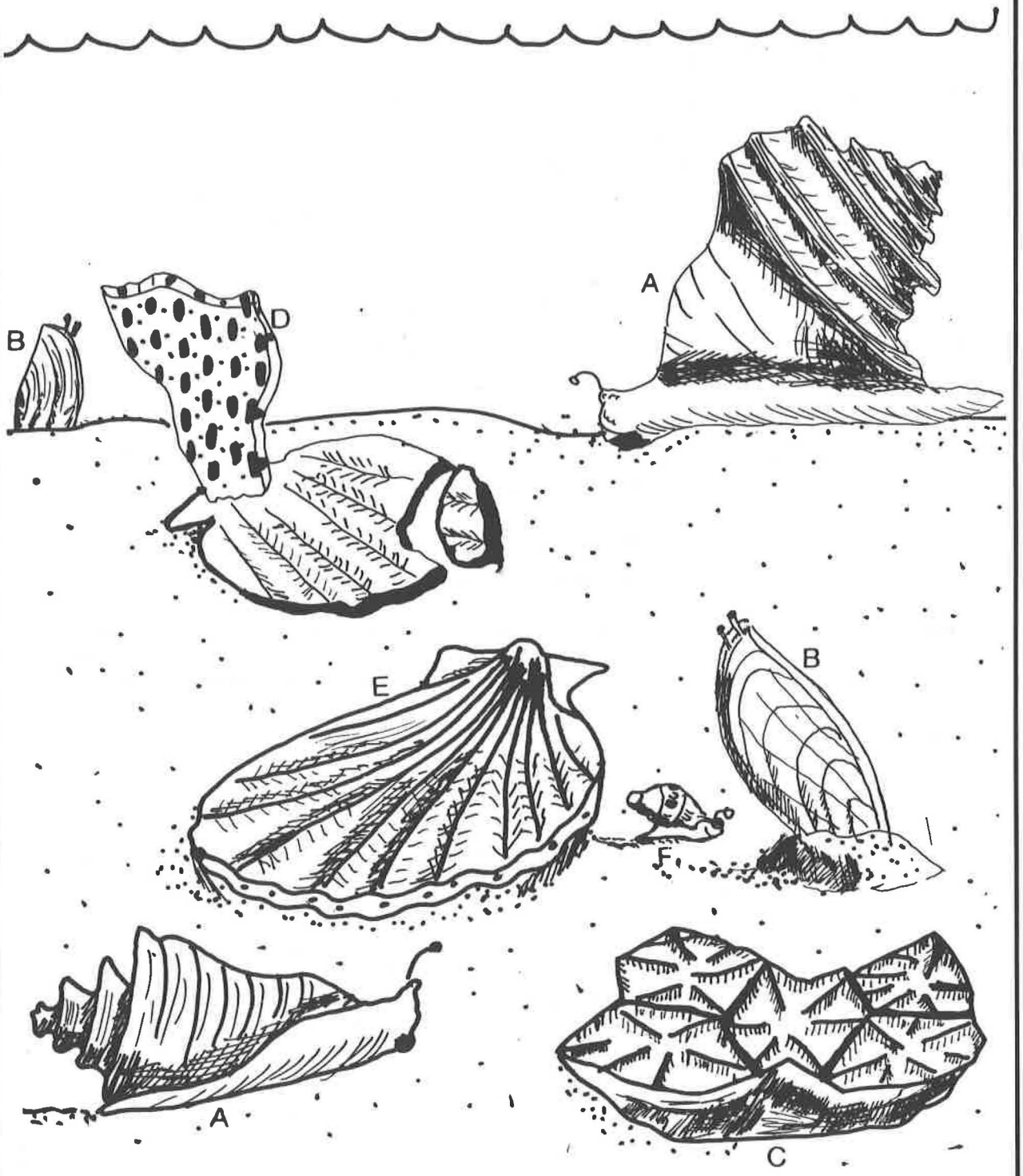
_____ **Snail**

_____ **Coral**

_____ **Clam**

_____ **Bud (the snail)**

(see page 40 for answers)

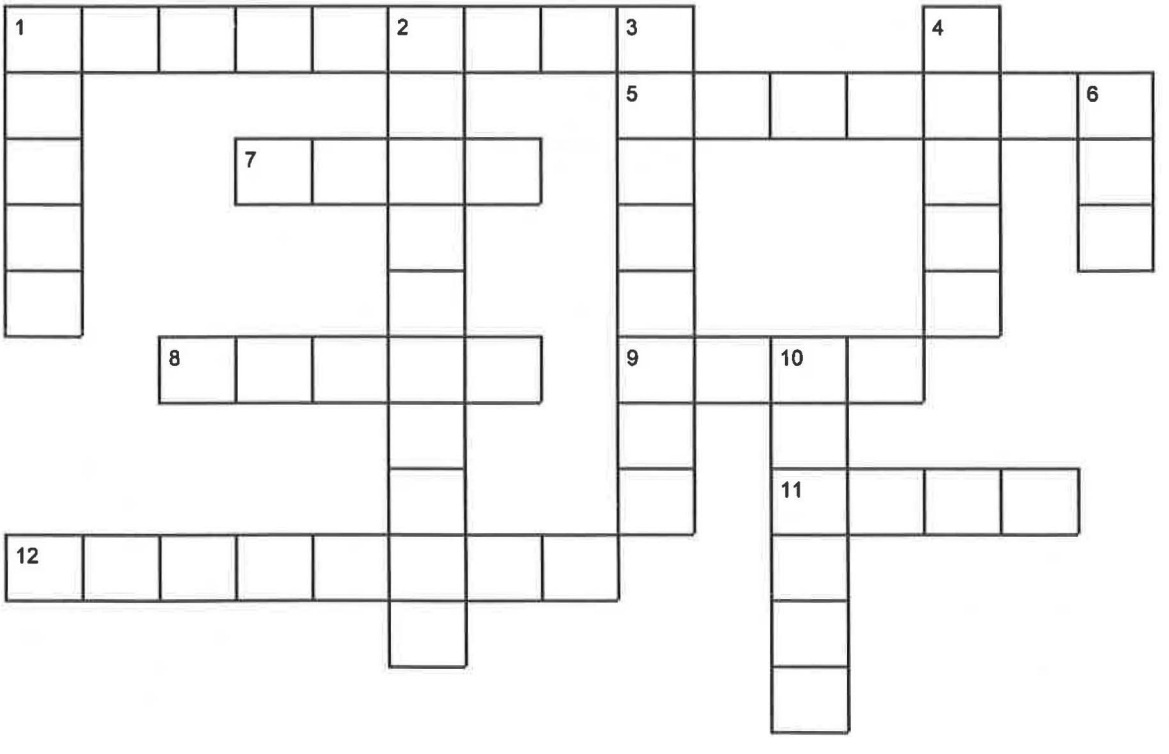

A
B
D
E
B
F
A
C

ACROSS

1 I am a distant relative of the Chesapeake blue crab.
5 A sea lily is actually an animal called the _____.
7 A scallop is a type of _____.
8 "Bud" is what type of animal?
9 Fossils are preserved in _____.
11 Bryozoans can form a colony that looks like a stick or is _____.
12 I am called a "moss animal."

DOWN

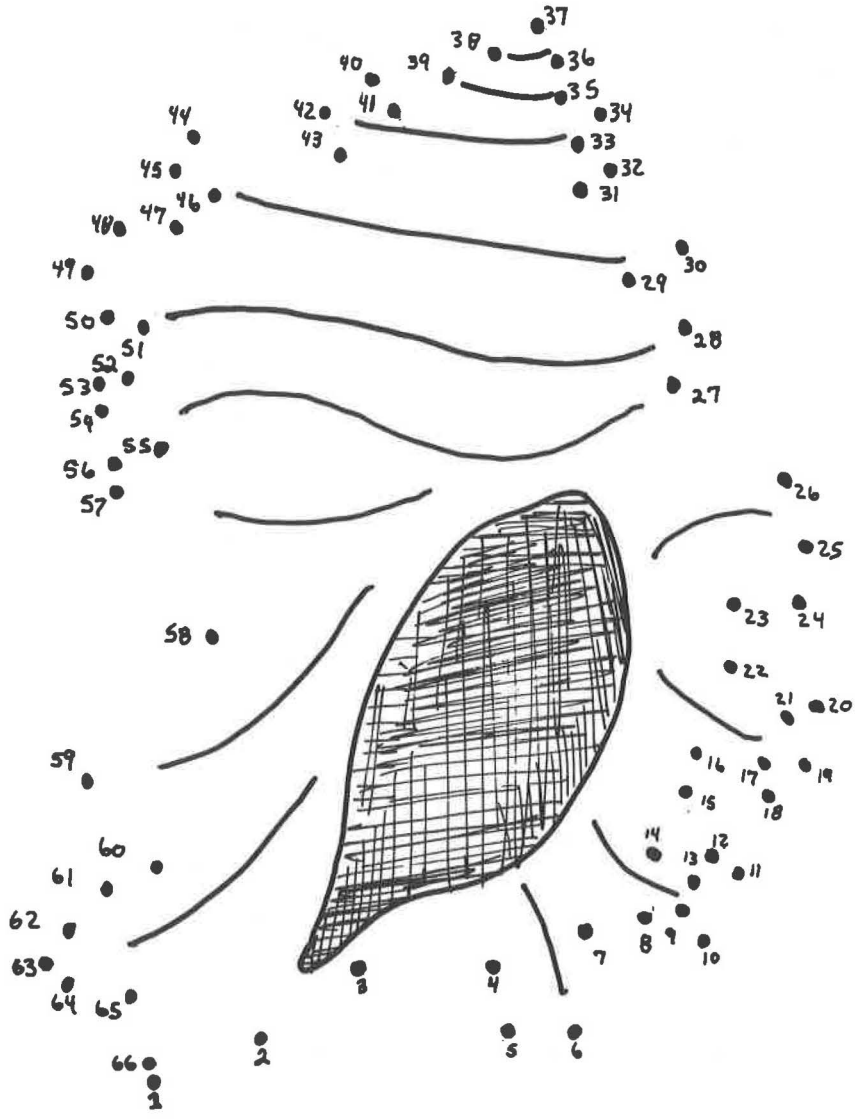
1 What part of sharks is typically preserved as fossils?
2 I look a lot like a clam, but I am not a clam.
3 I am the Maryland State Fossil Shell.
4 When you think of a reef, I am probably the first animal you think of.
6 What is the abbreviation for the Department of Natural Resources?
10 Corals can live as single animals in "hotels" called a _____.



(See answers on page 40)

What is my name?

(hint: I am the Maryland State fossil shell.)



The Maryland State fossil shell is E _ _ _ _ _ _.

In the puzzle to the right collect, by circling, as many types of fossils as you can find. Fossils are hiding either up and down or across. Below are the names you should look for. The word <u>fossils</u> is circled for you as an example.

crinoid

corals

Maryland

trilobite

snails

brachiopods

clam shell

bryozoans

sand dollar

sharks

fossils

Ecphora

(see page 40 for answers)


Z B N R T V U Z C N C L A M S H E L L
I R Q K C B R Y O Z O A N S N A I L S
C L D Y P U Z P X K R M T Y J U D C A
A Y M A R Y L A N D A M E T C D Y K N
T V D K V R J C J P L A U R A N I C D
D R X C R I N O I D S A C I L A T R D
C E K L V X D V D C Q A L B V I L P O
H C D S H A R K S M V L A D T L Q Q L
T P D Q T R N U B L O A M P Y S U V L
N H R U W R Y N T R I L O B I T E S A
A O I J C M N V D A E R I R D V Y X R
B R N L Y X C U T M C Z B L T R B C S
B A L A I Z B A P Q X T I Z O D R X T
T J L R N C D U Z V D B L N D J X V I
I B Q O T R I L O B I T E A S H A R K
B R A C H I O P O D S D J N N K W X W
T K D H P N P I A K L C A L A M I T U
Y J K L F O S S I L S I L O I J V V D
A O B U Y I A U R M L J H A L U P I U
Q P C A F D E V O S D O M L E M C M X

ANSWERS

Page 4 There are 23 counties in Maryland.

Page 24 There are eight corals in the coral colony.

Page 32

D- Brachiopod

F- Coral

E- Crinoid

C- Snail

B- Trilobite

A- Bryozoan

Page 34

B- Clam

D- Bryozoan

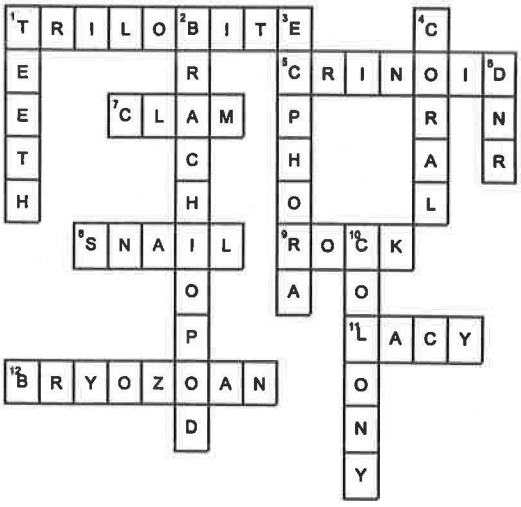
A- Snail

C- Coral

E- Clam

F- Bud (the snail)

Page 36 Crossword puzzle answers.



Page 37 The answer is *Ecphora*.

Page 39 The key to the word puzzle.