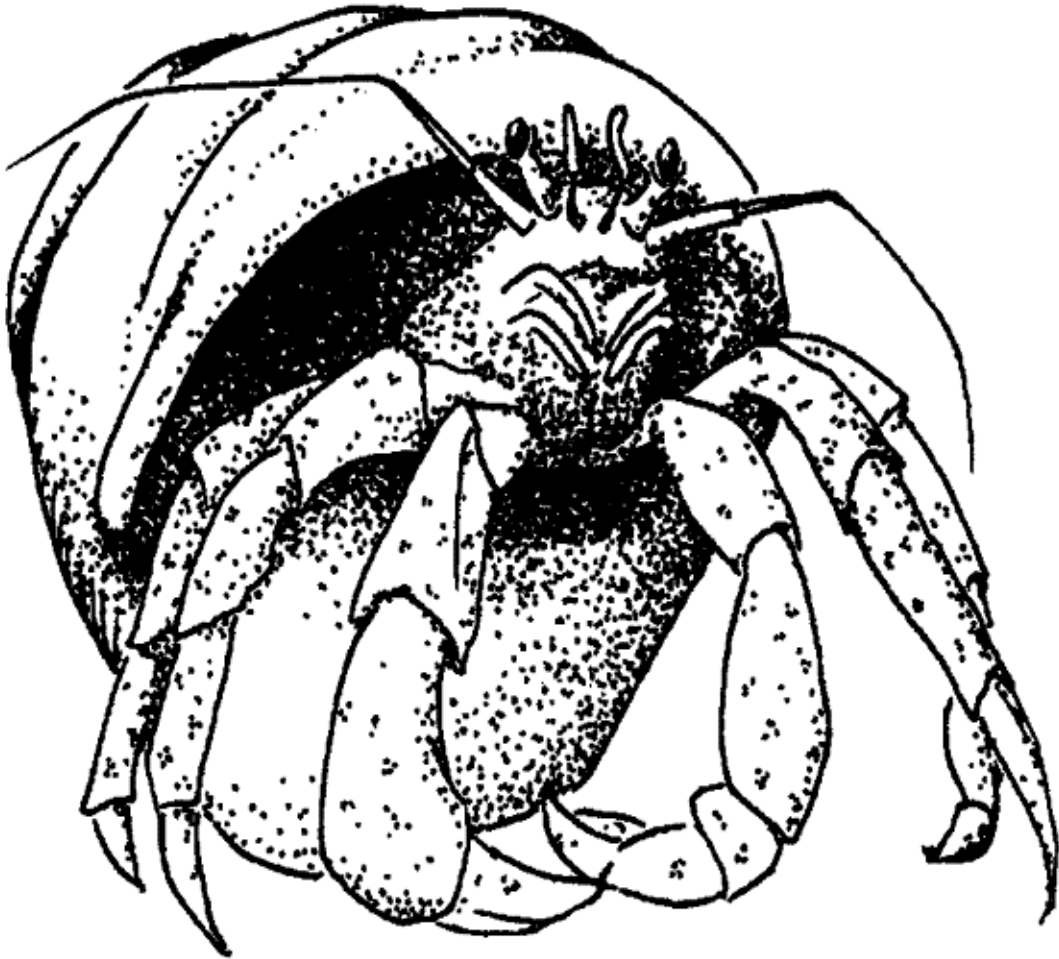

SEASHORE BINGO



FOR THE TEACHER

Discipline

Biological Science

Theme

Diversity

Key Concept

The rocky seashore is a habitat for many different types of plants and animals.

Synopsis

Students observe the diversity of plant and animal life at the rocky seashore. They identify the names and pictures of plants and animals by playing a bingo game using drawings of rocky seashore organisms. (Seashore Charades is a good companion activity to do either before or after Seashore Bingo.)

Science Processing Skills

observing, comparing

Social Skills

encourage, check for agreement

Vocabulary

diversity, adaptation

MATERIALS

INTO the activities

-
- One or more of the following:
 - MARE's Seashore Charades slide show,
 - and/or numerous pictures of rocky seashore organisms (good sources are photographs in magazines or books such as *Tidepools*—see Literature Connections in the Interdisciplinary section),
 - and/or rocky seashore videos (the Monterey Bay Aquarium video is excellent as is the “Seashore” video—see the Resources section)

THROUGH the activities

- Key Concept written in large letters on butcher or chart paper
- 19 organism drawings (Bingo Clue Cards) copied and colored. Optional: laminate the clue cards
- Bingo Boards (copy 2–3 of each and color; one board per student). Optional: laminate the Bingo Boards
- Bingo markers (six per student) such as beans, poker chips, or squares of colored construction paper
- a cup for each student to hold bingo markers
- optional
- card stock
- colored pens or crayons for each student

INTRODUCTION

“It is time for the preachers, the rabbis, the priests and pundits, and the professors to believe in the awesome wonder of diversity so that they can teach those who follow them. It is time for parents to teach young people early on that in diversity there is beauty and there is strength. We all should know that diversity makes for a rich tapestry, and we must understand that all the threads of the tapestry are equal in value no matter their color; equal in importance no matter their texture.”

Maya Angelou

Wouldn't Take Nothing for My Journey Now

Written about racial diversity, Maya Angelou's words are beautifully apropos to biological diversity at the rocky seashore. The health of the environment relies on the great diversity of organisms and habitats on our planet. Organisms, including humans, come in many shapes, sizes, and colors. They live in varied places and ways. Most importantly, every organism helps hold the interwoven tapestry of our natural world together.

In addition, all organisms are continually adapting to their environment. The environment is also constantly changing and, as organisms are faced with new challenges, organisms either adapt to these changes or become extinct. The best adapted individuals meet the challenges of their environment and produce more offspring than their counterparts. As a result, these better adapted individuals are more likely to pass on their more favorable characteristics to their offspring. This process of evolution has produced a fantastic variety of life forms. There are now perhaps 10 million different kinds of living organisms on earth.

To understand the concept of diversity, one must look for the similarities and the differences between things. Some of the external identifying features might be color, size, shape, texture, or taste. With animals, one might look for the number of arms and legs, what and how they eat, how they move, and where they live. The following list identifies the characteristics of some of the rocky seashore organisms identified in the Seashore Bingo game.

Seashore Bingo Organisms

There are standardized classification systems for organisms so scientists around the world can exchange information using specific, pre-assigned names to identify every organism. The following organisms are organized according to a “phylum.” Each phylum includes organisms that share certain common characteristics and a common ancestor. The "Build a Rocky Seashore" activity contains additional descriptions of many of these organisms.

This list is for the teacher’s information only. You may want to have students make up their own categories (see "Organism Sorting" in Through). For the purpose of the Seashore Bingo activity, the scientifically correct names may detract from students learning the concept of diversity for themselves.

Arthropods

common characteristics:

segmented animals with a firm external skeleton and jointed appendages

Hermit Crab

*olive-green pincers and legs with small blue dots,
red antennae, brown shell*

They grow to the size of a walnut (about four centimeters) on the Pacific coast of North America and much larger in the tropics. These crabs live in the shells of dead snails, with the soft rear sections of their body wrapped around the inside of the shell, and their pincers and antennae protruding.

Kelp Crab

reddish or olive-brown

This crab with a carapace (external shell-like skeleton covering the “back”) shaped like a shield can grow up to nine centimeters in width. It lives camouflaged among the kelp.

Lined Shore Crab

brown with thin red, purple, or green stripes

These are small, square-shaped, flat crabs. Never growing much larger than the palm of your hand (about eight centimeters), these animals are almost terrestrial and can spend half of their time out of the water. When not looking for food, they tend to wedge themselves into rock crevices to hide from waves, birds, and raccoons.

Rock Louse

olive-green to brown

This organism is shaped like a compressed football, with many legs to hold on tightly to its resting place, and antennae to identify its surroundings. It grows to be about four centimeters long.

Barnacles

gray, white, or pink

A young barnacle attaches its head to a rock and builds a shell around itself. It lives the rest of its life in that spot, extending feathery legs out of its volcano-like shell to gather food. Off the coast of California intertidal barnacles can grow from pin-size to a little larger than a person's big toe (from about a millimeter to six centimeters).

MOLLUSKS

common characteristics:

a compact body that can be divided into a foot, a body, and a head, which is sometimes very reduced (as in clams). Often secretes a shell, which covers its very soft body completely (as in mussels) or only partially (as in snails and abalone). Most mollusks have a radula (a rough tongue) to scrape food from hard surfaces.

Abalone

red or black

This type of snail has a large, flat, beret-shaped shell with holes on one edge. It holds tightly onto a rock and will often live its entire life in one spot. Red and black abalone are common along California's shores. They grow up to 30 centimeters in diameter.

Shield Limpet

brown or green to nearly black shell, often checkered with white

This snail's domed shell grows to four centimeters in length. They can be found living on rocks, algae, or in mussel beds. At low tide they hang on very tightly to the rocks. At high tide they move around and graze on algae.

Lined Chiton

light reddish shell with lines in alternating colors of red, blue, or white, surrounding skin surface is yellowish or greenish, often in colored bands

Chitons have eight butterfly-shaped overlapping plates instead of a single shell like snails. This gives them great flexibility to mold themselves to the rocks and hang on tightly. This chiton grows up to five centimeters long.

Sea Slug or Nudibranch

orange areas on back bordered by bright, light-blue lines

These soft-bodied, elongated relatives of snails grow to be eight centimeters long. They have no shells, but many deter predators with a foul taste or stinging cells taken from their sea anemone prey and placed in tentacle-like growths on their backs.

Mussels

gray and black

These bivalves (two shells connected with a muscle hinge) can be found as solitary animals or in colonies (“beds”) of tightly clustered shells. They attach themselves to rocks or other creatures with tiny threads secreted by a gland in their foot. They can grow to be 13 centimeters long in most California intertidal areas.

Two-Spot Octopus

upper body is dark gray, brown, red or olive mottled with black, and a dark blue-black spot under each eye

With eight arms and a very highly developed nervous system, this animal can change color to match its habitat. The octopus is a very intelligent and voracious predator. This species can grow to have a 120 cm. arm span.

CHORDATES

common characteristics:

all have a notochord (it functions much like the backbone in humans), gill slits, and a nerve chord—at least in the early stages of development

Tidepool Sculpin

greenish to red with a white belly

These fish have mottled colors that blend with their surroundings. They lie motionless on the bottom of the tidepool to hide from predators. They are generally less than 10 centimeters in length.

Western Gull

white and gray, yellow bill, yellow legs and feet

Gulls come to the rocky seashore in search of food. The adults have a 140 centimeter wing span. The young are dark gray-brown until they reach approximately three years of age.

Oyster Catcher

white wing patches, black head, red bill

This bird is found on rocky seashores where it uses its chisel-like beak to pry off or break open its prey (mussels, limpets, and barnacles). It is difficult to find this bird against the dark rocks. Grows to 40 centimeters in length.

ECHINODERMS

common characteristics:

the body can usually be divided into five parts around the center; they have a spiny internal skeleton covered by a thin layer of skin; most echinoderms have tube feet with suckers that can be used for attachment and locomotion (“echino”—spiny, “dermata”—skin)

Sea Urchin

purple, red, green, or brown

These spherical, prickly creatures can grow to the size of a cantaloupe (about 20 centimeters) and are covered with spines. The most abundant species off the California coast is purple and about the size of an orange.

Bat Star

red or orange

The bat star (a type of sea star) can grow to the size of a salad plate (about 15 centimeters). Most sea stars have five arms radiating out from a central disc. If they lose an arm they can grow it back.

Cnidaria

common characteristics:

mouth surrounded by a circle of tentacles with stinging cells (includes jellyfish, sea anemones, and corals)

Sea Anemone

light green to white body with blue, pink, or purple tentacles

Underwater, these animals look similar to a blooming flower, with a mouth in the center, edged with sticky tentacles. When exposed to air they close up to protect themselves from the heat of the sun and resemble a small mound of moss, with a donut hole in the center. They are often covered with tiny shells and rocks to reflect the heat of the sun's rays. They can grow to a 30 centimeters in diameter along the California coastline.

ALGAE

marine plants that range from microscopic, free-floating plankton to giant, anchored kelp. They are the primary food for many organisms. Algae is not actually the name of a phyla, but a group of organisms which is further broken down into phyla. Representatives from two separate phyla are included here.

Sea Palm

olive green

This 60-centimeter-tall, olive green seaweed lives where the waves break at the rocky seashore. They look similar to palm trees and bend with the force of waves much as palm trees bend with the force of hurricane winds.

Sea Lettuce

bright, light green

This paper-thin alga can grow as large as a person (about two meters). It is slippery to touch, tears easily, and is edible. It is found in many Japanese soups.

INTO

THE ACTIVITIES

Class Diversity: Exploring the Room

Exploring diversity in nature is an ideal time to explore the diversity among students in a classroom. It is a chance to look for and appreciate differences and similarities between students, parents, teachers, and the other individuals children encounter. It is an excellent opportunity to recognize the importance of each student as an individual who contributes to the richness of the classroom community.

Cluster students into groups around the room in various ways—by hair color, eye color, height, or even by the color of clothes. Look at the patterns and differences in nationality that can be found within the classroom and point out to the students the tremendous diversity in the classroom. Tell students how everyone brings to the class their own unique strengths and how that diversity makes the class more fun and interesting. Remind students that life at the rocky seashore is even more diverse.

Tidepool Images

For this activity, use one or all of the following materials: Mare Seashore Charades slides, pictures of the rocky seashore, and/or videos of the rocky seashore.

Quickly show the slides, and/or flash the pictures, and/or show the video to your students to familiarize them with some tidepool organisms. If you show students a video of rocky seashore organisms, turn off the narration, if there is any. Let students watch in pairs or small groups so that they can discuss their observations as the video is running.

Ask students to look for differences and similarities between different types of organisms.

- What did you see?
- Are all organisms at the rocky seashore alike?
- How are they different?
- Did you see any fish?
- Any plants?

Animal Corners

See the Teaching Strategies section for how to present this activity.

Pick any four organisms from the Bingo clue cards (for example, gull, octopus, shore crab, and sculpin).

Bingo Clue Cards

Hold up the Bingo Clue Cards one at a time and read the name of the organism to the students. Have the students tell a little bit about what they know about the organism or describe how it looks. Add any additional information from the Introduction that you want the students to know.

THROUGH THE ACTIVITIES

Seashore Bingo Game

This game is like the one played with numbers and letters, but instead of numbers and letters students use the rocky seashore organisms as the squares on their playing boards.

1. Give each student a cup, nine Bingo markers, and a Bingo Board. Hold up a few Bingo Boards and again run through the names of the organisms to familiarize the students with how their Bingo Boards are set up.

2. Shuffle the bingo clue cards like a stack of playing cards and pick them from the top. Have students pick the cards. As each organism is picked, call out the name of the organism and hold up the picture so that each student can put a marker on the corresponding organism on their own Bingo Board. This game proceeds, organism by organism, until one or more students has put a marker on three organisms in a horizontal, vertical, or diagonal row. The student who creates a three-marker row announces it by yelling “bingo” and wins the game. You can also play until someone has a “black out” (all pictures are covered).

3. Have the winner call back to you the names of the organisms that formed their winning row. After you have played several rounds, call out the names of animals without showing the pictures or hold up the pictures and see if students can read the names. You can also give clues about parts of the animal (adaptations, etc.) and see if the students can guess the animal.

Organism Sorting

Divide students into groups of two to four students. Give each group a complete set of Bingo Clue Cards. Ask students to cluster them using whatever criteria they think makes the most sense to them (for example, size, shape, color, number of appendages, etc.). Have each group guess the category criteria used by other groups. Finally, ask groups to explain their decisions and compare the techniques and reasons chosen for each categorization system.

Key Concept

Hold up the key concept and have one or two students read it aloud. Post it near other work from this activity.

BEYOND THE ACTIVITIES

Tidepool Field Trip

Visiting the tidepools is an ideal way to synthesize student learning. Use the MARE guidebook (see Resources section) to field trips in the San Francisco Bay Area for suggestions of how to plan your own field trip to the rocky seashore or to a touch tank such as the one at California Academy of Sciences in San Francisco.

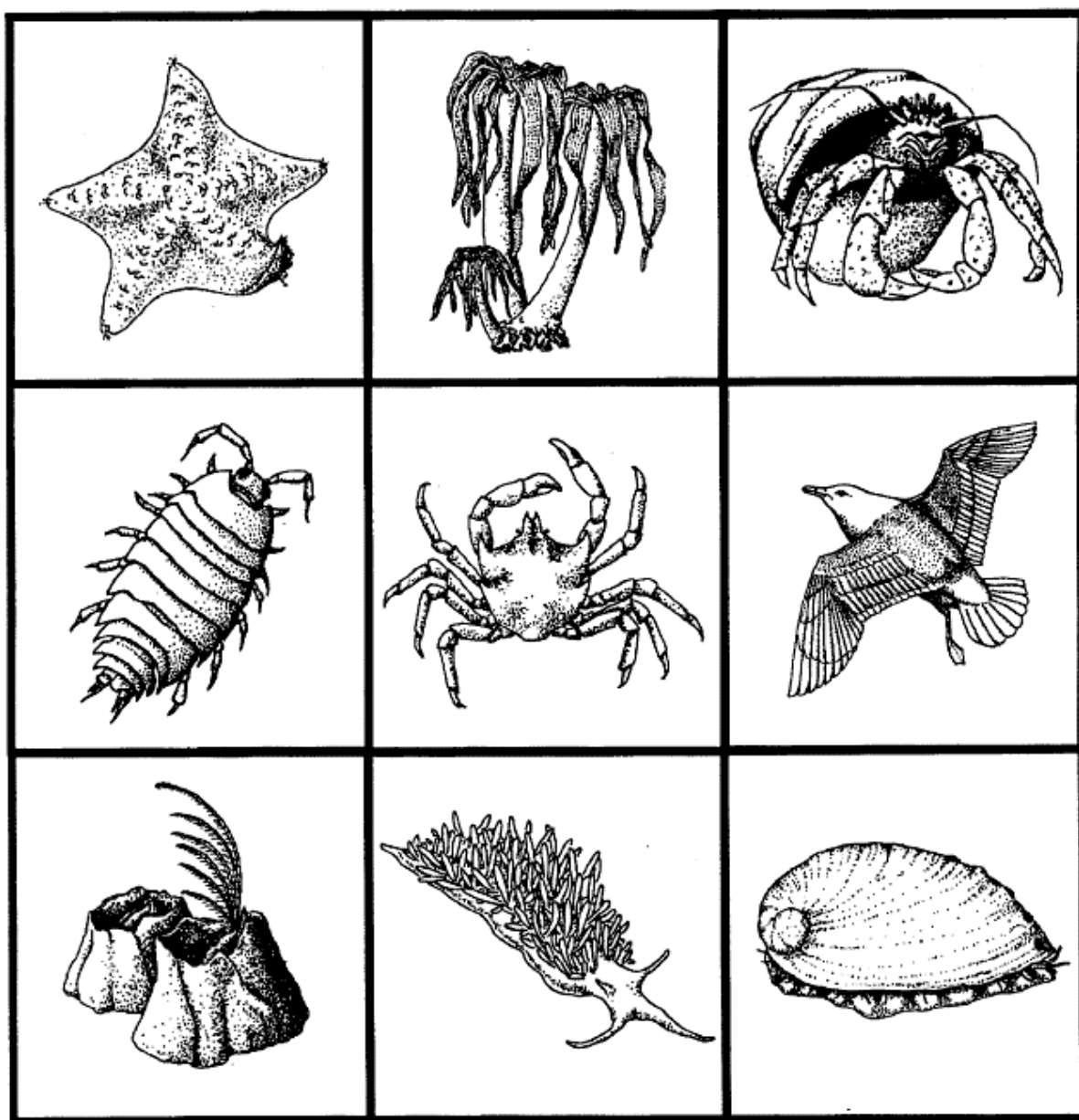
Splash Work Quilt

See the Teaching Strategies section for how to present this activity.

Assign to each student, or pair of students, a Seashore Bingo organism to illustrate for the quilt.

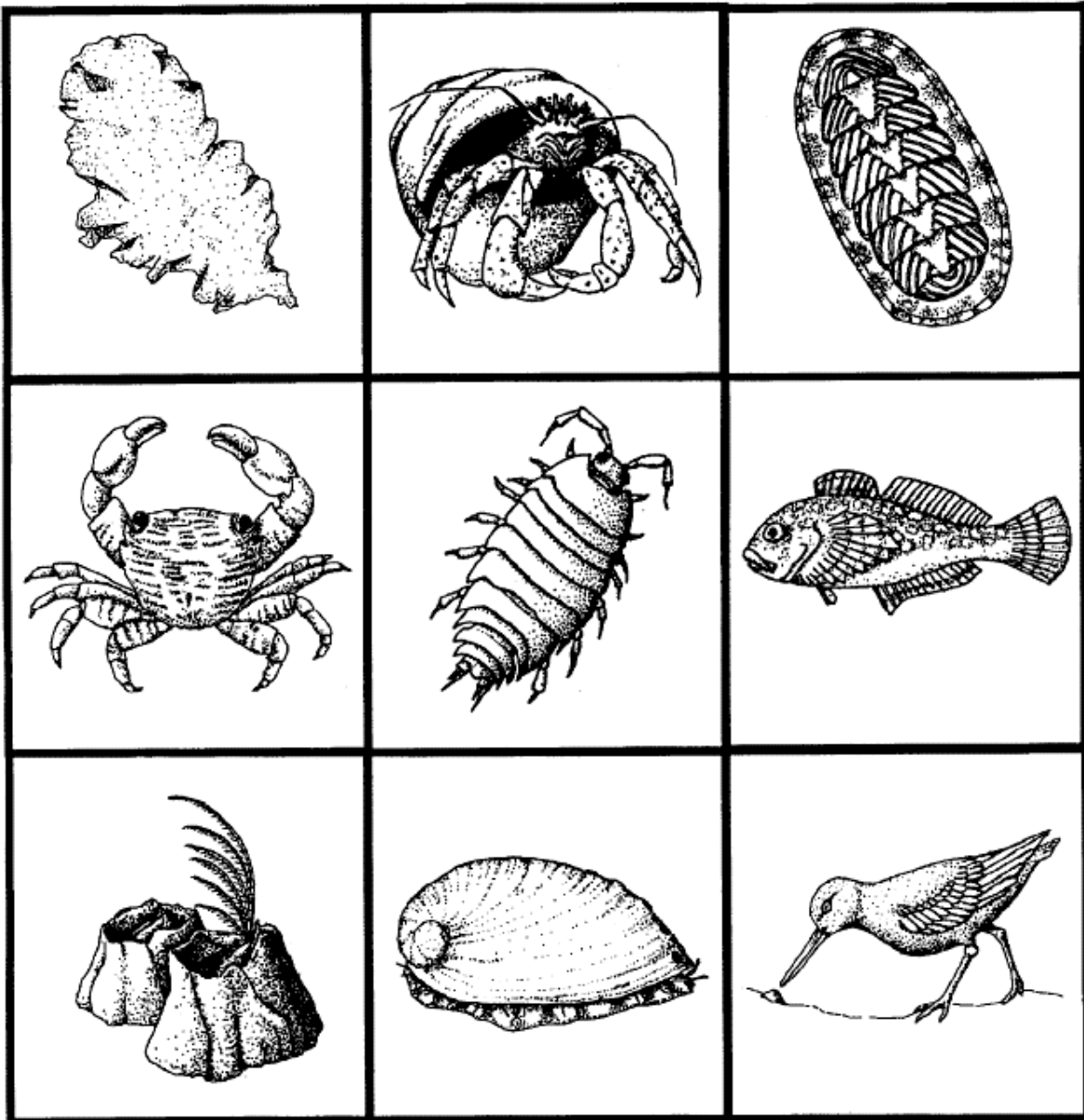


SEASHORE BINGO



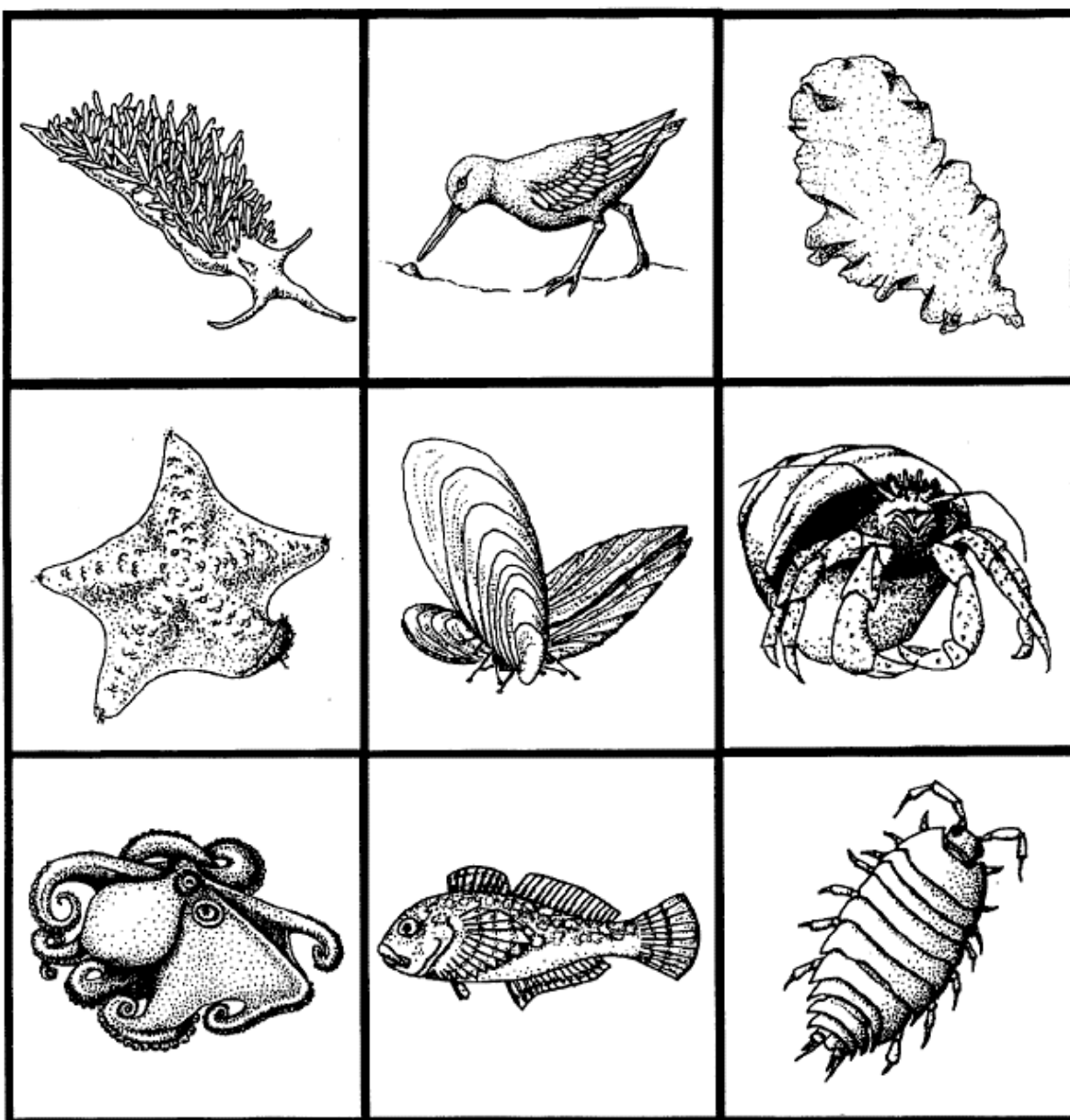


SEASHORE BINGO



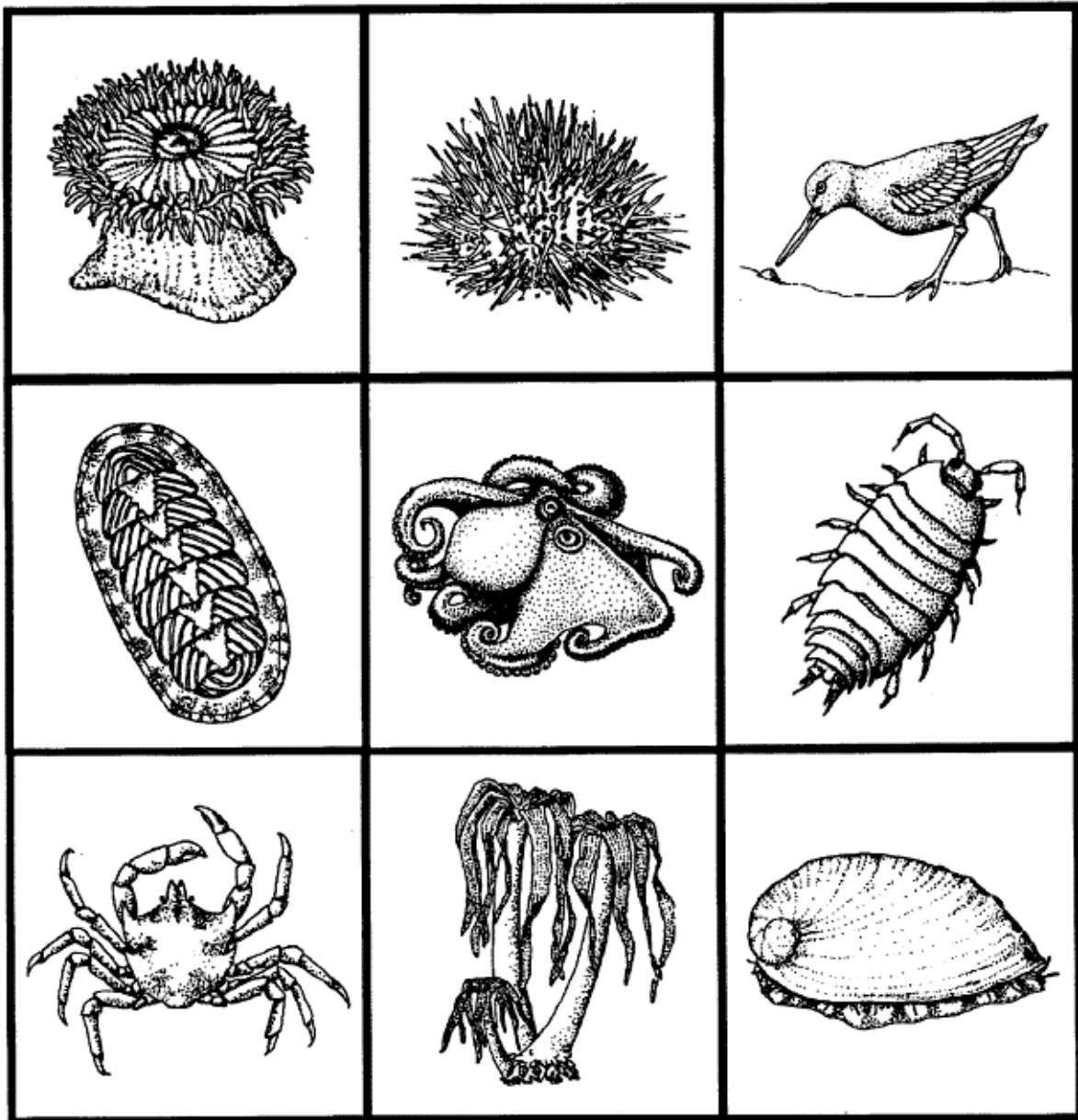


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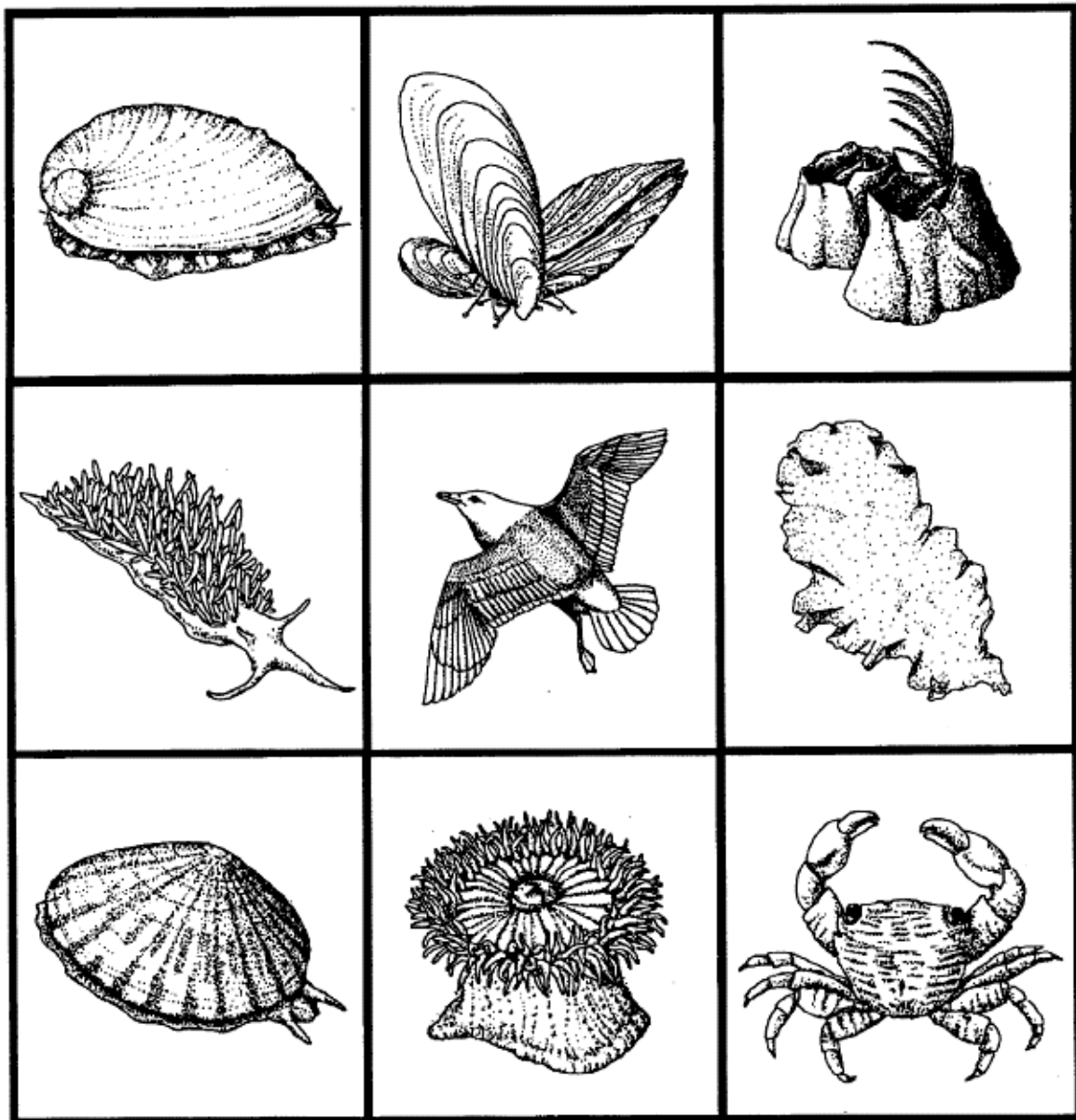


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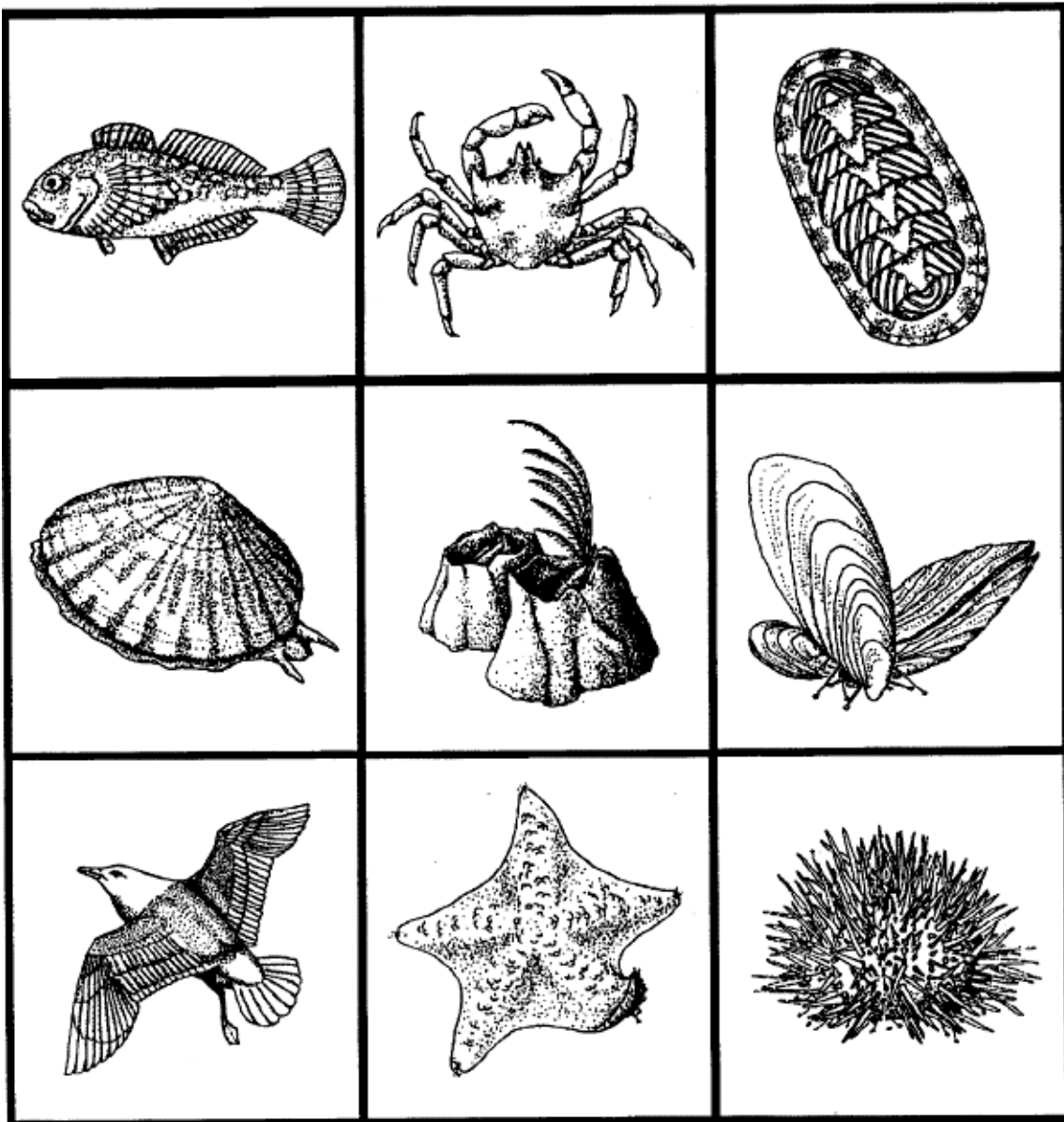


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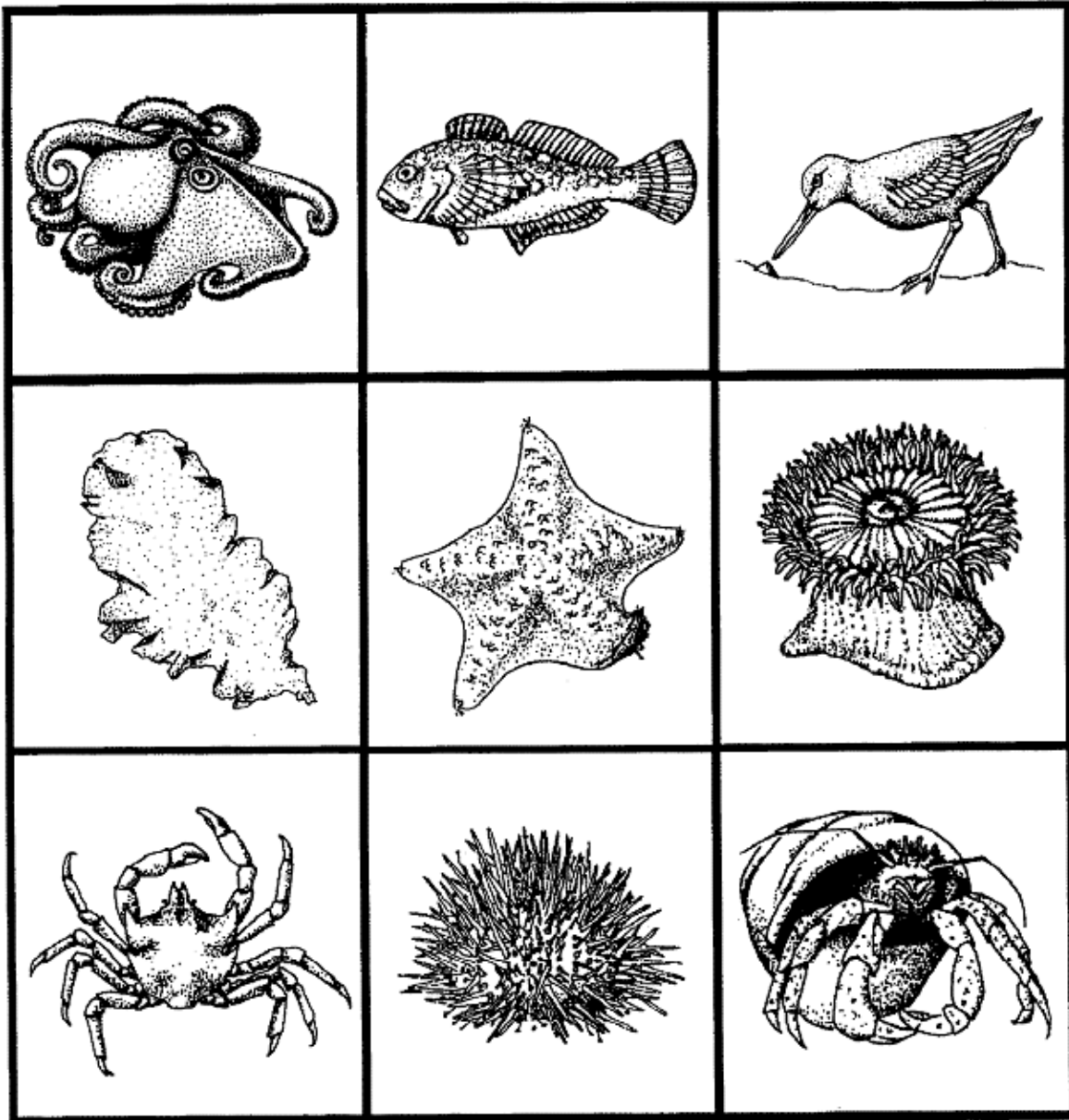


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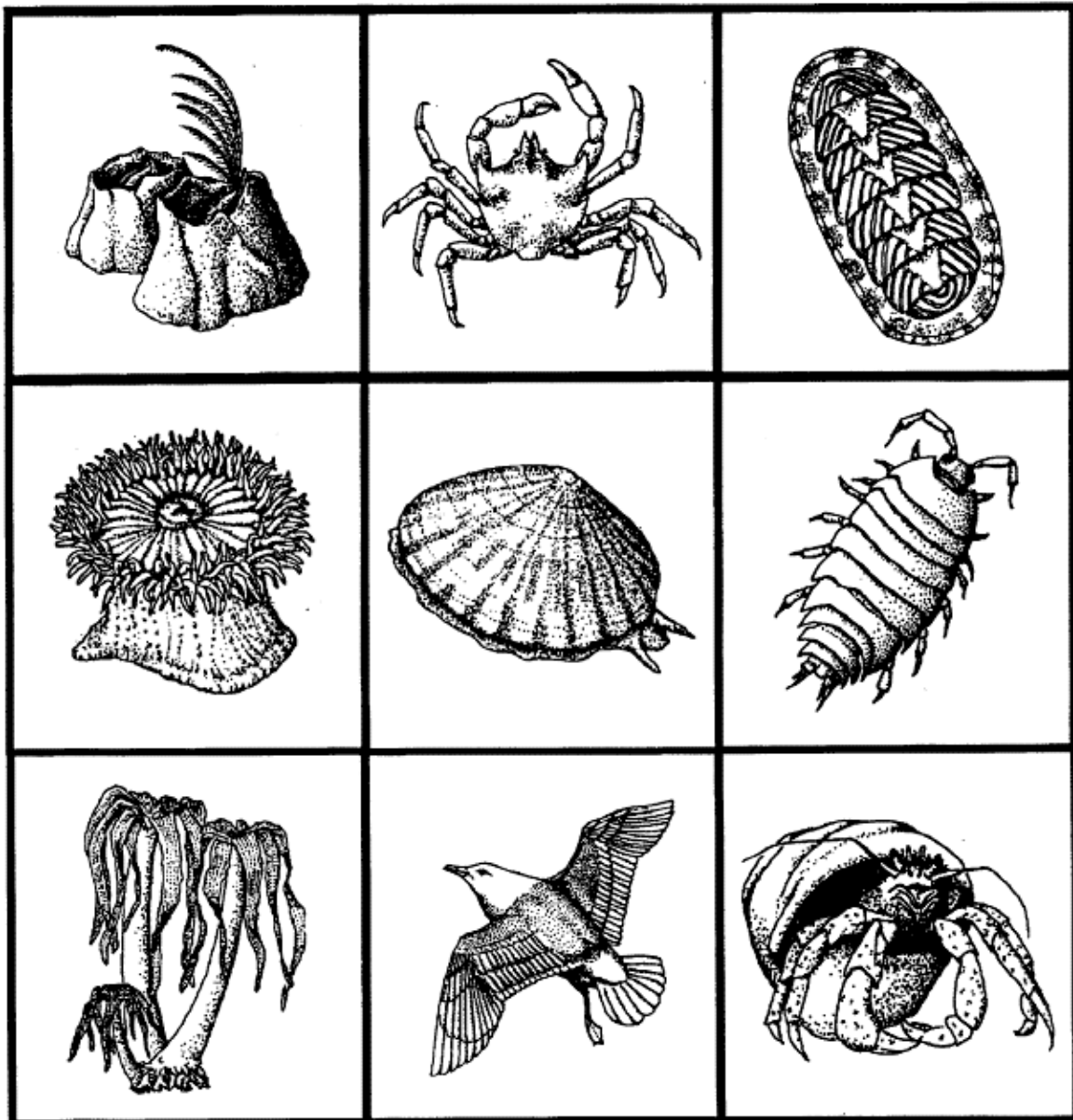


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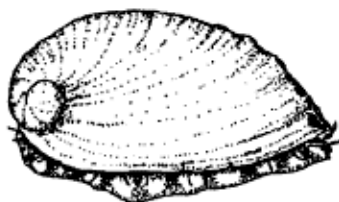


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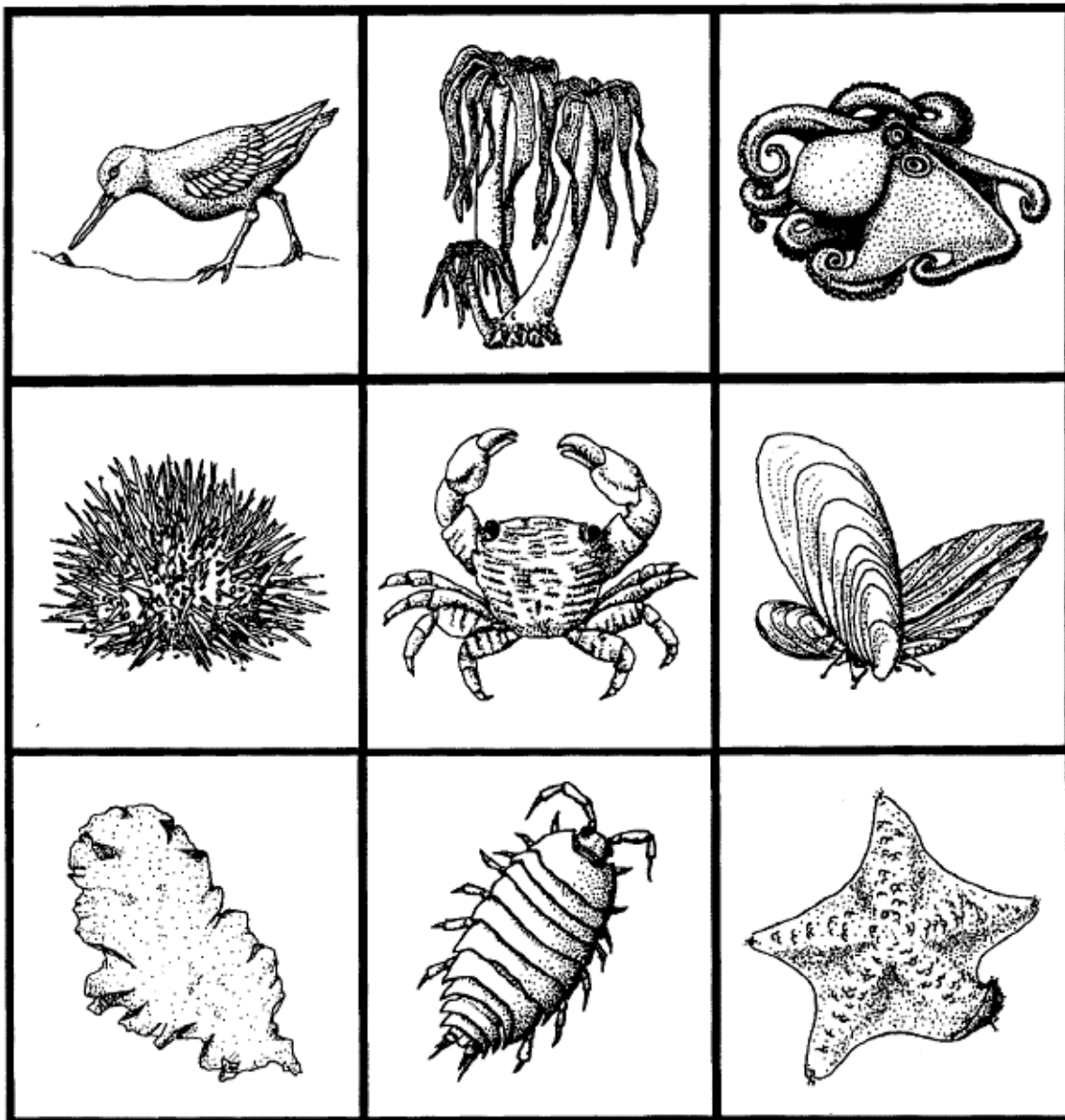


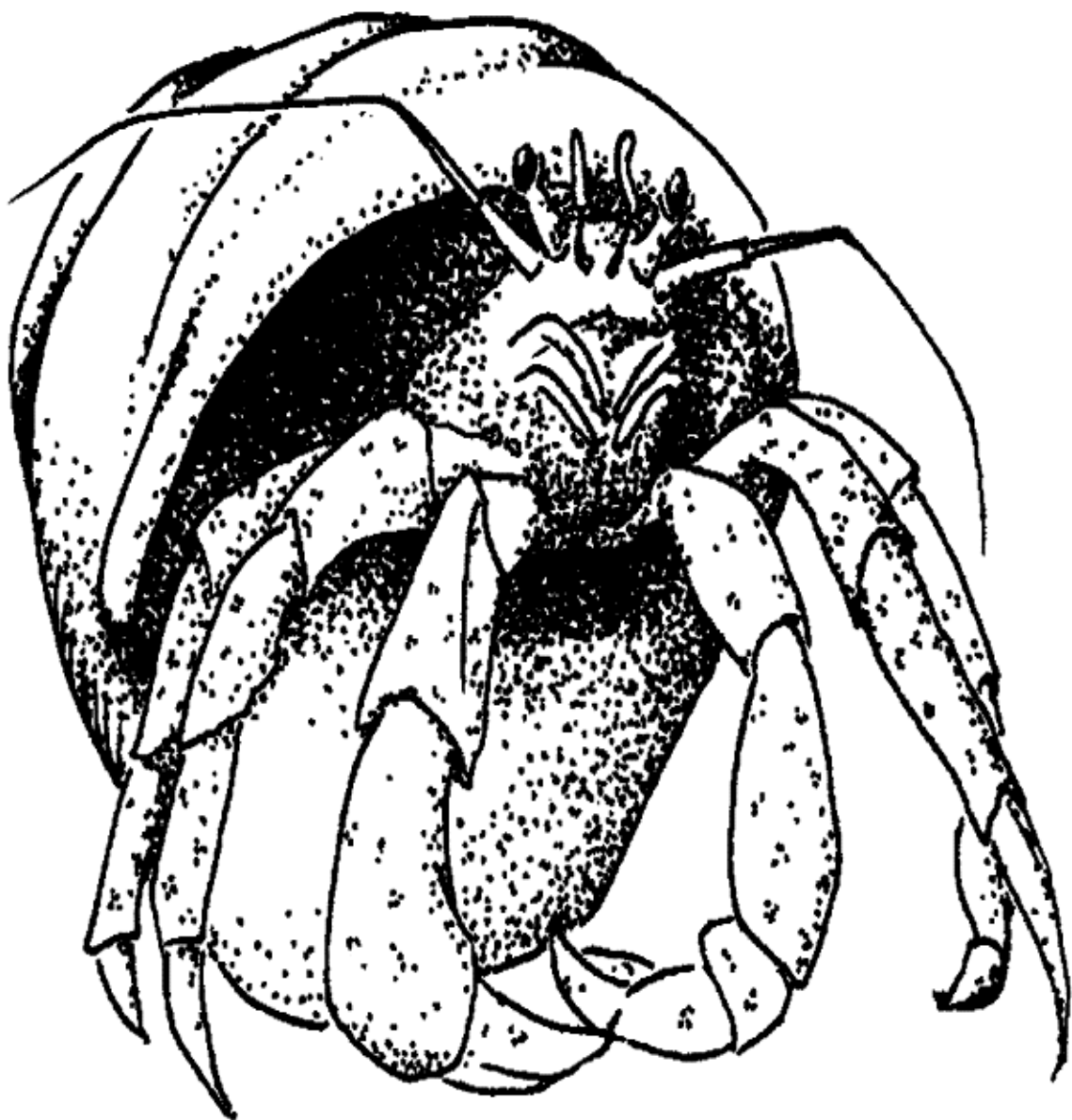
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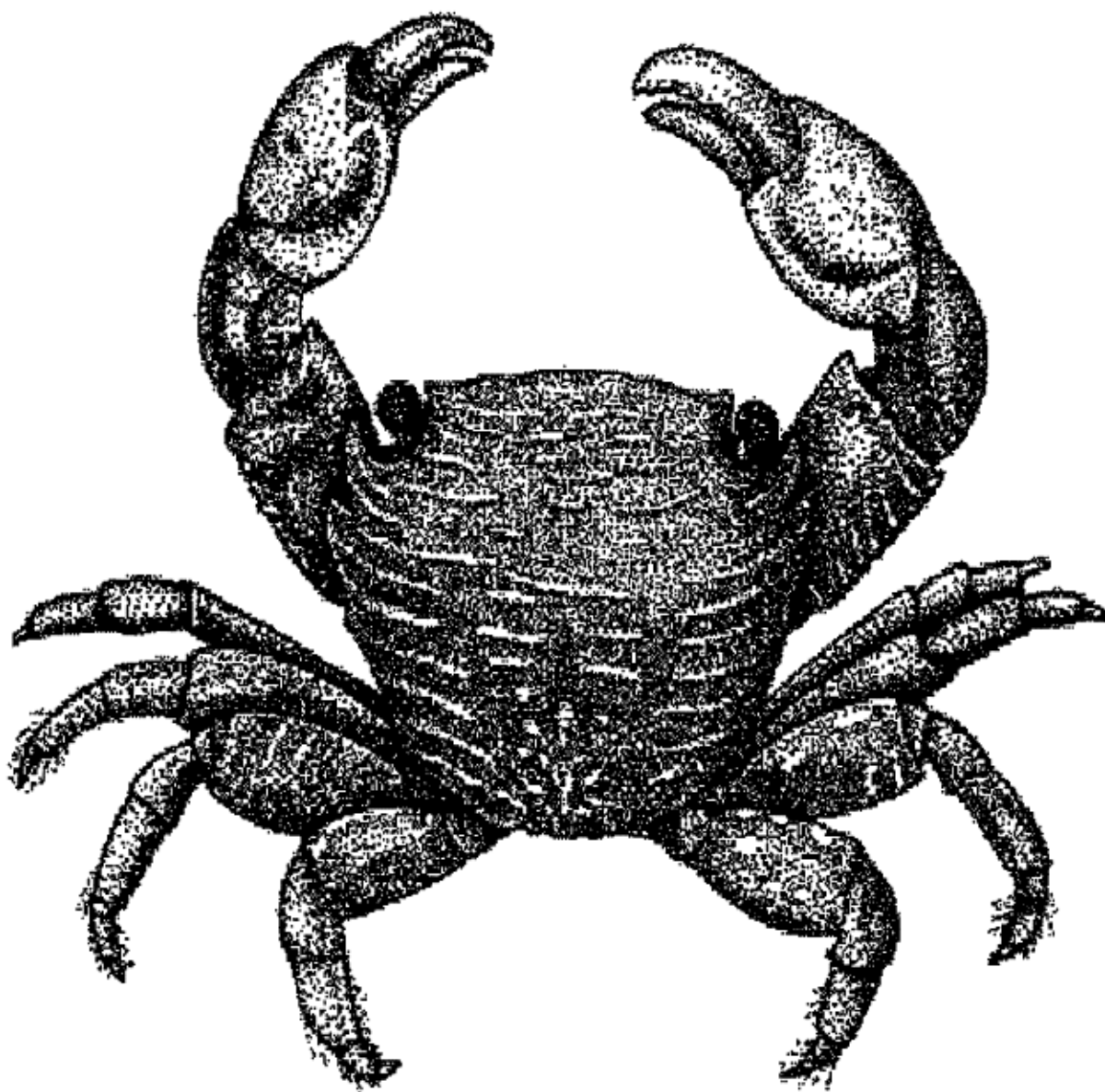


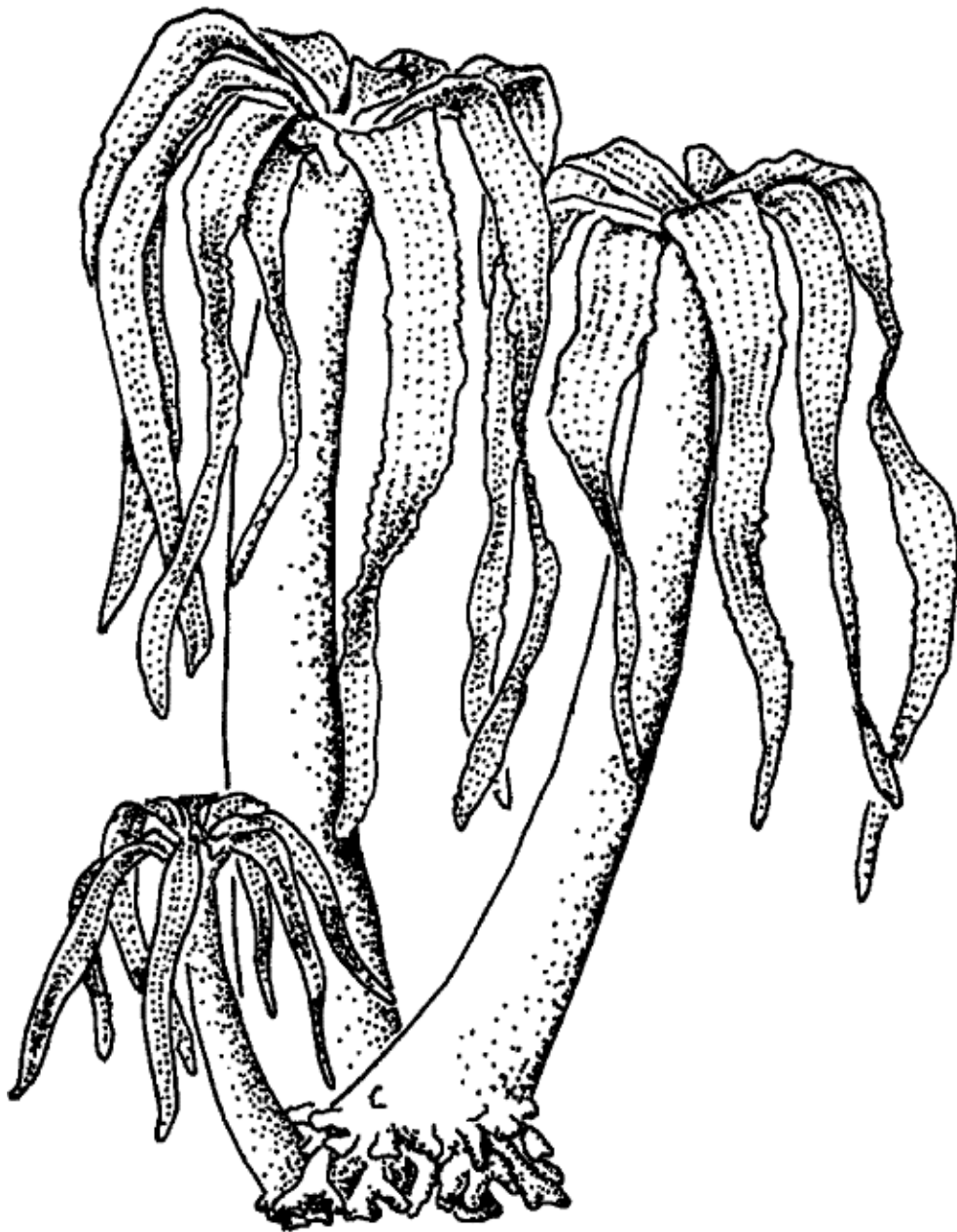


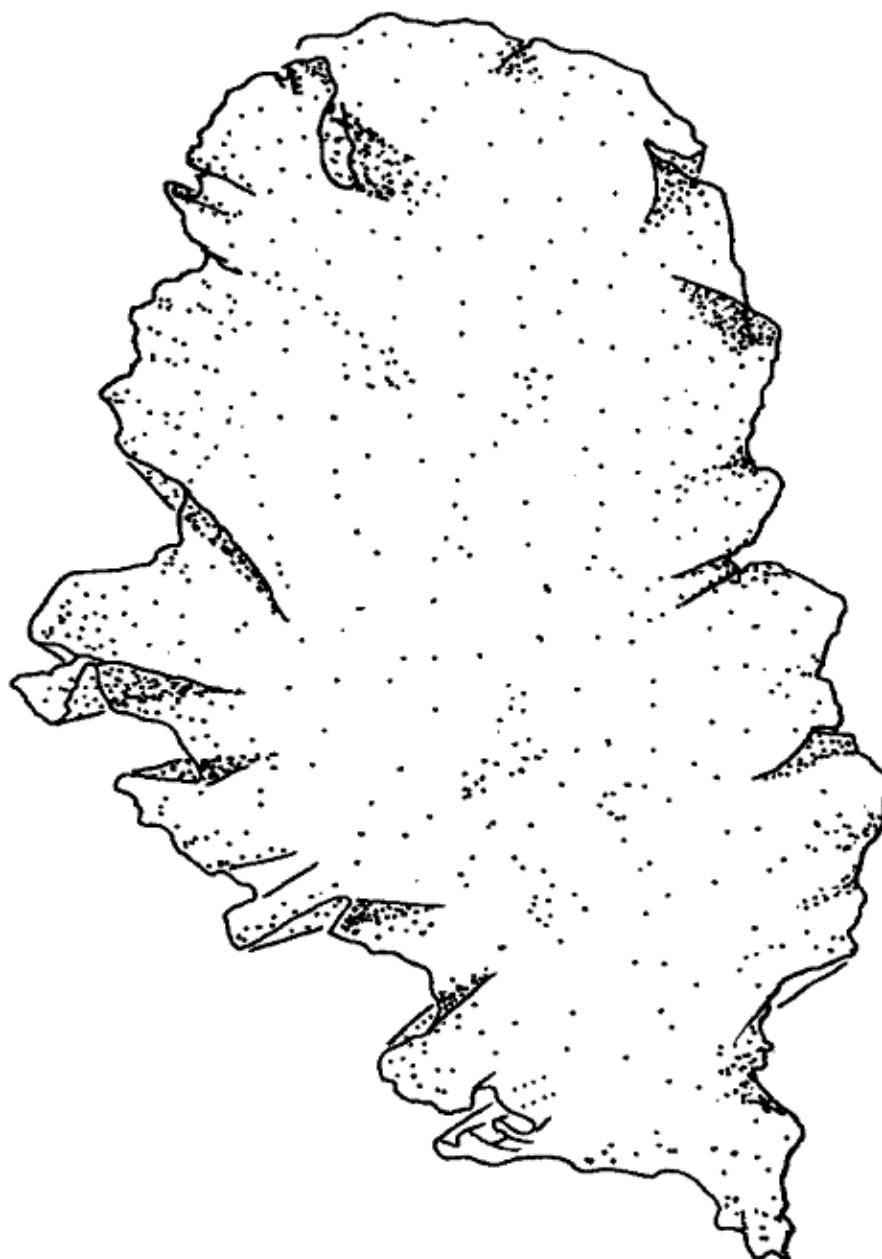
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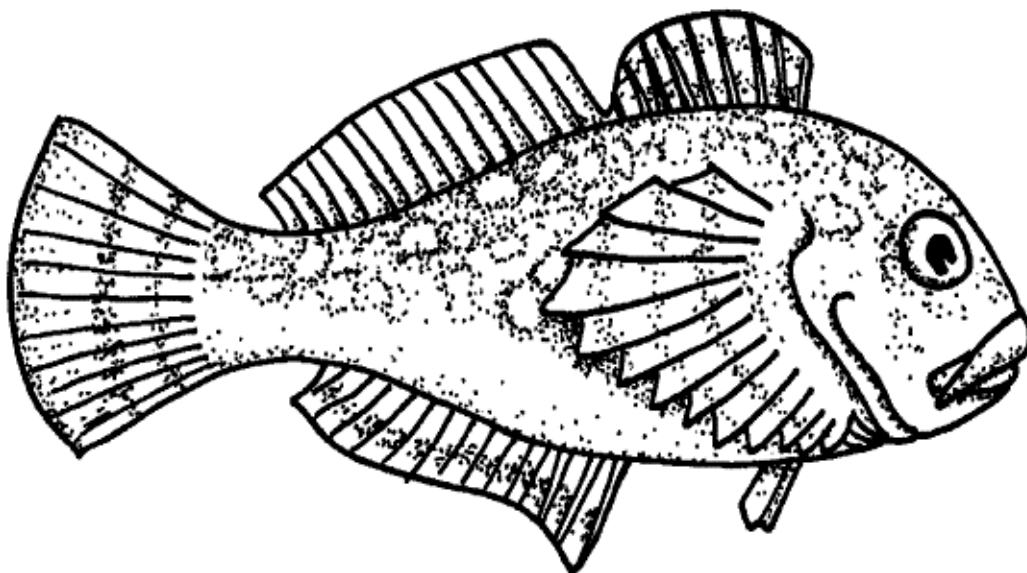


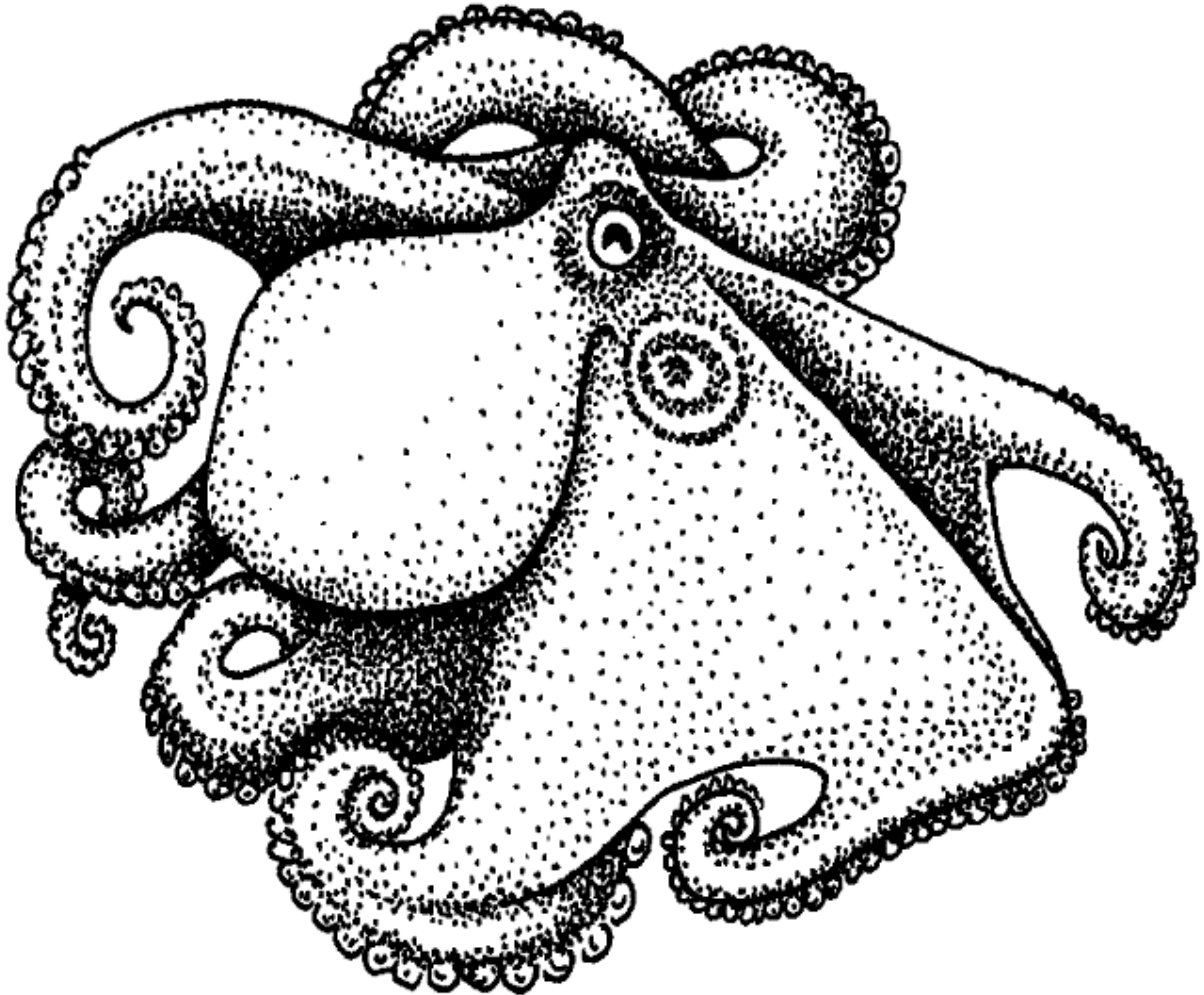


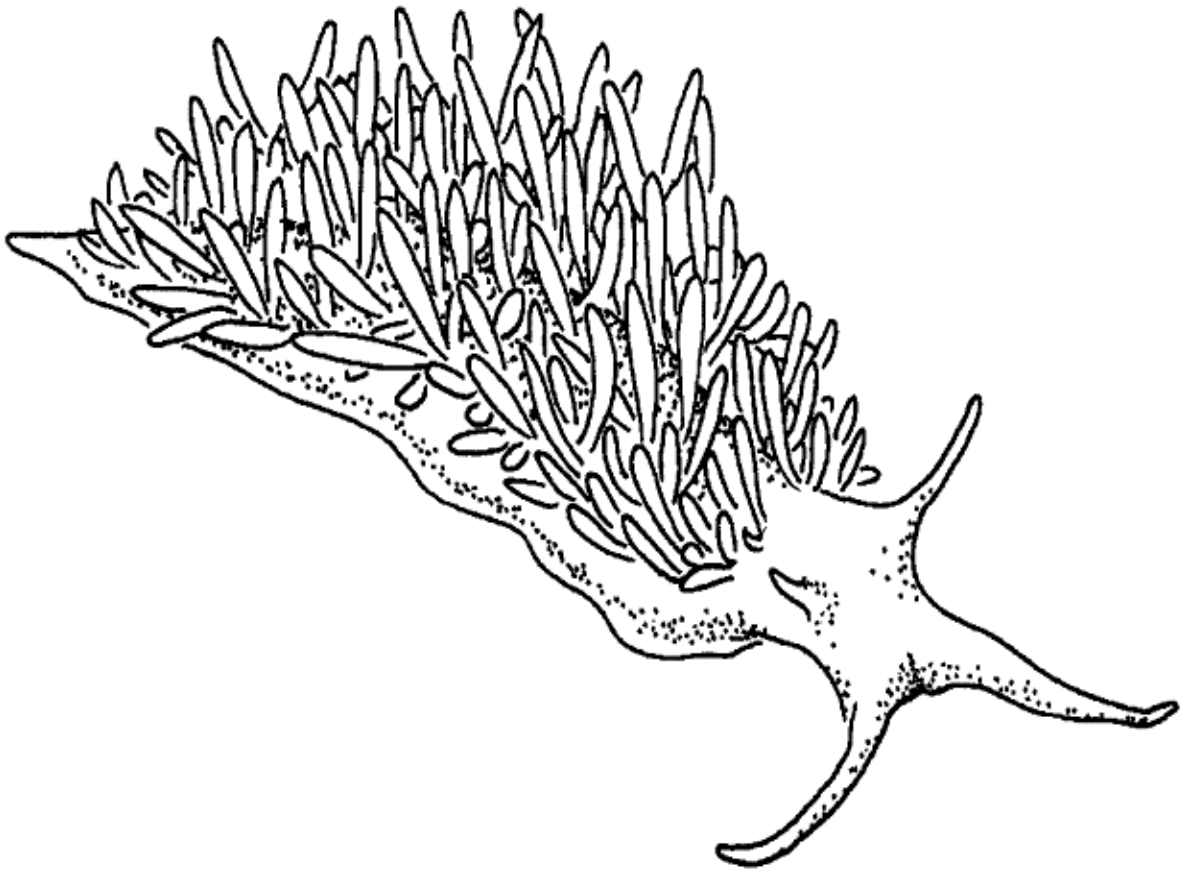


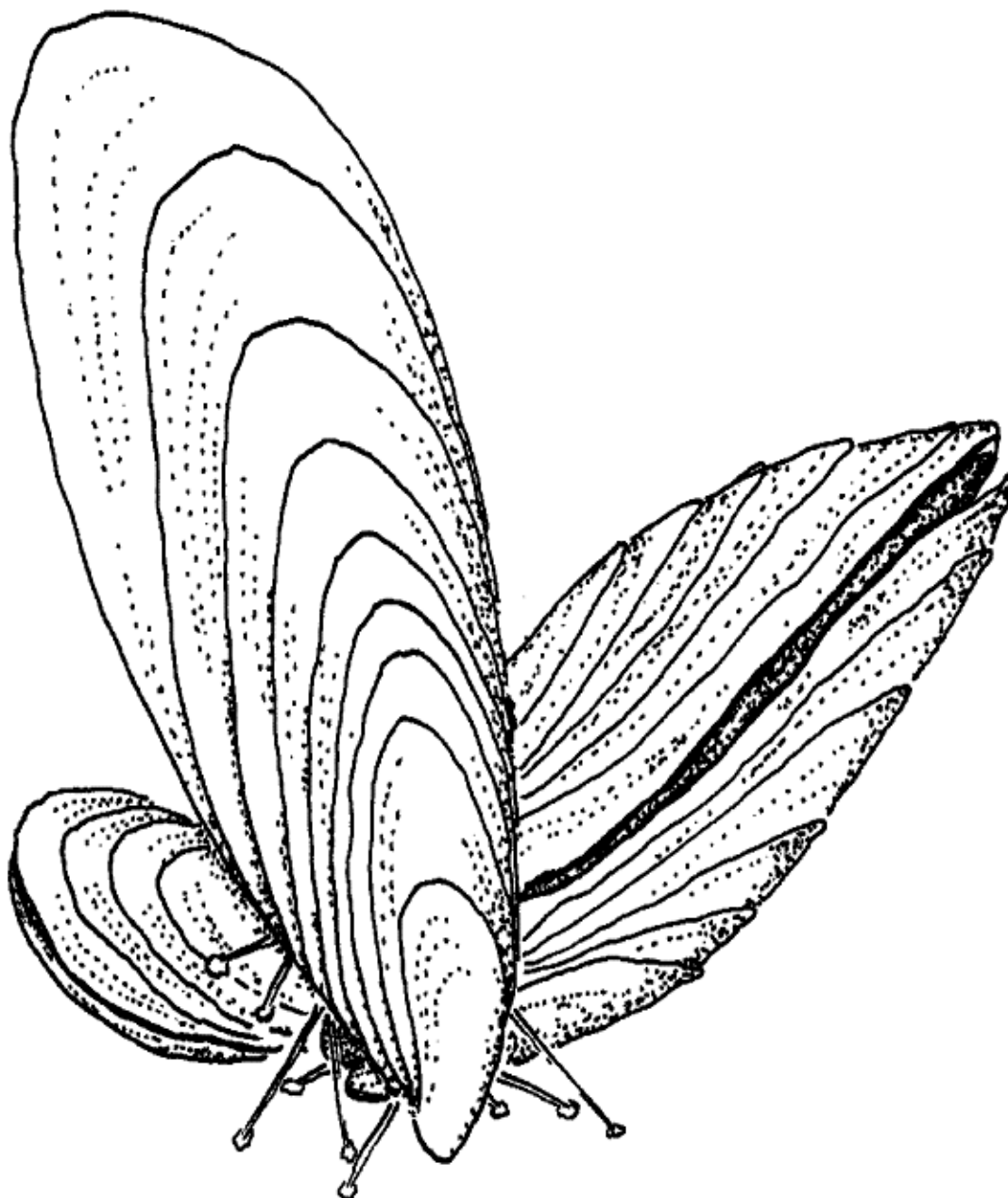




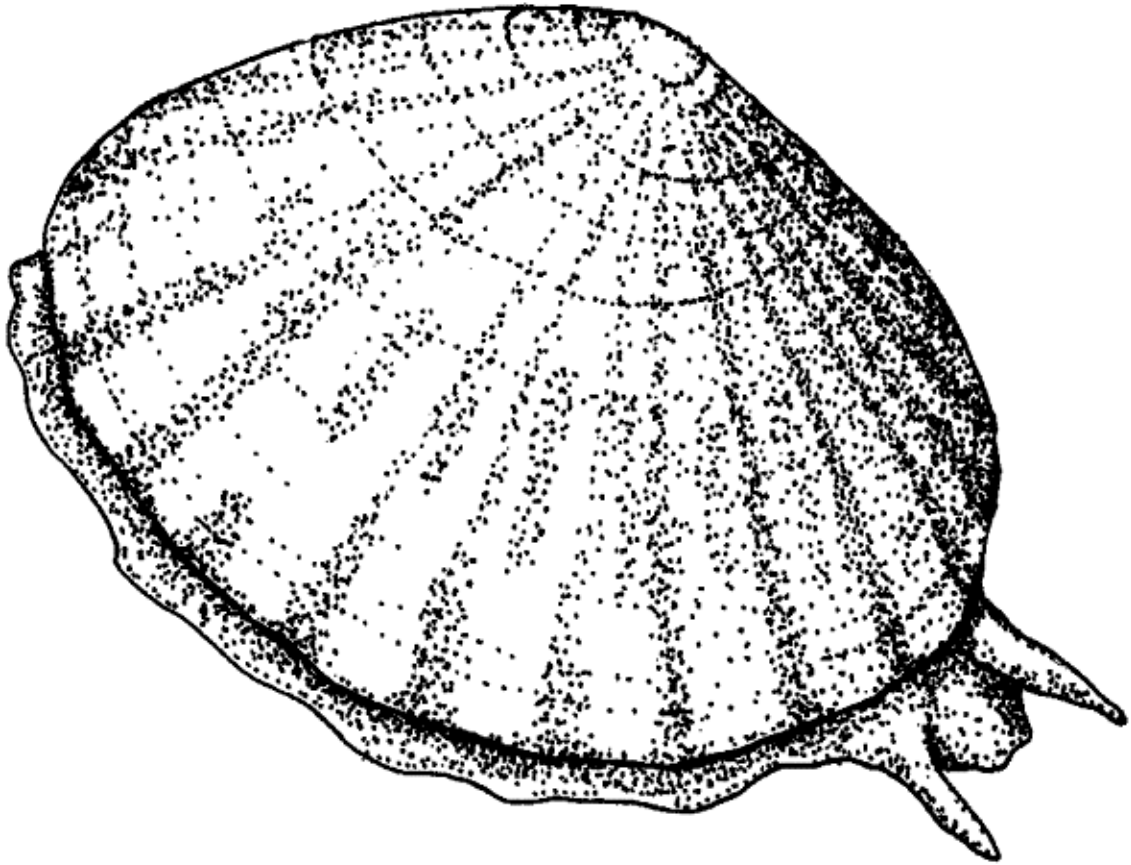


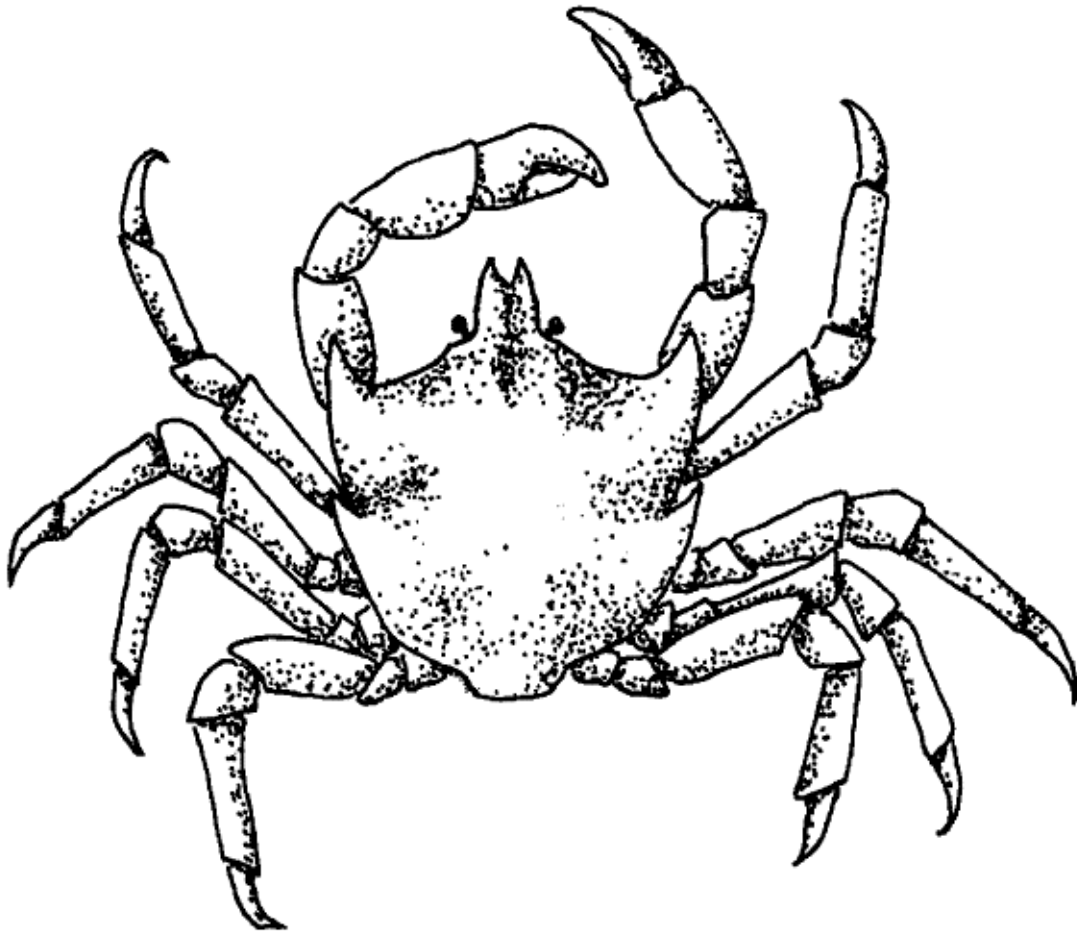


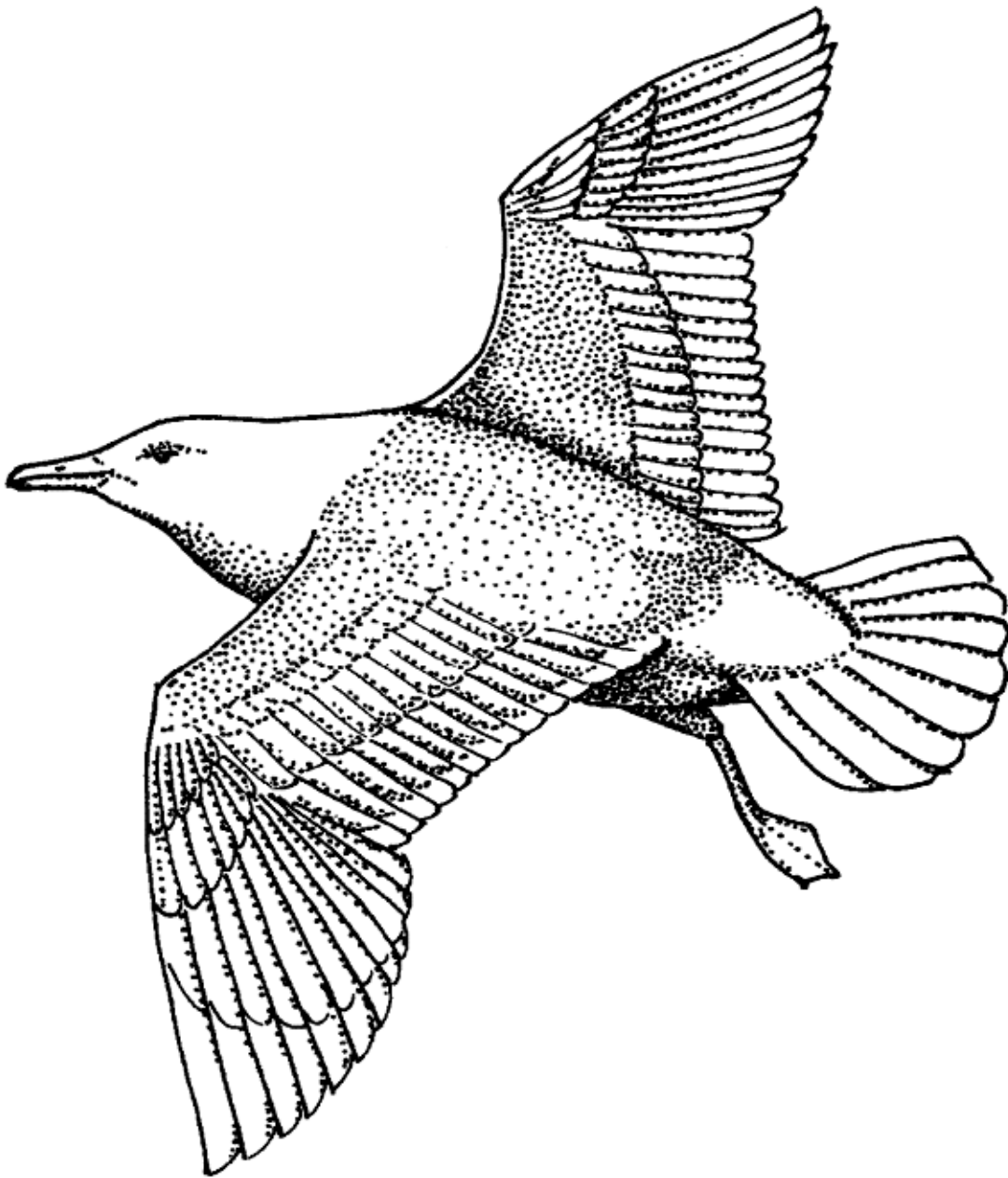


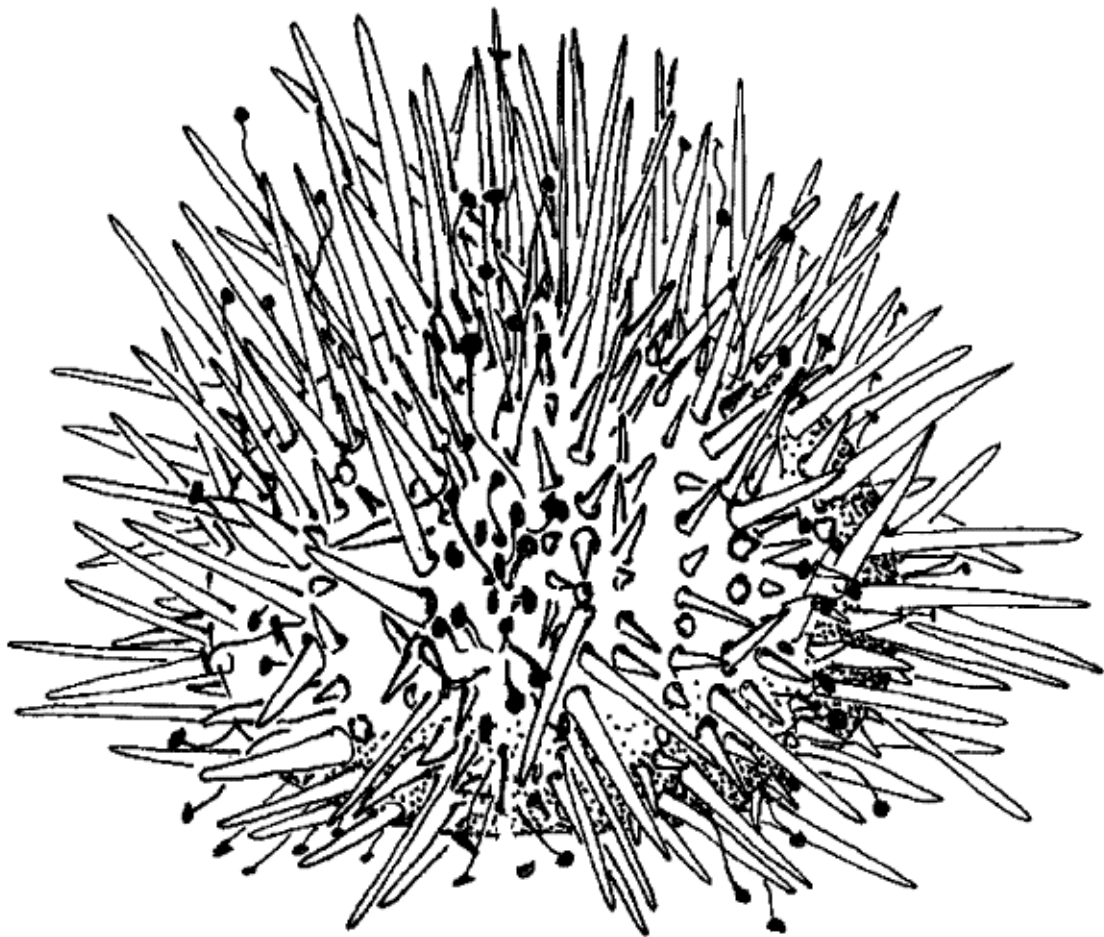


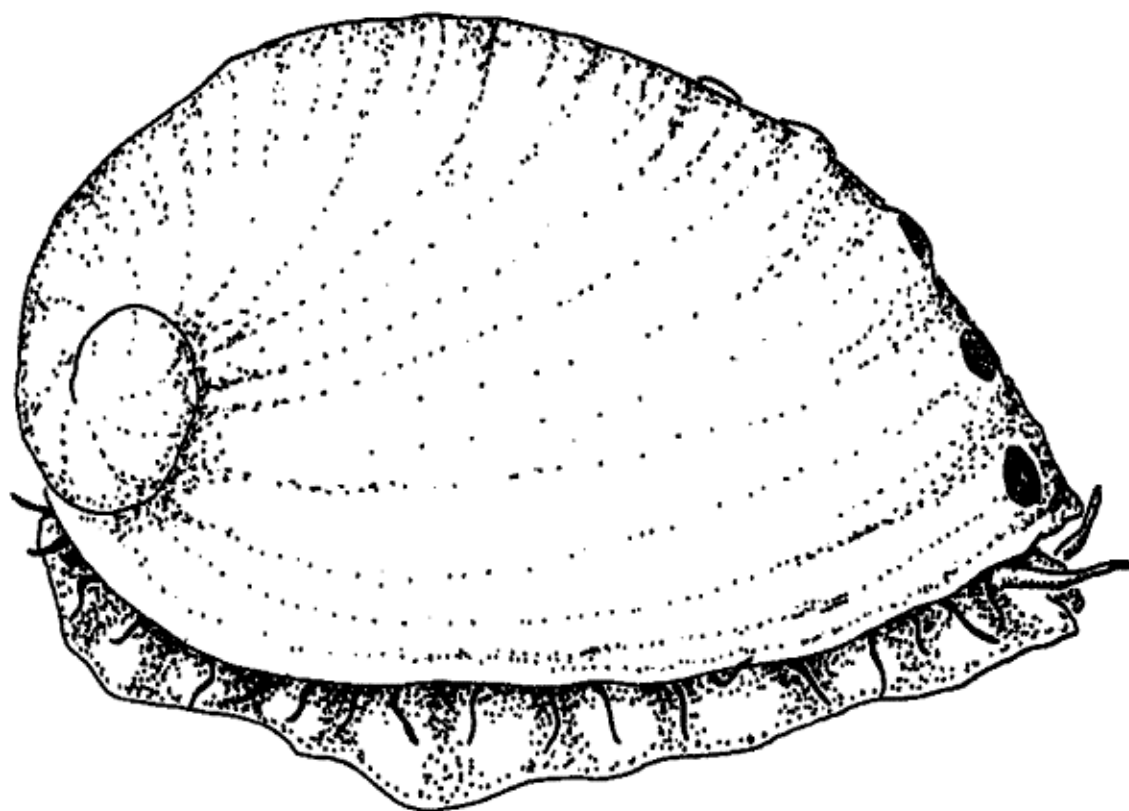


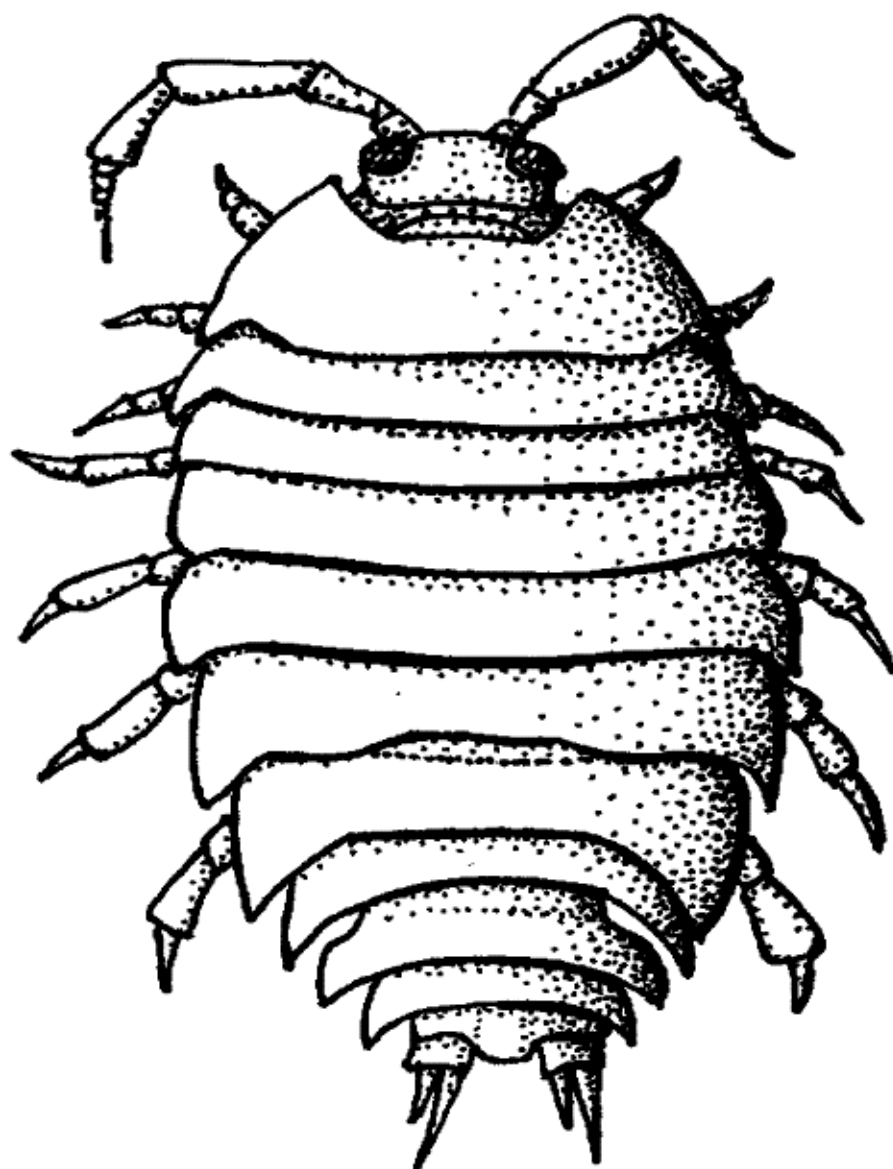


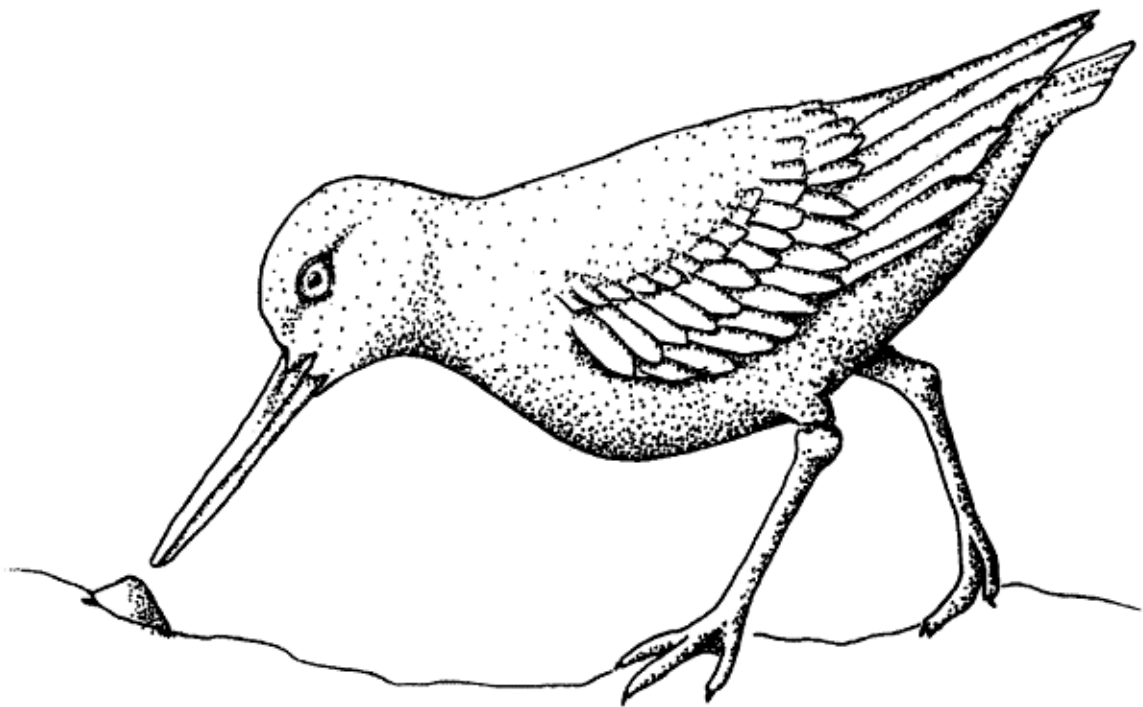


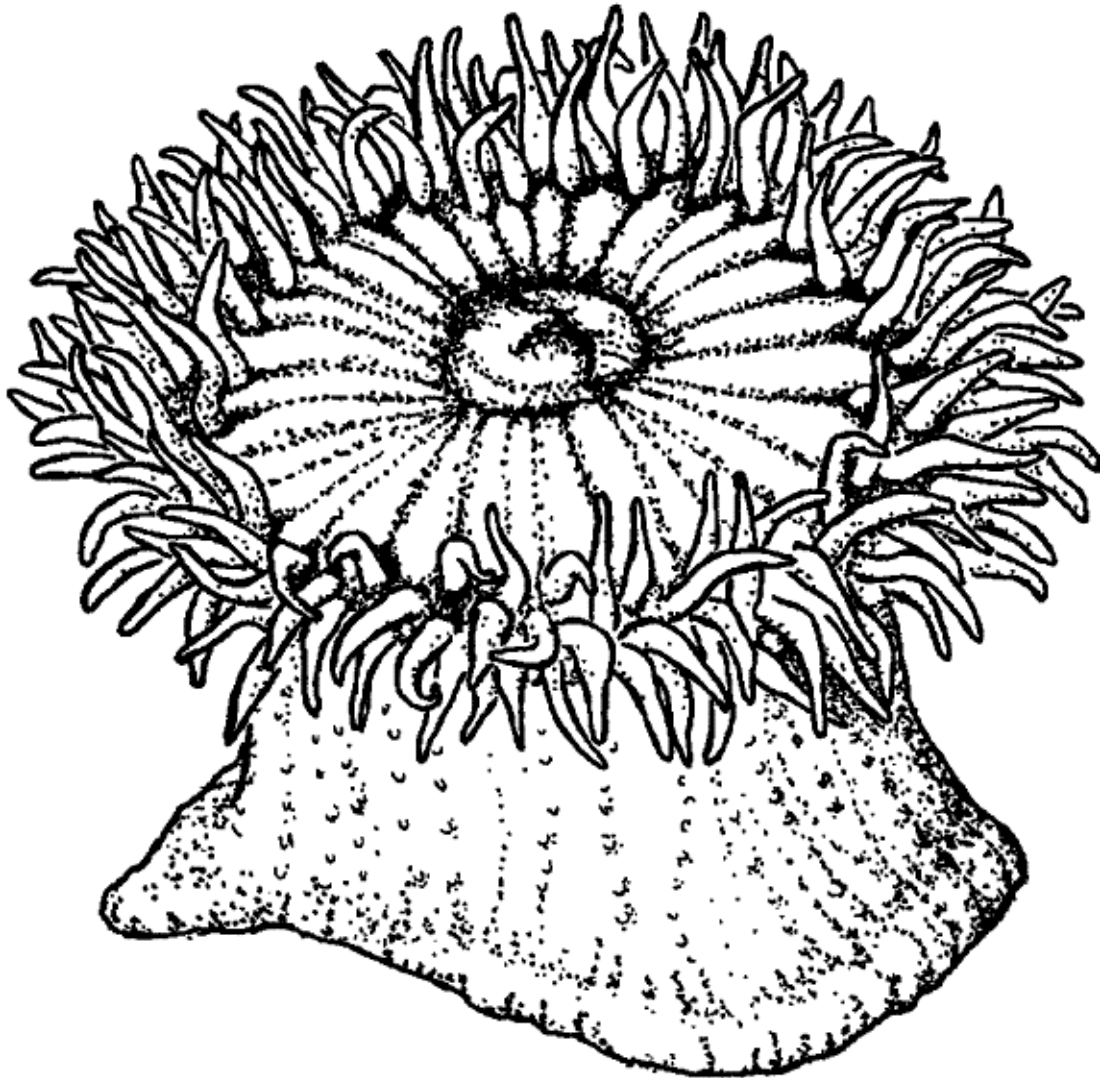






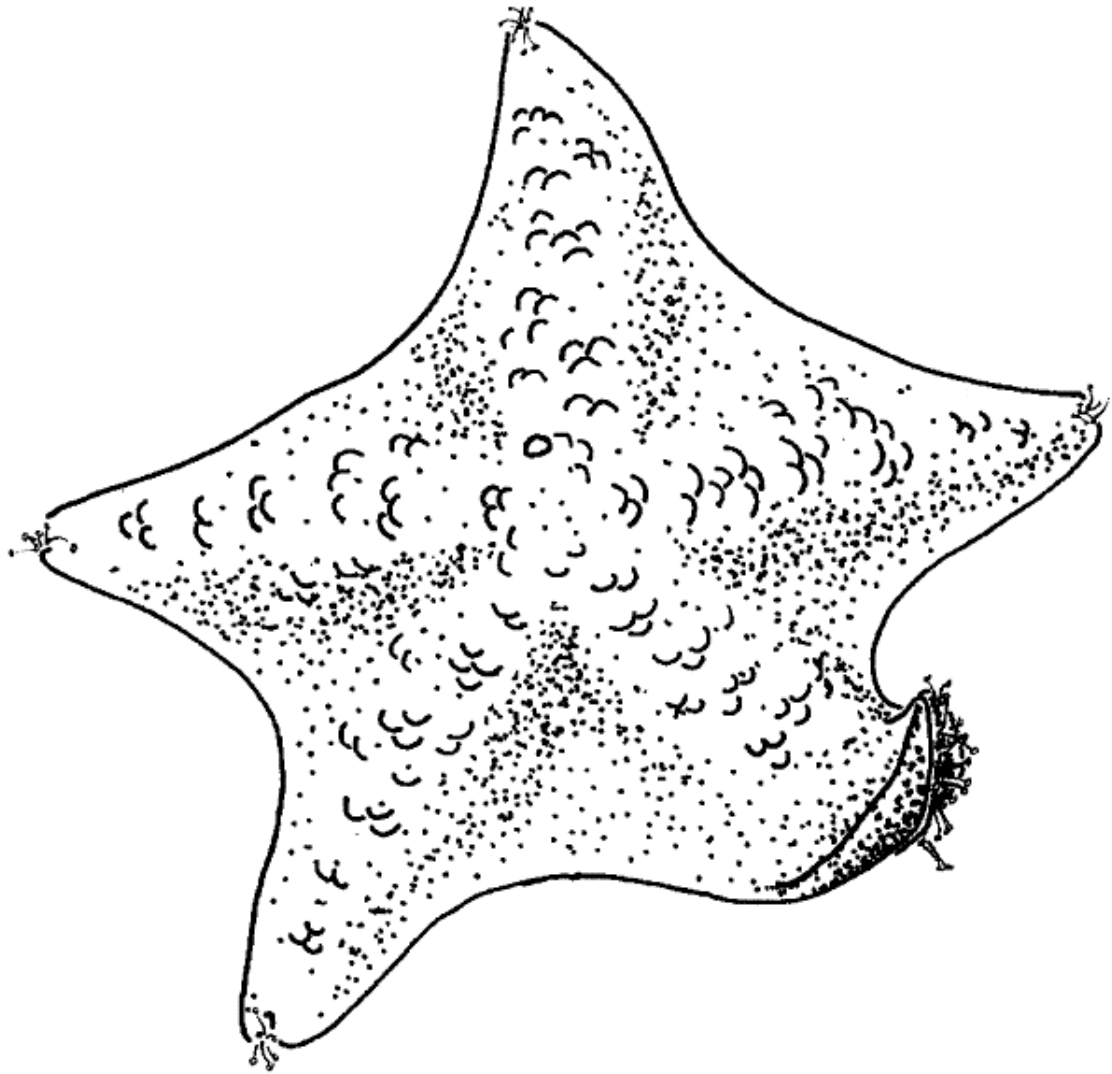








BARNACLES



BAT STAR