Name:_____

MARINE WORM COMMON WORMS

The free-living flatworms range in size from almost microscopic to 60 cm (24 in) in length. The great majority of the 3000 known species are marine, and most of these are bottom dwellers, living in sand or mud under rocks and algae. The marine flatworm illustrated here depicts a generalized form (such as *Notoplana*), and is commonly found worldwide in the rocky intertidal zone. It lives on the underside of large boulders, and glides along the rock by means of the cilia on its ventral surface. *Notoplana* has two dark *eyespots* at the anterior of its brownish-gray *body*. The dark area located on the midline of the body is the only opening of the digestive tract. What appears to be a ruffled curtain is the retracted *pharynx*, which can be extruded for food gathering (shown in the illustration). The flatworm shown here is a nocturnal predator, feeding on small molluscs, crustaceans, and other invertebrates.

1. Where are most flatworms found?

2. How does the flatworm use its pharynx?

3. What does the flatworm *notoplana* feed on?

The ribbon worms (over 600 species) are generally thought to be related to flatworms. They are capable of tremendous lengthwise extension; a worm that measures 20 cm (8 in) when contracted can stretch to over a meter (3 ft)! The ribbon worm shown here lives in a parchment-like *tube* among the algae, mussels, and other organisms on low intertidal and subtidal rocks and pilings along the west coast of North America.

Unlike the flatworms, ribbon worms possess a complete digestive tract (both mouth and anus). Ribbon worms have a food gathering device called an eversible *proboscis*, which, unlike the eversible pharynx of polychaete worms (Plate 27), is not an extension of the digestive system. When not in use, the proboscis is retracted inside a cavity above the

4. How far can a 20 cm flatworm stretch?

5. Where does this ribbon worm live?

WORMS REVIEW

6. State one difference between a ribbon worm and a flatworm..

7. State two interesting facts about a worms' proboscis.

digestive tract. The proboscis can be everted (shot out) anteriorly to coil around the worm's prey. A very sticky mucus is secreted from the proboscis to aid in the capture of the prey. In some ribbon worm species, the proboscis may be longer than the rest of the worm, and may be equipped with a piercing barb, or stylet, and poison glands. Ribbon worms are generally nocturnal carnivores, feeding on other worms, molluscs, crustaceans, and small fish.

The peanut worms, or sipunculids, are a group of about 300 species. They live burrowed in mud or sand flats, in muddy crevices between rocks, in coral crevices, in abandoned shells of gastropods, or in the tubes of polychaete worms. Peanut worms range in size from 0.2 to 72 cm (0.08–28 in); the average length is about 10 cm (4 in). Their bodies consist of two basic sections: the rounded, bulbous *trunk* and the narrower *introvert*. The introvert is the anterior portion of the worm's body, and can be retracted into the trunk. The mouth is at the tip of the introvert and is surrounded by ciliated *tentacles* that are used in filter or deposit feeding. A peanut worm with a 5-cm (2-in) trunk can extend its introvert out 15 cm (6 in) in search of food, while it stays safely in a crevice.

8. Where are peanut worms found?

The nematodes or round worms are the most common of the worm groups in both the terrestrial and marine realms. However, they are frequently overlooked because most are a few millimeters or less in length. Almost all nematodes look very similar. The worm is encased in a translucent, elastic *cuticle* which gives it a smooth, unornamented appearance. The *mouth*, surrounded by three blunt *lips*, opens at the anterior end of the worm. The posterior end tapers to a point. Nematodes are extremely successful parasites. The cuticle is impervious to noxious chemicals such as stomach enzymes, and many nematodes are intestinal parasites of vertebrates. They also parasitize plants, feeding on the sap and cell fluids. Many species are free-living, occurring by the millions in terrestrial soils as well as in marine muds and sands where they ingest the organic material contained in the substrate.

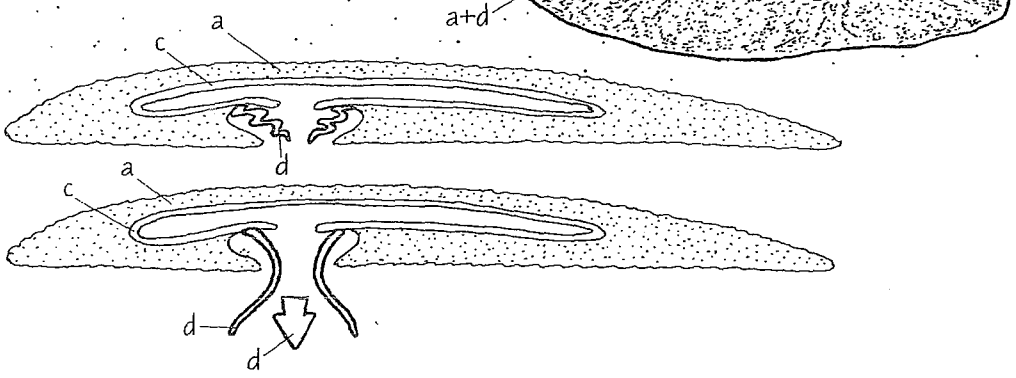
9. How large are naematodes or round worms?

10. how do nematodes survive stomach enzymes?

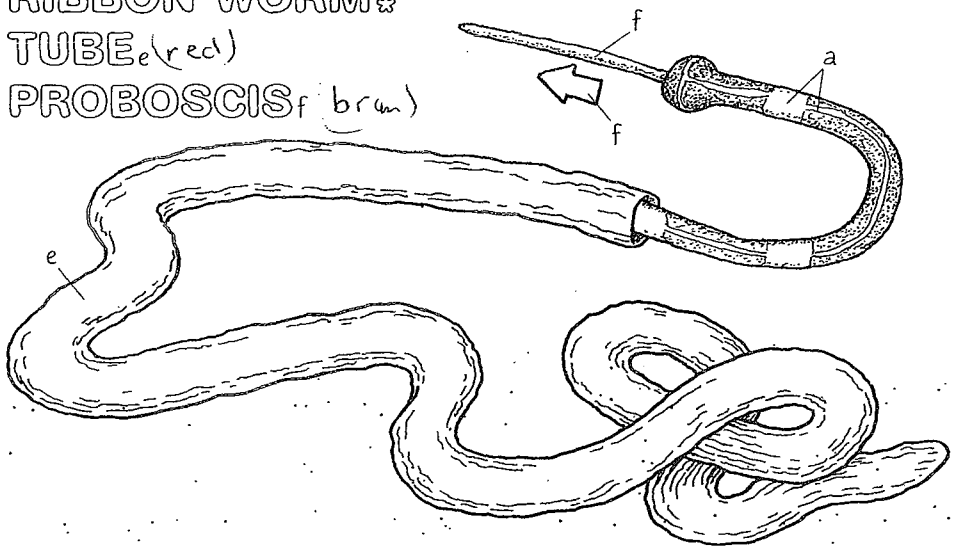
COMMON WORMS

BODY$_a$ (any color
EYE SPOT$_b$ these are
GUT$_c$ crazy colorful)

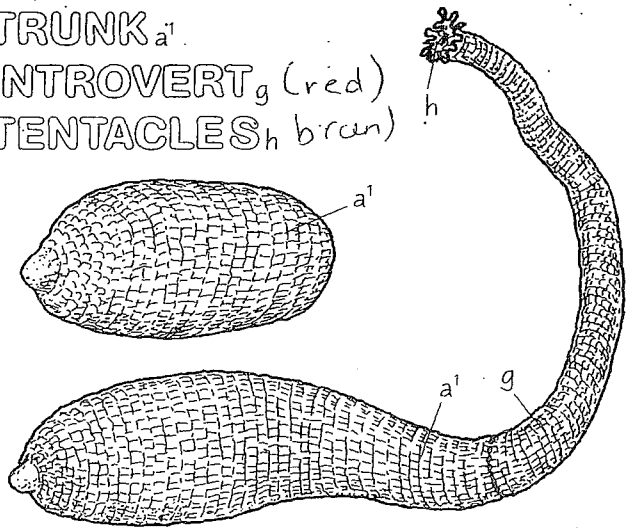
FLATWO
PHARYNX



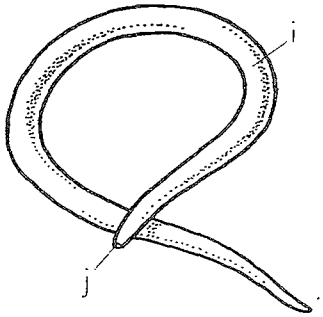
RIBBON WORM ✿
TUBE$_e$ (red)
PROBOSCIS$_f$ (brown)

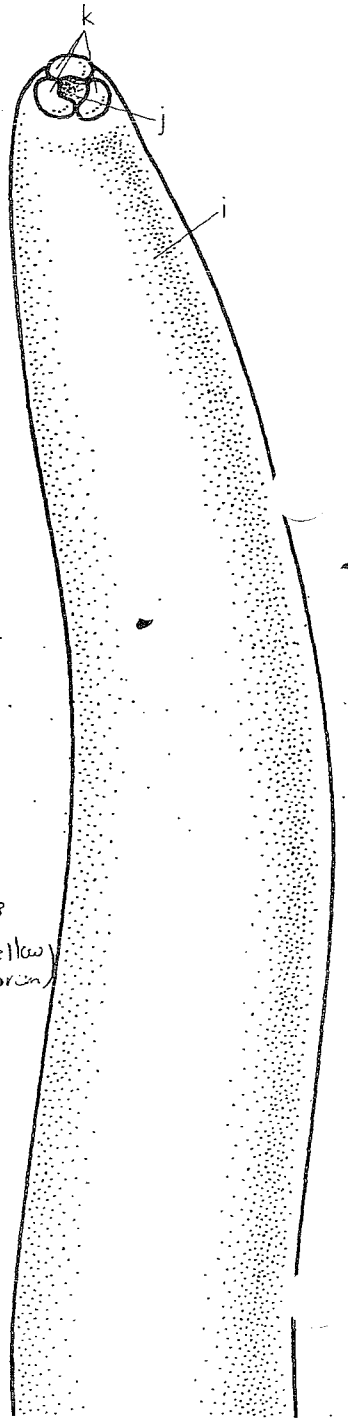


PEANUT WORM ✿ (yellow)
TRUNK$_{a'}$
INTROVERT$_g$ (red)
TENTACLES$_h$ (brown)



NEMATODE ✿
CUTICLE$_i$ (yellow/brown)
MOUTH$_j$
LIPS$_k$





Name: _____

MARINE WORM POLYCHAETES

Of the many phyla of worms, the segmented or annelid worms are the most diverse and perhaps the most beautiful. This group includes the familiar earthworm, the leech, and, in the marine environment, the class of polychaetes, comprising over 5000 species.

The annelid body is divided by partitions into compartments (segments) that, in part, restrict the flow of body fluids. This segmentation enables the burrowing annelid to dig much more efficiently than the nonsegmented worm. In this plate, three polychaete worms will be introduced.

Color *Nereis* and the enlarged views of its head region at right. *Nereis* is often an iridescent blue-green.

The clam worm, *Nereis*, is a widely distributed genus and is minimally specialized. *Nereis* has what may be considered the typical polychaete body, consisting of repeated identical *body segments*, each with a pair of lateral paddle-shaped appendages called *parapodia*. The parapodia are flattened projections of the body and are equipped with rods called *setae*. The setae project through the parapodia and are connected to muscles that enable them to retract or extend. As *Nereis* crawls along, the setae aid in gripping the substratum.

The head of *Nereis* consists of two segments, a *prostomium* and a *peristomium*. The prostomium is positioned in front of the *mouth* and bears several sensory structures; these include the light-sensitive eyes, as well as the *antennae* and *palps*, which appear to be receptors for both chemical and tactile senses. The peristomium, just behind the prostomium, contains the mouth and three pairs of tentacular *cirri* that also act as tactile receptors. As *Nereis* moves through the environment, these sensory structures concentrated in the head area provide information.

The mouth of *Nereis* holds an eversible *proboscis*. The proboscis remains folded in on itself until contracting body wall musculature increases pressure on the body fluid, which, in turn, everts the proboscis. The proboscis is armed with *jaws* that swing open and then clamp shut as the body fluid pressure is reduced and the retractor muscles pull the proboscis back in.

Nereid polychaetes consume a variety of foods; some are carnivores, some omnivorous scavengers, and some are herbivores. Species of *Nereis* move about freely in many habitats, including the rocky intertidal zone, and burrow in mud and sand flats.

1. why is the annelid a more efficient at burrowing?

2. What are the functions of the following:
Setae:

Prostomium:
Proboscis

Now color *Glycera* and note its everted proboscis. The natural color of *Glycera* is a dark pink or light red. Also color the smaller drawing that shows the worm in its network of tunnels. Give the flooded galleries and the water above them a light blue color.

Glycera is a sand-flat-dwelling carnivore possessing a proboscis that is one-fifth its own body length and armed with four stout jaws, each with its own poison gland. *Glycera* constructs a nest of interconnecting burrows (*galleries*) in the substratum with many openings to the surface of the sand flat.

Glycera's prostomium is conical and adorned with four short antennae. It is sensitive to changes in water pressure, as for example when prey move above the nest. *Glycera* feeds on polychaetes and other invertebrates. Some species of *Glycera* reach a length of more than 50 cm (20 in).

Next color the lug worm, *Arenicola*, and its burrow environment. The arrows indicating the flow of oxygenated water into the burrow and through the sand should also be colored. The natural color of lug worms ranges from pink to dark green.

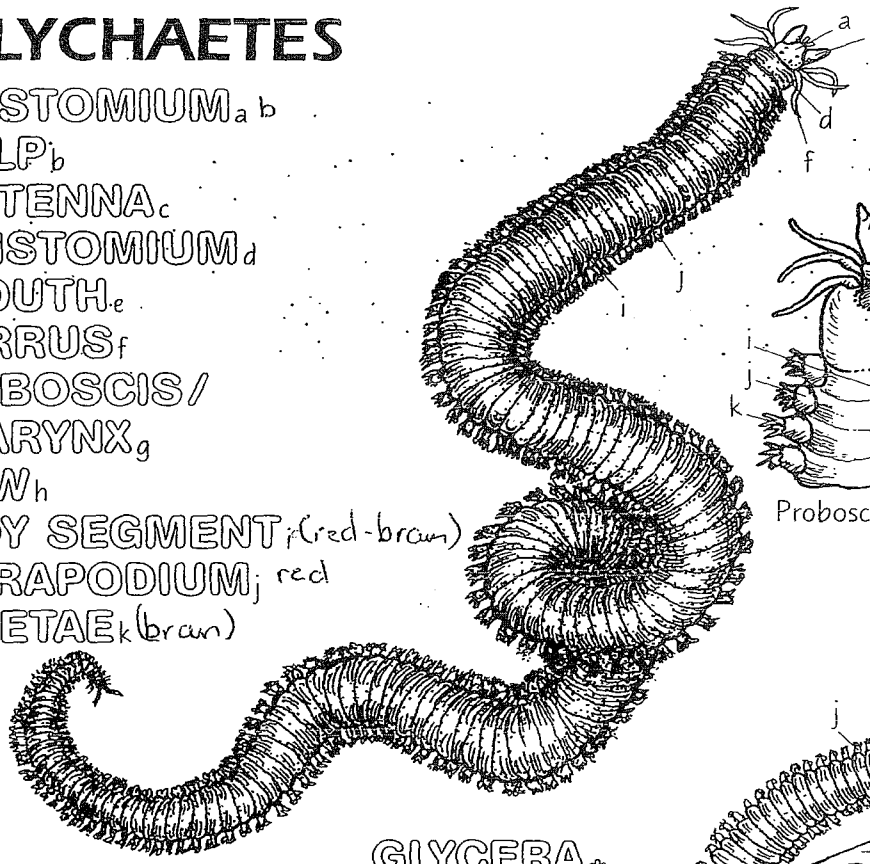
The lug worm, *Arenicola*, lives on muddy sand flats and is a deposit feeder, not a carnivore. It excavates an L-shaped *burrow* and lies with its head in the toe of the L. The lug worm engulfs the sand at the toe of the burrow, and passes the sand through its digestive tract, thus removing any organic matter. As the lug worm swallows the sand at the toe of the burrow, new sand falls in to replace it, forming a distinct depression on the surface of the sand flat above. *Arenicola's* burrow is easily identified by the pile of *fecal mounds* located at its opening. The lug worm ventilates its burrow using rhythmic peristaltic body contractions. *Oxygenated water* is pumped in from the surface through the burrow opening, flows over the *gills* on the body, and then disperses into the sand (*aerated sand*), thus aerating the upper layers of the sand flat. The worm's feeding and burrowing activities provide circulation and re-exposure of the buried sediments and the nutrients they contain.

What does the Arenicola lug worm eat?

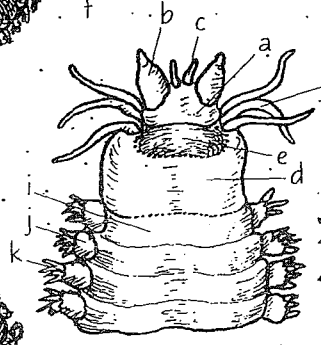
How do you identify the arenicola's burrow?

POLYCHAETES

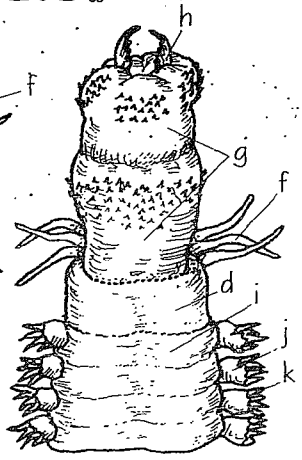
PROSTOMIUM a b
PALP b
ANTENNA c
PERISTOMIUM d
MOUTH e
CIRRUS f
PROBOSCIS / PHARYNX g
JAW h
BODY SEGMENT i (red-brown)
PARAPODIUM j red
SETAE k (brown)



NEREIS ☆

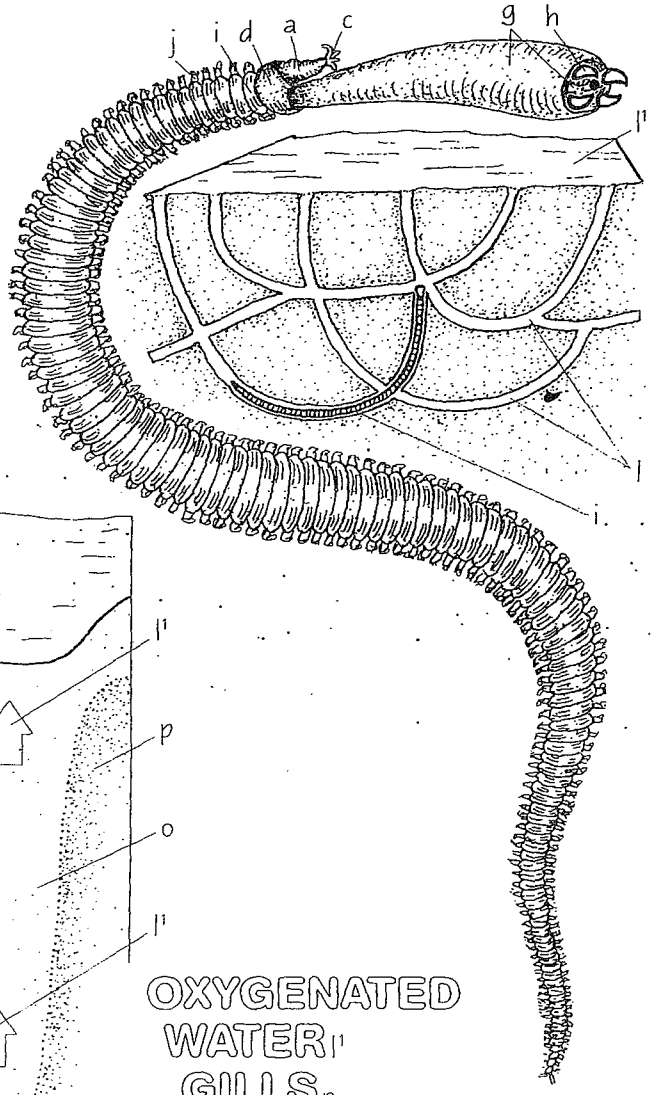


Proboscis retracted

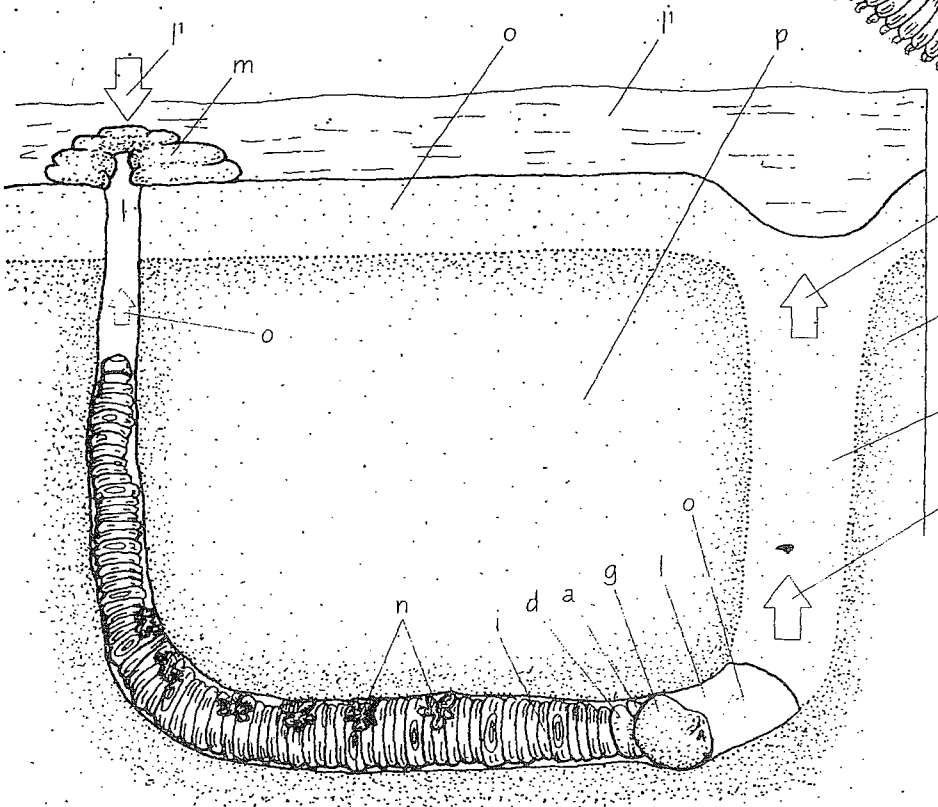


Proboscis everted

GLYCERA ☆
GALLERIES l
WATER l'



ARENICOLA ☆
BURROW l
FECAL MOUNDS m



OXYGENATED WATER l'
GILLS n
AERATED SAND o
UNAERATED SAND p