Echinoderm Review

Match the vocabulary word with its definition.

<table>
<thead>
<tr>
<th>Pedicellaria</th>
<th>Deuterostome</th>
<th>Bipinnaria</th>
<th>Marine</th>
<th>Aboral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>Madreporite</td>
<td>Ampulla</td>
<td>Regeneration</td>
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<tr>
<td>Pentaradial</td>
<td>Ossicles</td>
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1) _____________________ Organism in which the embryonic blastopore becomes its anus

2) _____________________ Underside of the starfish’s body where the mouth is located

3) _____________________ Dorsal surface of a starfish opposite the from the mouth where the anus and madreporite are located

4) _____________________ The ability to regrow lost body parts

5) _____________________ Calcium carbonate plates that make up the endoskeleton in starfish

6) _____________________ Sieve-like plate on the aboral surface that acts as the opening to the water vascular system

7) _____________________ Special kind of radial symmetry seen in sea stars with 5 arms

8) _____________________ Pincher-like structure between the spines which helps keep the starfish’s body surface free of foreign objects

9) _____________________ Bulbs on the tops of the tube feet that control the amount of water entering and leaving the tube feet

10) _____________________ Organisms that live in salt water

11) _____________________ Winged larva seen in echinoderms
MULTIPLE CHOICE.
CIRCLE ALL THAT ARE TRUE. There may be MORE THAN ONE correct answer.

1) Which of the following is true about symmetry in ECHINODERMS?
   A) ADULTS have bilateral symmetry.
   B) LARVAE have bilateral symmetry
   C) ADULTS have radial symmetry.
   D) LARVAE have radial symmetry.

2) Echinoderms are the only ____________________
   A) invertebrate protostomes
   B) invertebrate deuterostomes
   C) vertebrate protostomes
   D) vertebrate deuterostomes

3) The function of the water vascular system is to ________________.
   A) help digest food
   B) provide water pressure to operate the tube feet
   C) pump blood through blood vessels to the body organs
   D) produces larvae

4) Which of the following is TRUE about starfish reproduction?
   A) They have separate sexes and external fertilization.
   B) They are hermaphrodites with internal fertilization.
   C) They have direct development.
   D) They have indirect development.
   E) They reproduce using either sexual or asexual reproduction.

5) Echinoderms exchange gases with the water through their ________________
   A) nephridia
   B) lungs
   C) gills
   D) skin gills

6) The _____________ stomach in a starfish can be turned inside out through the mouth during feeding.
   A) cardiac
   B) pyloric
   C) intermediate
   D) secondary

7) Which of the following are part(s) of the water vascular system?
   A) madreporite
   B) stone canal
   C) ring canal
   D) nerve ring
   E) radial canal

8) Which of the following are characteristics shared by all echinoderms?
   A) water vascular system
   B) endoskeleton made of ossicles
   C) has cephalization
   D) all are marine
   E) have tube feet which help in locomotion, feeding, gas exchange, and excretion
Starfish have a number of different structures extending from their surface. LOOK AT THE DIAGRAM below and MATCH the structure with its description. YOU CAN USE THE LETTERS MORE THAN ONCE.

1) _____ Pedicellaria
2) _____ Spines
3) _____ Skin gills
4) _____ Gas exchange
5) _____ Keep surface clear
6) _____ Protection
7) _____ Excrete nitrogen waste
8) _____ Pincer

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**STARFISH CHARACTERISTICS**

<table>
<thead>
<tr>
<th>BLASTOPORE BECOMES?</th>
<th>TYPE OF SYMMETRY?</th>
<th>TYPE OF BODY CAVITY?</th>
<th>HOW RESPIRE?</th>
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<tr>
<th>PARTS OF THE NERVOUS SYSTEM?</th>
<th>OPEN OR CLOSED CIRCULATION?</th>
<th>PARTS OF THE DIGESTIVE SYSTEM?</th>
<th>HOW WASTES EXCRETED?</th>
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LABEL THE ORAL AND ABORAL SURFACES. USE THE FOLLOWING TERMS TO LABEL THE STARFISH --- MADREPORITE, SPINES, MOUTH, ARMS, ANUS, AND AMBULACRAL GROOVE.

Tell how a NERVE RING is DIFFERENT from a RING CANAL.

Nerve ring ____________________________________________

Ring canal ____________________________________________

WRITE THE CORRECT PART OF THE STOMACH FOR EACH FUNCTION.

<table>
<thead>
<tr>
<th>CARDIAC STOMACH</th>
<th>PYLORIC STOMACH</th>
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</thead>
<tbody>
<tr>
<td>1) ______________ Extruded out through mouth during feeding</td>
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<tr>
<td>2) ______________ Stays inside the starfish during feeding</td>
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<tr>
<td>3) ______________ Connects to the anus</td>
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<tr>
<td>4) ______________ Connects to the mouth</td>
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</tbody>
</table>
NAME THE BODY ORGAN IN STARFISH FOR EACH OF THE FOLLOWING:

1) General term for reproductive organs ____________________
2) Opening for water entering the water vascular system __________________
3) Connects stone canal with radial canals ______________________________
4) Connects madreporite and ring canal __________________________
5) Muscular bulb that controls water entering tube feet ___________________
6) Keeps surface free of foreign objects _____________________________
7) Skin extensions that exchange gases with water __________________________
8) Gives Echinoderms their name and provides protection ____________________
9) Groove on underside of arms that holds the tube feet _____________________
10) Ridge inside each arm that contains the radial canal and radial nerve ______________
11) Calcium carbonate plates that make up the skeleton _______________________
12) Senses light at the ends of a starfish’s arms __________________________
13) Found in the ambulacral groove; help in locomotion, grabbing food, & prying open bivalve shells _____________________________
14) Part of the nervous system that encircles the starfish’s mouth and connects the radial nerves together _____________________________
15) Part of the water vascular system that encircles the starfish’s mouth and connects the radial canals together ______________________________

*   *   *   *   *   *   *   *   *   *   *   *

Put these parts of the water vascular system in the correct sequence.

Ampullae  ring canal  stone canal  radial canal

madreporite → __________________→ __________________→
________________→ __________________→ tube feet

Which 2 structures are found INSIDE THE AMBULACRAL RIDGE?

__________________________  __________________________
THE WORD BEGINS WITH?

1) The madreporite and anus are both located on the _A_ ___ ___ ___ surface of a starfish.

2) A _P_ ___ ___ ___ ___ ___ ___ ___ is a pincher-like structure that keeps the surface of some echinoderms free of organisms.

3) Network of water filled canals found only in echinoderms that provide water pressure to run the tube feet _W_ ___ ___ ___ _V_ ___ ___ ___ ___ ___ _S_ ___ ___ ___.

4) The mouth, tube feet, and ambulacral groove are all located on the _O_ ___ ___ surface.

5) Starfish have _E_ ___ ___ ___ ___ fertilization; that means sperm and egg join outside the body in the ocean.

6) The _R_ ___ ___ _C_ ___ ___ encircles the starfish’s mouth and connects the stone canal to the radial canals in the arms.

7) All Echinoderms are _M_ ___ ___ ____; that means they live in oceans (salt water).

8) The _S_ ___ ___ ___ _C_ ___ ___ connects the madreporite to the ring canal.

9) The nerve that encircles the mouth of a starfish is the _N_ ___ ___ ___ _R_ ___ ____.

10) Starfish have _D_ ___ ___ ___ ____ _G_ ___ ___ ___ which make bile and absorb nutrients just like clams did.

11) The _P_ ___ ___ ___ ____ stomach stays inside the body in a starfish and is connected to the digestive glands and anus.

12) _O_ ___ ___ ___ ___ ___ are small calcium carbonate plates that make up the endoskeleton of an echinoderm.

13) Pigmented eyespots on the tips of each starfish arm can sense _L_ ___ ___ ___ and _D_ ___ ___

14) The _A_ ___ ___ ___ ___ ___ _G_ ___ ___ ___ is a trench that runs along the ventral surface of the starfish’s arms and holds the tube feet.

15) Echinoderms have a winged larva called a _B_ ___ ___ ___ ___ ___ __.

16) The name echinoderm comes from the Latin word meaning “_S_ ___ ___ ___ _S_ ___ ____”.

17) The _C_ ___ ___ ___ ___ stomach is closest to the mouth and is extruded outside the body during feeding.

18) The sieve-like opening into the water vascular system on the aboral surface of a starfish is called the _M_ ___ ___ ___ ___ ___ __.

19) The _T_ ___ ___ _F_ ___ ___ are small flexible fluid filled tubes found on the oral surface that are used in locomotion, grabbing food, and gas exchange.

20) Echinoderms are _I_ ___ ___ ___ ___ ___ ___ ___ _D_ ___ ___ ___ ___ ___ ___ because even though they have no backbone, their blastopore becomes their anus.
21) The larva in a starfish has _B_ symmetry, but adult seastars have _R_ symmetry.

22) _P_ symmetry is a special kind of radial symmetry seen in 5 armed starfish.

23) Starfish have _A_ symmetry, the ability to “self amputate” body parts, which they can use to escape predators.

24) The ability to regrow lost body parts, called _R_ symmetry, allows seastars to undergo _A_ as well as _S_ reproduction.

25) The bulb-like sac at the base of the tube foot, which squeezes to control the amount of water moving in the foot is called an _A_.

26) Echinoderms have an _E_ skeleton inside their body made of ossicles.

27) The general term for reproductive organs (female or male) is _G_.

28) The _R_ N and the _R_ C are both found inside the ambulacral _R_.

29) The fleshy skin extensions next to the spines on a starfish’s surface involved in gas exchange, excretion of nitrogen waste, and osmoregulation are called _S_ G_.

* * * * * * * * * * * COMPLETED THE FOLLOWING TABLE FOR THE CLASSES OF ECHINODERMS.

<table>
<thead>
<tr>
<th>TRAIT</th>
<th>ASTEROIDEA</th>
<th>OPHIUROIDEA</th>
<th>CRINODEA</th>
<th>ECHINODEA</th>
<th>HOLOTHUROIDEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF SYMMETRY?</td>
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<tr>
<td>EXAMPLES?</td>
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<td>BODY PLAN?</td>
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<tr>
<td>DISTINGUISHING TRAITS</td>
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