

## Echinoderms

### Phylum Echinodermata

All marine and include sea stars, brittle stars, sea urchins, sea cucumbers, and sea lillies

Have radial symmetry (How?)

Cambrian ancestors thought to be sessile

All free living

No ability to osmoregulate

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## Echinoderms

### General Echinoderm Traits

- Radial symmetry (bilateral larvae)
- Generally 5 or more radiate areas
  - Pentamerous design
- No head or brain
- Endoskeleton of calcareous ossicles
- Water – vascular system
- Respiration by dermal branchiae

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## Echinoderms

### Sea Star Form & Function

- Central disc with 5 or more arms (rays)
- “Open” ambulacral groove on each arm    **See Fig. 14.6A in text**
- Rows of tube feet (podia)
- Spiny aboral surface with pedicellariae    **See Fig. 14.5 in text**
- Dermal branchiae

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## Echinoderms

### Sea Star Form & Function

- Endoskeleton of calcareous plates (ossicles)
- Meshwork pattern called stereom
- Large fluid filled coelom
- Excretion and respiration at dermal branchiae and podia

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## Echinoderms

### Sea Star Form & Function

- Unique water-vascular system
- Canal system with opening (Madreporite)
- 1 radial canal with lateral canals to podia
- Podia with suckers and muscular sac (ampulla)
- Hydraulic pressure for movement

See Fig. 14.6 in text

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## Echinoderms

### Other Echinoderm Taxa

#### **Brittle Stars**

- Thin arms with closed groove
- No pedicellariae or dermal branchiae
- Podia aid in feeding, not locomotion
- Deep water

See Fig. 14.13 in text

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**Echinoderms**

**Other Echinoderm Taxa**

**Sea Urchins**

- No arms, have endoskeletal test
- Oral surface extends onto aboral side
- Movable spines
- Aristotle's Lantern for grinding

See Figs. 14.16 and 14.17 in text

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**Echinoderms**

**Other Echinoderm taxa**

**Sea cucumbers**

- Ossicles reduced, soft-bodied
- Secondarily bilateral
- Specialization of podia
- Respiratory tree

See Fig. 14.20 in text

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**Echinoderms**

**Other Echinoderm taxa**

**Sea lilies**

- Many attached to substrate
- Central disc (calyx) at top of stalk
- 5 arms branch into many
- Grooves open for food transfer

See Fig. 14.21 in text

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