**Study and classification with reasons of the following animals**

**Phylum - Echinodermata**

**Sub-phylum**

**Pelmatozoa Eleutherozoa**

**Crinoidea**

**e.g. Antedon**

**Classes**

**Holothuroidea Echinoidea Asteroidea Ophiuroidea**

e.g. **Holothuria** e.g. **Echinus** e.g. **Astropecten** e.g. **Brittle Star**

1. **Antedon**

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| **Kingdom:** Animalia | 1. Nutrition heterotrophic. 2. Control and Coordination mechanisms well developed. |
| **Subkingdom:** Metazoa | Multicellular animals. |
| **Division:** Bilateria | Triploblastic animals with bilateral symmetry. |
| **Subdivision:** Coelomata | Presence of true coelom. |
| **Phylum:** Echinodermata | 1. Exclusively marine, free living, spiny skinned radially symmetrical animals with distinct oral and aboral surfaces. 2. Unsegmented, pentamerous body marked with ambulacral and interambulacral areas. 3. Water vascular system present. 6. Respiration by dermal branchiae, tube feet, respiratory trees, & bursae. 7. Locomotion by tube feet. 8. Great power of regeneration. |
| **Sub-phylum:**Pelmatozoa | 1. Many are extinct. 2. Oral surface with central mouth and eccentric anus. 3. Aboral surface with cirri or stalk. |
| **Class:**  Crinoidea | 1. Arms movable branched with or without pinnules. 2. Madreporite, spines, pedicellariae & suckers absent. |
| Antedon | * 1. Body consists of central disc and a series of bi-radiating arms.3. Each arm is divided at its base into two. 4. Pinnules are present. |

1. **Holothuria**

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| **Kingdom:** Animalia | 1.Nutrition heterotrophic. 2. Control and Coordination mechanisms well developed. |
| **Subkingdom:** Metazoa | Multicellular animals. |
| **Division:** Bilateria | Triploblastic animals with bilateral symmetry. |
| **Subdivision :** Coelomata | Presence of true coelom. |
| **Phylum:** Echinodermata | * + 1. Exclusively marine, free living, spiny skinned radially symmetrical animals with distinct oral and aboral surfaces. 2. Unsegmented, pentamerous body marked with ambulacral and interambulacral areas. 3. Water vascular system present. 6. Respiration by dermal branchiae, tube feet, respiratory trees, & bursae. 7. Locomotion by tube feet. 8. Great power of regeneration. |
| **Sub phylum:** Eleutherozoa | 1. Free living without stalk. 2. Oral surface bears mouth and aboral with anus and madreporite. 3. Tube feet with suckers. |
| **Class:** Holothuroidea. | 1. Bilaterally symmetrical elongated body with mouth and anus at opposite ends. 2. Alimentary canal is long and coiled. 3. Respiration by respiratory tree. 3. Mouth is surrounded by tentacles. |
| Holothuria. | 1. Body wall leathery having minute ossicles. 3. Mouth is surrounded by tentacles. 4. Respiratory tree is well developed. 5. Madreporite internal. |

1. **Echinus**

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| --- | --- |
| **Kingdom:** Animalia | 1.Nutrition heterotrophic. 2. Control and Coordination mechanisms well developed. |
| **Subkingdom:** Metazoa | Multicellular animals. |
| **Division:** Bilateria | Triploblastic animals with bilateral symmetry. |
| **Subdivision :** Coelomata | Presence of true coelom. |
| **Phylum:** Echinodermata | * + - * 1. Exclusively marine, free living, spiny skinned radially symmetrical animals with distinct oral and aboral surfaces. 2. Unsegmented, pentamerous body marked with ambulacral and interambulacral areas. 3. Water vascular system present. 6. Respiration by dermal branchiae, tube feet, respiratory trees, & bursae. 7. Locomotion by tube feet. 8. Great power of regeneration. |
| **Sub phylum:** Eleutherozoa | 1.Free living without stalk. 2. Oral surface bears mouth and aboral with anus and madreporite. 3. Tube feet with suckers. |
| **Class:** Echinoidea. | 1. Spherical, disc like, oval or heart shaped body covered with movable spires and enclosed in test of closely fitted calcareous plates. 2. Pedicellariae are stalked with 3 jaws. |
| Echinus | 1. Body is globular. 2. Entire body except peristome and periproct is covered with spines. 3. Masticatory organ with 5 teeth i.e. Aristotle’s lantern present. |

1. **Asteropecten**

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| **Subkingdom:** Metazoa | Multicellular animals. |
| **Division:** Bilateria | Triploblastic animals with bilateral symmetry. |
| **Subdivision:** Coelomata | Presence of true coelom. |
| **Phylum:** Echinodermata | Exclusively marine, free living, spiny skinned radially symmetrical animals with distinct oral and aboral surfaces. 2. Unsegmented, pentamerous body marked with ambulacral and interambulacral areas. 3. Water vascular system present. 6. Respiration by dermal branchiae, tube feet, respiratory trees, & bursae. 7. Locomotion by tube feet. 8. Great power of regeneration. |
| **Sub-phylum:** Eleutherozoa | 1. Free living without stalk. 2. Oral surface bears mouth and aboral with anus and madreporite. 3. Tube feet with suckers. |
| **Class:** Asteroidea | 1. Flat, pentagonal star shaped body. 2. Ambulacral grooves on oral surface. 4. Respiration by papulae. 5. Small, movable, spine like pedicellariae. |
| Astropecten | 1. Large indistinct central disc, with five arms tapering at tips. 2. Arms with marginal spines & plates. 3. Tube feet without suckers. 4. Pedicellarie sessile. |

1. **Brittle Star**

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| **Kingdom:** Animalia | 1. Nutrition heterotrophic. 2. Control and Coordination mechanisms well developed. |
| **Subkingdom:** Metazoa | Multicellular animals. |
| **Division:** Bilateria | Triploblastic animals with bilateral symmetry. |
| **Subdivision:** Coelomata | Presence of true coelom. |
| **Phylum:** Echinodermata | 1. Exclusively marine, free living, spiny skinned radially symmetrical animals with distinct oral and aboral surfaces. 2. Unsegmented, pentamerous body marked with ambulacral and interambulacral areas. 3. Water vascular system present. 6. Respiration by dermal branchiae, tube feet, respiratory trees, & bursae. 7. Locomotion by tube feet. 8. Great power of regeneration. |
| **Sub-phylum:** Eleutherozoa | 1. Free living without stalk. 2. Oral surface bears mouth and aboral with anus and madreporite. 3. Tube feet with suckers. |
| **Class:** Ophiuroidea | 1.Body flat ,pentamerous symmetry 2.Arms long slender , smooth or spiny 3. Ambulacral grooves absent. 4.Anus and intestine absent. 5.Madreporite on oral surface. 6.Respiration by bursae. 7.Commonly called brittle star. |
| Brittle Star | 1. Long slender banded arms with a distinct central disc. 2. Tube feet without sucker 3. Found under rocks, coral heads. 4. Great power of regeneration. |