**Ch. 25: The History of Life on Earth**

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| **Question/Learning Criteria** | **Answer** |
| 1. Describe conditions on **EARLY EARTH**
 | How old is Earth?When did life first appear? |
| 1. How did life arise?
 | 1. Small molecules 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(proteins, nucleic acids)**
2. Packaged into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (membrane-containing droplets)**
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules allow for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	1. “RNA World”:
	2. First catalysts =
 |
| 1. How did organic molecules (possibly) arise?
 | 1920:1953: |
| 1. What are Key Events in Origin of Life?
 | Origin of Cells (Protobionts)* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ → separate \_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_\_

→ separate \_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  |
| Origin of Genetics* \_\_\_\_\_\_\_\_\_\_ is likely first genetic material
* multiple functions:
	+ makes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ possible
	+ makes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & evolution possible
 |
| Origin of Eukaryotes* + endosymbiosis
 |
| 1. How do scientists date fossils?
 | Relative Dating:Radiometric Dating: |
| 1. What was the progression of the appearance of life on Earth?
 |  |
| 1. How were **THE 1ST EUKARYOTES** different from prokaryotes?
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| 1. What is the **ENDOSYMBIONT THEORY**? (Endosymbiosis)
 | Proposed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_An explanation for how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ evolvedhttp://www.goldiesroom.org/Multimedia/Bio_Images/21%20Evolution/24%20Aggregation%20of%20Cells.jpg |
| ***1st Endosymbiosis Event:**** origin of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* engulfed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but did not digest them
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationship
 |
| ***2nd Endosymbiosis Event:**** origin of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* engulfed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but did not digest them
* mutually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationship
 |
| 1. What **EVIDENCE** do we have for **ENDOSYMBIOSIS**?
 | Structural* mitochondria & chloroplasts resemble \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* mitochondria & chloroplasts have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* mitochondria & chloroplasts have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |
| Genetic* mitochondria & chloroplasts have their own…
 |
| Functional* mitochondria & chloroplasts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* mitochondria & chloroplasts\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* mitochondria & chloroplasts have their own \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |
| 1. Why are **MASS EXTINCTIONS** significant in Earth’s History?
 | Major periods in Earth’s history \_\_\_\_\_\_\_\_\_\_ with *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* & new ones \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* |
| 1. Describe major life events in Earth’s history
 | **Precambrian:** microscopic fossils (stromatolites) | * Photosynthesis 🡪atmospheric \_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (endosymbiont theory)
 |
| **Paleozoic: *Cambrian Explosion*** | * \_\_\_\_\_\_\_\_\_\_\_ invade \_\_\_\_\_\_\_\_\_\_\_, many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ appear
* Permian Extinction (-96% species)
 |
| **Mesozoic:** “Age of Reptiles”, dinosaur, plants | * Formation of Pangaea supercontinent
* Cretaceous Extinction – \_\_\_\_\_\_\_\_\_\_\_\_\_\_ off Mexico’s coast
 |
| **Cenozoic:**  |  |
| 1. Define heterochrony
 | evolutionary change in \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ events. This can affect how species evolve. |
| 1. What are **HOMEOTIC GENES**
 | master \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ genes determine location and organization of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Ex:  |