

Name _____

Exploring Marine Science at the Seymour Center

“What is Science?” (Orange Pod)



SEYMOUR CENTER AT LONG MARINE LABORATORY

Read all the questions below, then choose at least three to answer from this area.

1. What is science and what does it require? What are some parts of the scientific process?
2. From the display or video, describe interesting things that Burney Le Boeuf has learned about elephant seals.
3. Turn the drum to find out what's happening at Año Nuevo this month.
4. What did you observe on the Año Nuevo Elephant Seal Camera today? ? *(Note: Periodically Año has trouble with the real-time, live camera, therefore it may not always be possible to monitor the daily activities of the elephant seals.)*
5. Describe three observations made by John Pearse and students over 25 years of studying life in the tidepools.
6. What are good rules to follow in order to preserve tide pool organisms?
7. How do stereoscopes help geologists like Gary Griggs?
8. Why does the appearance of beaches change with the seasons?

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“What is Science?” (Orange Pod): ANSWER KEY



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Read all the questions below, then choose at least three to answer from this area.

1. What is science and what does it require? What are some parts of the scientific process?

Science is a process that requires evidence and testing. Some parts of the scientific process are gathering and analyzing data, discussion, and discovery which can lead to benefits.

2. From the display or video, describe interesting things that Burney Le Boeuf has learned about elephant seals.

- When elephant seals leave Ano Nuevo, they swim and feed 2 to 8 months at sea and come ashore only once to molt during that time.
- While at sea, elephant seals dive and feed continuously.
- They dive deeper and longer than other seals and most whales.
- Most dives are about 1700 feet, but dives can be up to 5000 feet at their deepest.
- Elephant seals can hold their breath for up to 90 minutes.
- A major predator of elephant seals is the white shark.
- Elephant seals are the largest seal or sea lion.
- Males have a dominance hierarchy, the largest males monopolize mating.
- Males fight for females in bloody fights or they bluff with loud sounds (vocal threat).
- Females protect their pups by rushing and biting intruders.
- All this can be seen at Ano Nuevo, where between 1500 to 2000 animals fight, mate, give birth, and nurse their pups in plain view of human spectators.

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3. Turn the drum to find out what’s happening at Año Nuevo this month.

Month	Male Activity	Female Activity	Juvenile Activity	
December	Breeding Season	Oldest males arrive, followed by other males.	Juveniles (ages 1-4) leave the island.	
January		Males mate with females after females have given birth.	Females give birth and nurse for one month. They are ready to mate about 24 days later.	
February			Pups born.	
March		Young males begin to leave.	Females begin to return to the sea. Mating ends.	Pups nursing.
April		Older males leave the island.	Female Molting Season	Juveniles (age 1-4) return to go through a one month molt. Number peak.
May		Pups born in the winter leave the island.		
June	Most seals leave the island.	Most seals leave island.		
July	Male Molting Season	Males (age 5-6) return to go through a one month molt.		
August		Adult males (age 6+) arrive to molt.		
September		All males leave island by the first week of September.	Juvenile Haul Out Season	Juveniles (age 1-4) begin to arrive for a one month rest.
October				The numbers of yearlings and juveniles peak.
November		Subadult males begin to arrive for breeding season.		Yearlings and juveniles begin to leave.

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4. **What did you observe on the Año Nuevo Elephant Seal Camera today?** *(Note: Periodically Año has trouble with the real-time, live camera, therefore it may not always be possible to monitor the daily activities of the elephant seals.)*

Answers will depend on season and availability of live feed.

5. **Describe three observations made by John Pearse and students over 25 years of studying life in the tidepools.**

- Study sites were surprisingly stable in number and mix of plants and animals.
- Although the number of species found was stable, a different variety of species was seen each visit; some were constant, some were rare.
- Pearse recorded an average of 30% increase in invertebrate species diversity since 1971.
- Pearse did not see some changes that he had expected like evidence of global warming.
- Even very popular sites, such as Natural Bridges, did not show much damage from increased visitation. It seems people are becoming more careful when they visit 😊.

6. **What are good rules to follow in order to preserve tide pool organisms?**

- Observe more, touch less.
- When you touch, be gentle.
- If you pick something up, hold it for just a moment and carefully put it back where it came from.
- Never pry a plant or animal from its home
- Do not take souvenirs home. Even empty shells are “recycled” in tide pool habitats.

7. **How do stereoscopes help geologists like Gary Griggs?** Stereoscopes create a 3D scene from two photographs. Geologists can compare the 3D image of a cliff today with the same cliff's images from 10, 20, even 50 years ago and track changes over time.

8. **Why does the appearance of beaches change with the seasons?** During the winter, powerful waves carry sand away from the beaches and deposit seaweed and driftwood on the shore. In summer, gentle waves carry sand on to the shore, making a broader beach than in winter.