

the Water Brothers EPISODE GUIDE QUESTIONS

ACID OCEAN

1. What is the main cause of ocean acidification?
2. What percent of all carbon dioxide emissions do the oceans absorb?
3. True or False: As carbon dioxide builds up in the ocean, it reacts with seawater, making it more difficult for marine life to absorb calcium carbonate. This process also causes the pH level of seawater to lower, increasing its acidity.
4. Since the industrial revolution, by what percentage has the acidity of seawater increased?
5. Name two marine animals that are affected by ocean acidification.
6. What marine animal thrives in more acidic oceans?
7. 55 million years ago, during the PETM when oceans were more acidic, what kind of marine life went extinct?
8. How many times faster is ocean acidification occurring today compared to during the PETM? 5 times, 20 times or 30 times faster?
9. Name one area mentioned in the episode where the ocean is naturally more acidic.
10. In scientist Jason's experiment, did the corals survive in the acidic waters of Vulcano?
11. How many people directly benefit from reefs for food and coastal protection?

the Water Brothers EPISODE GUIDE ANSWERS

ACID OCEAN

- 1. What is the main cause of ocean acidification?** Increasing CO₂ levels is the main cause of ocean acidification. The oceans are absorbing CO₂.
- 2. What percent of all carbon dioxide emissions do the oceans absorb?** The oceans absorb 30% of all carbon dioxide emissions.
- 3. True or False: As carbon dioxide builds up in the ocean, it reacts with seawater, making it more difficult for marine life to absorb calcium carbonate. This process also causes the pH level of seawater to lower, increasing its acidity.** True.
- 4. Since the industrial revolution, by what percentage has the acidity of seawater increased?** Since the industrial revolution, the acidity of seawater has increased by around 30%.
- 5. Name two marine animals that are affected by ocean acidification.** Shellfish (mussels, scallops, oysters, etc.) and squid are affected by ocean acidification.
- 6. What marine animal thrives in more acidic oceans?** Jellyfish thrive in more acidic oceans.
- 7. 55 million years ago, during the PETM when oceans were more acidic, what kind of marine life went extinct?** During the PETM, shelled marine life living on the seafloor went extinct.
- 8. How many times faster is ocean acidification occurring today compared to during the PETM? 5 times, 20 times or 30 times faster?** Modern day ocean acidification is occurring 10 times faster than it did during the PETM.
- 9. Name one area mentioned in the episode where the ocean is naturally more acidic.** 1. Waters in the Pacific Northwest are naturally more acidic. / 2. At Vulcano, an island in Italy, the waters are naturally more acidic from gas containing carbon dioxide coming out of the seabed.
- 10. In scientist Jason's experiment, did the corals survive in the acidic waters of Vulcano?** Almost all of the corals in Jason's experiment did not survive the acidic waters of Vulcano.
- 11. How many people directly benefit from reefs for food and coastal protection?** Over half a billion people directly benefit from reefs for food and coastal protection.

the Water Brothers EPISODE GUIDE ACTIVITIES

ACID OCEAN

Ocean Acidification

- <http://ocean.nationalgeographic.com/ocean/explore/pristine-seas/critical-issues-ocean-acidification/>
- <http://www.davidsuzuki.org/blogs/science-matters/2015/11/canadas-oceans-matter-at-the-paris-climate-talks-and-beyond/>
- <http://oneocean.cbc.ca/pledge/issues/acidification>

Carbon Dioxide Emissions

- <http://whatsyourimpact.org/greenhouse-gases/carbon-dioxide-sources>
- http://coralreef.noaa.gov/aboutcrp/strategy/reprioritization/wgroups/resources/climate/resources/oa_royalsociety.pdf
- <http://timeforchange.org/ocean-acidification-effect-of-global-warming>

PETM

- <http://www.wunderground.com/climate/PETM.asp>
- <http://ngm.nationalgeographic.com/2011/10/hothouse-earth/kunzig-text>