

Veriref

Information to be Verified (Upload PDF or Enter Text):

No file selected.

While the surface of the ocean is well studied, its depths remain one of the least explored regions on Earth. Sunlight cannot penetrate more than a few hundred meters, making the deep sea a cold, pitch-black environment. Despite this, life thrives thanks to photosynthesis from thermal vents on the ocean floor. These vents release chemicals that bacteria use to create energy.

These bacteria form the base of a food chain that includes giant tube worms, deep-sea crabs, and even fish with glowing organs. Scientists use manned submarines and drones to explore these habitats, often discovering new species. However, because of extreme pressure, many of these creatures are made of hard calcium shells. As mining operations begin targeting the ocean floor, there's growing concern about how such delicate ecosystems will respond.

Select claim types to analyse:

- ☒ Wrong Claims ☒ Not Given Claims ☒ Could Not Access Resources ☒ Correct claims
☒ Almost correct claims ☒ Claims that might be correct ☒ Source text not relevant

Submit

The text discusses the deep sea, highlighting its extreme conditions and unique ecosystems. It explains how life thrives near thermal vents through chemosynthesis and describes the various organisms that inhabit these depths. The text also touches on the challenges and concerns surrounding the exploration and potential mining of these delicate environments.

Detailed sentence by sentence analysis:

Search sentences...

- ☐ Failed Checks ☐ Not Given ☐ Could Not Access Resources ☐ All Correct
☐ Source Text Irrelevant ☐ Almost Correct ☐ Might Be Correct/Controversial

While the surface of the ocean is well studied, its depths remain one of the least explored regions on Earth.

Could not
check 1
claims ▼

The sentence can be split into the following claims:

i cannot say

Explanation: **i** It is impossible to say whether the claim "The surface of the ocean is well studied" is correct or not based solely on the provided text for several reasons:

1. **Scope of the Text:** The text primarily discusses the exploration of the ocean floor, not the surface. It provides detailed information about the mapping and exploration of the seabed but does not offer any data or insights into the study of the ocean's surface.
2. **Lack of Specific Information:** The text does not mention any studies, research, or data collection efforts related to the ocean's surface. It focuses on the limitations of ocean floor exploration, which does not directly translate to the state of surface exploration.
3. **Ambiguity of "Well Studied":** The term "well studied" is subjective and can vary based on different criteria. The text does not provide any benchmarks or comparisons that would allow us to determine what constitutes "well studied" in the context of ocean surface exploration.
4. **No

Other sources found and considered during the online search: **i**

1. <https://enviroliteracy.org/how-deep-have-we-explored-the-ocean/> - cannot say
2. <https://science.howstuffworks.com/environmental/earth/oceanography/deep-ocean-exploration.htm> - cannot say
3. <https://www.scientificamerican.com/article/which-is-more-dangerous-outer-space-or-the-deep-sea/> - cannot say
4. <https://www.britannica.com/science/Understanding-the-depth-of-Earths-oceans-2231362> - cannot say
5. <https://ocean.si.edu/conservation/climate-change/observing-worlds-ocean-space> - cannot say
6. <https://www.nasa.gov/missions/swot/next-generation-water-satellite-maps-seafloor-from-space/> - cannot say
7. <https://sealevel.jpl.nasa.gov/ocean-observation/why-study-the-ocean/benefits/> - cannot say
8. <https://www.nature.com/articles/s41586-025-08722-8> - cannot say
9. <https://science.nasa.gov/earth-science/focus-areas/climate-variability-and-change/ocean-physics/oceanography/> - cannot say

i correct

Explanation: **i** The claim "The depths of the ocean remain one of the least

explored regions on Earth" is correct based on the provided text for the following reasons:

1. **Percentage of Exploration:** The text states that "we've only scratched the surface of this underwater world." This phrase implies that a very small portion of the ocean has been explored, supporting the claim that the depths remain largely unexplored.
2. **Continuous but Slow Process:** The text mentions that the quest to understand the ocean's depths has been a "continuous, albeit slow, process." This indicates that while efforts are ongoing, the rate of exploration is not rapid, further emphasizing that much of the ocean remains unexplored.
3. **Immense Amount Unknown:** The text explicitly states that there is an "immense amount that remains unknown" about the ocean. This directly supports the claim that the depths of the ocean are one of the least explored regions. These points from the text collectively validate the claim that the depths of the ocean

Reference sentences: ⓘ See source: <https://enviroliteracy.org/how-deep-have-we-explored-the-ocean/> Here are the sentences from the text that support the claim "The depths of the ocean remain one of the least explored regions on Earth": - "While we've made significant strides, the reality is that we've only scratched the surface of this underwater world." - "the immense amount that remains unknown."

Other sources found and considered during the online search: ⓘ

1. <https://enviroliteracy.org/how-deep-have-we-explored-the-ocean/> - cannot say
2. <https://science.howstuffworks.com/environmental/earth/oceanography/deep-ocean-exploration.htm> - cannot say
3. <https://www.scientificamerican.com/article/which-is-more-dangerous-outer-space-or-the-deep-sea/> - cannot say
4. <https://www.britannica.com/science/Understanding-the-depth-of-Earths-oceans-2231362> - cannot say

Add another source ▼

Reload

Sunlight cannot penetrate more than a few hundred meters, making the deep sea a cold, pitch-black environment.

Could not
check 1
claims



The sentence can be split into the following claims:

ⓘ cannot say

Explanation: ⓘ It is impossible to say whether the claim "Sunlight cannot penetrate more than a few hundred meters into the ocean" is correct or not based solely on the provided text for several reasons:

1. **Vagueness of "a few hundred meters":** The text states that sunlight can

travel about 1,000 meters into the ocean under the right conditions, but there is rarely any significant light beyond 200 meters. The claim uses the vague phrase "a few hundred meters," which could be interpreted in different ways. It could mean 200 meters, 300 meters, or even 500 meters. Without a clear definition, it's hard to confirm or deny the claim.

2. **Context of "significant light"**: The text specifies that there is rarely any significant light beyond 200 meters. The claim does not specify the amount of light needed for penetration, so it's unclear whether "a few hundred meters" align

Other sources found and considered during the online search: ⓘ

1. <https://www.americoceans.org/facts/how-deep-does-light-penetrate-the-ocean/> - cannot say
2. <https://rwu.pressbooks.pub/webboceanography/chapter/6-5-light/> - cannot say
3. <https://enviroliteracy.org/how-deep-does-light-penetrate-the-ocean/> - cannot say
4. <https://enviroliteracy.org/how-far-does-sunlight-penetrate-the-ocean/> - cannot say
5. https://oceanservice.noaa.gov/facts/light_travel.html - cannot say
6. <https://www.americoceans.org/facts/how-deep-does-light-penetrate-the-ocean/> - cannot say
7. <https://rwu.pressbooks.pub/webboceanography/chapter/6-5-light/> - cannot say
8. <https://enviroliteracy.org/how-deep-does-light-penetrate-the-ocean/> - cannot say
9. <https://enviroliteracy.org/how-far-does-sunlight-penetrate-the-ocean/> - cannot say

ⓘ almost correct. The source text mentions that no light penetrates below 1,000 meters, which supports the claim that the deep sea is pitch-black. However, the source text does not explicitly state that the deep sea is cold.

Explanation: ⓘ The claim "The deep sea is a cold, pitch-black environment because sunlight cannot penetrate more than a few hundred meters into the ocean" is almost correct with regards to the text provided, but let's break down the parts that are correct and the parts that are not explicitly supported by the text. **Correct parts of the claim:**

1. **Pitch-black environment**: The text mentions that the cusk eel lives "where no light penetrates," which supports the idea that the deep sea is pitch-black. This is also implied by the description of the aphotic zone, which is the deepest zone where sunlight does not reach.

2. **Sunlight cannot penetrate more than a few hundred meters**: The text describes the euphotic zone as the upper 200 meters (656 feet) of the ocean, where sunlight penetrates sufficiently to support plant growth. This implies that below this depth, sunlight does not penetrate effectively, supporting the claim that sunlight cannot penetrate more than a few hundred

Reference sentences: ⓘ See source: <https://oceanexplorer.noaa.gov/facts/light-distributed.html> Here are the sentences from the source text that support the claim 'The deep sea is a cold, pitch-black environment because sunlight cannot penetrate more than a few hundred meters into the ocean.':

1. "This unpatterned, brown cusk eel (probably an undescribed species) has

color typical of many fishes living near the bottom between 0.5 and 3.6 miles (1,000 and 6,000 meters) down in the ocean, where no light penetrates."

2. "The ocean is generally divided into three zones which are named based on the amount of sunlight they receive: the euphotic, dysphotic, and aphotic zones."

3. "The upper 200 meters (656 feet) of the ocean is called the euphotic zone. Since sunlight penetrates this zone sufficiently to support the growth of phytoplankton and/or macro algae (i.e., plants that need sun!)" These sentences highlight

Other sources found and considered during the online search: ⓘ

1. <https://www.americanococeans.org/facts/how-deep-does-light-penetrate-the-ocean/> - cannot say

2. <https://rwu.pressbooks.pub/webboceanography/chapter/6-5-light/> - cannot say

3. <https://enviroliteracy.org/how-deep-does-light-penetrate-the-ocean/> - cannot say

4. <https://enviroliteracy.org/how-far-does-sunlight-penetrate-the-ocean/> - cannot say

5. <https://enviroliteracy.org/how-deep-does-light-penetrate-the-ocean/> - cannot say

6. <https://www.americanococeans.org/facts/how-deep-does-light-penetrate-the-ocean/> - cannot say

7. <https://www.noaa.gov/jetstream/ocean/layers-of-ocean> - cannot say

8. <https://oceanexplorer.noaa.gov/facts/light-distributed.html> - cannot say

Add another source ▼

Reload

Despite this, life thrives thanks to photosynthesis from thermal vents on the ocean floor.

2 claims are controversial ▼

The sentence can be split into the following claims:

ⓘ might be correct. The source text mentions that life is typically sparse in the deep sea but also describes unique ecosystems with unusual animal species around hydrothermal vents.

Explanation: ⓘ The claim "Life thrives in the deep sea" might be considered correct based on the provided text for the following reasons:

1. **Unique Ecosystems:** The text describes "unique ecosystems" that "teem with unusual animal species" at certain spots on the ocean floor where tectonic plates meet. This suggests that there are areas in the deep sea where life is abundant and diverse.

2. **Hydrothermal Vent Communities:** The text mentions "hydrothermal vent communities," which are groups of animals that live around hydrothermal vents. The use of the term "communities" implies a thriving and interconnected

ecosystem.

3. **Microbes:** The text highlights the role of microbes in making these ecosystems possible, indicating that life at a microbial level is not only present but also crucial for the survival of other organisms. However, the evidence in the text for this claim is indirect, partial, or uncertain for several reasons:

1. **Limited Scope:** The text specifies that these ecosystems

Reference sentences: ⓘ See source: <https://ocean.si.edu/ecosystems/deep-sea/microbes-keep-hydrothermal-vents-pumping> To support the claim "Life thrives in the deep sea," the following sentences from the source text are relevant:

1. "But at certain spots on the ocean floor where tectonic plates meet, unique ecosystems teem with unusual animal species."
2. "These oases in the deep sea were a complete surprise—Dr. Bob Ballard calls them a far more important discovery than his finding of the wreck of the Titanic!"
3. "The animals are spectacular, but often overlooked are the organisms that make these ecosystems possible: the microbes that convert the minerals."

Other sources found and considered during the online search: ⓘ

1. <https://education.nationalgeographic.org/resource/deep-sea-hydrothermal-vents/> - might be correct. The source text discusses the discovery of hydrothermal vent ecosystems in the deep ocean, which implies that life can exist in these environments. However, it does not explicitly state that life "thrives" in the deep sea.
2. <https://www.nature.com/articles/s41579-019-0160-2> - cannot say
3. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say
4. <https://ocean.si.edu/ocean-life/invertebrates/hydrothermal-vent-creatures> - correct

ⓘ might be correct. The source text mentions unique ecosystems and unusual animal species thriving near hydrothermal vents, but it does not explicitly state that chemosynthesis is the process enabling life to thrive.

Explanation: ⓘ The claim "Chemosynthesis from thermal vents on the ocean floor enables life to thrive in the deep sea" might be correct based on the provided text for the following reasons:

1. **Unique Ecosystems:** The text describes unique ecosystems teeming with unusual animal species at spots where tectonic plates meet, specifically around hydrothermal vents. This suggests that these vents support life in an environment where life is typically sparse.
2. **Mineral-Laden Fluid:** The vents emit mineral-laden fluid, which could potentially be used by microbes for chemosynthesis. Chemosynthesis is a process by which certain organisms convert inorganic compounds into organic matter, using the energy released from chemical reactions.
3. **Microbes:** The text mentions "the microbes that convert the minerals," which strongly suggests that chemosynthesis is occurring. These microbes are described as making the ecosystems possible, implying that they are the base of the food chain. However, the evidence in the text for this claim is indirect

Reference sentences: ⓘ See source: <https://ocean.si.edu/ecosystems/deep-sea/microbes-keep-hydrothermal-vents-pumping> The following sentences from

the source text suggest that the claim "Chemosynthesis from thermal vents on the ocean floor enables life to thrive in the deep sea" might be correct:

1. "But at certain spots on the ocean floor where tectonic plates meet, unique ecosystems teem with unusual animal species."
 2. "These structures are referred to as hydrothermal vents, and the assortment of animals surrounding them are referred to as hydrothermal vent communities."
 3. "The animals are spectacular, but often overlooked are the organisms that make these ecosystems possible: the microbes that convert the minerals."
- These sentences indicate that hydrothermal vents support unique ecosystems and that microbes play a crucial role in these ecosystems, which aligns with the concept of chemosynthesis enabling life to thrive in the deep sea.

Other sources found and considered during the online search: ⓘ

1. <https://education.nationalgeographic.org/resource/deep-sea-hydrothermal-vents/> - cannot say
2. <https://www.nature.com/articles/s41579-019-0160-2> - cannot say
3. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say
4. <https://ocean.si.edu/ocean-life/invertebrates/hydrothermal-vent-creatures> - correct

ⓘ almost correct. The source text describes the deep seafloor as having "near-freezing temperatures" and "pitch-black darkness," which supports the claim. However, the claim uses "cold" instead of "near-freezing," which is a small inaccuracy.

Explanation: ⓘ The claim "The deep sea has a cold, pitch-black environment" is almost correct with regards to the provided text. Here's why:

Correct parts of the claim:

1. **Pitch-black darkness:** The text explicitly states that the deep seafloor is characterized by "pitch-black darkness."
2. **Cold environment:** The text mentions "near-freezing temperatures," which supports the claim that the deep sea is cold.

Wrong part of the claim:

1. **Not always cold:** While the deep sea is generally cold, the text also describes specific areas where the temperature is much higher. These are the hydrothermal vents, which emit "warm" fluid (5-100 degrees Celsius/41-212 degrees Fahrenheit) or even "superheated water" (250-400 degrees Celsius/482-752 degrees Fahrenheit). So, while the general deep sea environment is cold, there are

Reference sentences: ⓘ See source: <https://ocean.si.edu/ecosystems/deep-sea/microbes-keep-hydrothermal-vents-pumping> Here are the sentences from the source text that support the claim 'The deep sea has a cold, pitch-black environment.': - "Life is typically sparse on the deep seafloor, where organisms endure... pitch-black darkness." - "But at certain spots on the ocean floor where tectonic plates meet, unique ecosystems teem with unusual animal species."

Other sources found and considered during the online search: ⓘ

1. <https://education.nationalgeographic.org/resource/deep-sea-hydrothermal-vents/> - cannot say
2. <https://www.nature.com/articles/s41579-019-0160-2> - cannot say
3. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say

4. <https://ocean.si.edu/ocean-life/invertebrates/hydrothermal-vent-creatures> - cannot say

Add another source ▼

Reload

These vents release chemicals that bacteria use to create energy.

No errors in the input text detected ▼

The sentence can be split into the following claims:

① correct

Explanation: ① The claim "Thermal vents release chemicals" is correct based on the provided text for the following reason: The text states that hydrothermal vents emit "mineral-laden fluid." This phrase indicates that the vents release fluids containing minerals, which are a type of chemical. Therefore, the text supports the claim that thermal vents release chemicals.

Reference sentences: ① See source: <https://ocean.si.edu/ecosystems/deep-sea/microbes-keep-hydrothermal-vents-pumping> Here are the sentences from the source text that support the claim 'Thermal vents release chemicals': - "mineral-laden fluid is emitted either as a warm (5-100 degrees Celsius/41-212 degrees Fahrenheit), diffuse flow from seabed cracks or as plumes of superheated water (250-400 degrees Celsius/482-752 degrees Fahrenheit) from chimney-like structures." - "These structures are referred to as hydrothermal vents, and the assortment of animals surrounding them are referred to as hydrothermal vent communities."

Other sources found and considered during the online search: ①

1. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10077256/> - cannot say
2. https://en.wikipedia.org/wiki/Hydrothermal_vent_microbial_communities - correct
3. <https://www.nature.com/articles/s41579-019-0160-2> - cannot say

① correct

Explanation: ① The claim "Bacteria use chemicals to create energy" is correct based on the provided text. The text states that "Chemolithoautotrophic bacteria derive nutrients and energy from the geological activity at Hydrothermal vents to fix carbon into organic forms." This sentence explicitly mentions that certain bacteria (chemolithoautotrophic bacteria) use chemicals derived from geological activity to create energy. Therefore, the claim is supported by the information given in the text.

Reference sentences: ⓘ See source: https://en.wikipedia.org/wiki/Hydrothermal_vent_microbial_communities To support the claim "Bacteria use chemicals to create energy," the following sentence from the source text is relevant: "Chemolithoautotrophic bacteria derive nutrients and energy from the geological activity at Hydrothermal vents to fix carbon into organic forms."

Other sources found and considered during the online search: ⓘ

1. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10077256/> - cannot say
2. https://en.wikipedia.org/wiki/Hydrothermal_vent_microbial_communities - cannot say
3. <https://www.nature.com/articles/s41579-019-0160-2> - cannot say

Add another source ▼

Reload

These bacteria form the base of a food chain that includes giant tube worms, deep-sea crabs, and even fish with glowing organs.

Could not check 1 claims, 1 claims are controversial ▼

The sentence can be split into the following claims:

ⓘ cannot say

Explanation: ⓘ It is impossible to say whether the claim "The food chain includes deep-sea crabs" is correct or not based solely on the provided text for several reasons:

1. **Lack of Specific Mention:** The text does not explicitly mention deep-sea crabs. While it describes various organisms and ecosystems, it does not provide a detailed list of all species present.
2. **General Description:** The text discusses the general characteristics of hydrothermal vent communities and the microbes that support these ecosystems. It does not delve into the specifics of the animal species that inhabit these areas.
3. **Broad Terminology:** The term "deep-sea crabs" is broad and could refer to a variety of species. The text does not specify whether any of these species are present in the hydrothermal vent communities.
4. **Focus on Microbes:** The text emphasizes the role of microbes in making these ecosystems possible, but it does not provide information on the higher trophic levels, such as

Other sources found and considered during the online search: ⓘ

1. <https://www.biointeractive.org/sites/default/files/TubeWorms-Educator-film.pdf> - cannot say
2. <https://www.mbari.org/animal/giant-tubeworm/> - cannot say
3. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
4. <https://www.biointeractive.org/classroom-resources/how-giant-tube-worms-survive-hydrothermal-vents> - cannot say

5. <https://www.naturalworldfacts.com/deep-sea-food-web> - cannot say
6. <https://education.nationalgeographic.org/resource/marine-food-chain/> - cannot say
7. <https://www.sciencefacts.net/ocean-food-chain.html> - cannot say
8. <https://www.disl.edu/dhp/resources/DeepSeaRedCrabs.pdf> - cannot say
9. <https://www.sciencelearn.org.nz/resources/143-marine-food-webs> - cannot say

(i) might be correct

Explanation: (i) The claim "Bacteria that use chemicals from thermal vents to create energy form the base of a food chain" might be correct based on the provided text for the following reasons:

1. **Chemosynthetic Bacteria:** The text mentions that some species of bacteria can use inorganic compounds like hydrogen sulfide (H₂S) from hydrothermal vents to produce organic molecules through chemosynthesis. This process converts inorganic chemicals into energy-rich organic compounds.
2. **Symbiotic Relationship:** The text describes a symbiotic relationship between giant tube worms and chemosynthetic bacteria. This suggests that the bacteria provide energy to the worms, indicating that the bacteria are a source of energy for other organisms.
3. **Ecosystem Base:** The text implies that these bacteria are part of a diverse community of organisms inhabiting the deep-sea hydrothermal vents. This community structure suggests a food chain where the bacteria, as primary producers, support other organisms. However, the evidence in the text for this claim is indirect


Reference sentences: (i) See source: <https://www.biointeractive.org/classroom-resources/how-giant-tube-worms-survive-hydrothermal-vents> The following sentences from the source text suggest that the claim "Bacteria that use chemicals from thermal vents to create energy form the base of a food chain" might be correct:

1. "The sources of energy in these ecosystems are hydrogen sulfide (H₂S) and other inorganic chemicals that are abundant in the water that rises from the vents."
2. "Some species of bacteria can use these inorganic compounds in chemical reactions to produce sugar and other organic molecules in a process called chemosynthesis."
3. "Scientists discovered that some animals living near hydrothermal vents, such as the giant tube worm, *Riftia pachyptila*, have a symbiotic relationship with species of chemosynthetic bacteria, which allows these animals to survive deep in the ocean."


Other sources found and considered during the online search: (i)

1. <https://www.biointeractive.org/sites/default/files/TubeWorms-Educator-film.pdf> - cannot say
2. <https://www.mbari.org/animal/giant-tubeworm/> - cannot say
3. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
4. <https://www.biointeractive.org/classroom-resources/how-giant-tube-worms-survive-hydrothermal-vents> - cannot say

 correct

Explanation:  The claim "The food chain includes giant tube worms" is correct based on the provided text for the following reasons:

1. **Existence of Giant Tube Worms:** The text explicitly mentions the existence of giant tube worms, specifically the species *Riftia pachyptila*.
2. **Symbiotic Relationship:** The text describes a symbiotic relationship between giant tube worms and chemosynthetic bacteria. This relationship allows the worms to survive in the deep ocean where sunlight is absent.
3. **Energy Source:** The text explains that the energy source for these ecosystems is hydrogen sulfide and other inorganic chemicals, which are used by chemosynthetic bacteria to produce organic molecules. These organic molecules are then utilized by the giant tube worms.
4. **Inclusion in the Food Chain:** Since the giant tube worms are part of an ecosystem where they derive energy from chemosynthetic bacteria, they are inherently part of the food chain. They consume the organic molecules produced by the bacteria, making them a part


Reference sentences:  See source: <https://www.biointeractive.org/classroom-resources/how-giant-tube-worms-survive-hydrothermal-vents> To support the claim "The food chain includes giant tube worms," the following sentences from the source text are relevant:

1. "Some animals living near hydrothermal vents, such as the giant tube worm, *Riftia pachyptila*, have a symbiotic relationship with species of chemosynthetic bacteria, which allows these animals to survive deep in the ocean." This sentence explicitly mentions the giant tube worm as part of the ecosystem near hydrothermal vents, implying its inclusion in the food chain.

Other sources found and considered during the online search: 

1. <https://www.biointeractive.org/sites/default/files/TubeWorms-Educator-film.pdf> - cannot say
2. <https://www.mbari.org/animal/giant-tubeworm/> - cannot say
3. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
4. <https://www.biointeractive.org/classroom-resources/how-giant-tube-worms-survive-hydrothermal-vents> - cannot say

 correct

Explanation:  The claim "The food chain includes fish with glowing organs" is correct based on the provided text for the following reasons:

1. **Explicit Mention of Glowing Organs:** The text explicitly states that female anglerfish have a bioluminescent lure extending from their head, which is a glowing organ. This is described as an "illicium" that terminates in a "glowing esca."
2. **Function in the Food Chain:** The text describes how this glowing organ is used to attract prey, which places the anglerfish within the food chain. The glowing organ is a crucial tool for the anglerfish to survive and feed in the dark depths of the ocean.
3. **Symbiotic Relationship:** The text also mentions that the "light" is produced by bioluminescent bacteria, which live in a symbiotic relationship with the anglerfish. This further supports the idea that the glowing organ is an integral

part of the anglerfish's role in

Reference sentences: ⓘ See source: <https://enviroliteracy.org/what-fish-has-a-glowing-head/> Here are the sentences from the source text that support the claim "The food chain includes fish with glowing organs":

1. "female anglerfish are famed for their remarkable adaptation: a bioluminescent lure extending from their head."
2. "This "fishing rod," or illicium, terminates in a glowing esca, attracting unsuspecting prey in the perpetually dark depths of the ocean."
3. "The anglerfish's glowing head isn't just a novelty; it's a crucial survival tool."
4. "The "light" is produced by bioluminescent bacteria, typically of the Photobacterium genus."
5. "The bacteria emit light, attracting smaller fish, crustaceans, and other organisms within striking distance of the anglerfish."

Other sources found and considered during the online search: ⓘ

1. <https://www.biointeractive.org/sites/default/files/TubeWorms-Educator-film.pdf> - cannot say
2. <https://www.mbari.org/animal/giant-tubeworm/> - cannot say
3. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
4. <https://www.biointeractive.org/classroom-resources/how-giant-tube-worms-survive-hydrothermal-vents> - cannot say
5. <https://enviroliteracy.org/what-fish-has-a-glowing-head/> - cannot say

Add another source ▼

Reload

Scientists use manned submarines and drones to explore these habitats, often discovering new species. Could not check 1 claims, 2 claims are controversial ▼

The sentence can be split into the following claims:

ⓘ cannot say

Explanation: ⓘ It is impossible to say whether the claim "Scientists use drones to explore deep-sea habitats near thermal vents" is correct or not based solely on the provided text for several reasons:

1. **Lack of Specific Terminology:** The text mentions "a deep-sea robot" and a "human occupied submarine," but it does not specify whether the deep-sea robot is a drone. While drones are a type of unmanned vehicle, the term "drone" is not explicitly used in the text.
2. **Contextual Ambiguity:** The text discusses the use of both robotic and human exploration methods but does not provide detailed information about the specific types of robots or their capabilities. It does not clarify whether the robots used are drones or other types of underwater vehicles.
3. **No Direct Reference to Drones:** There is no direct mention of drones in the

text. The term "drone" is not used, and without this specific terminology, it is unclear whether

Other sources found and considered during the online search: ⓘ

1. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say
2. <https://phys.org/news/2024-05-scientists-hydrothermal-vents-pacific-ocean.html> - Source text is not related to the claim.
3. <https://www.ebsco.com/research-starters/history/deep-sea-hydrothermal-vents-and-new-life-forms-are-discovered> - cannot say
4. <https://www.earth.com/news/five-new-hydrothermal-vents-discovered-in-the-pacific-ocean/> - cannot say
5. <https://schmidtocean.org/cruise/virtual-vents-changing-face-hydrothermalism-revealed/> - cannot say
6. <https://cicoes.uw.edu/2023/04/21/scientists-discover-three-new-hydrothermal-vent-fields-on-mid-atlantic-ridge/> - cannot say

ⓘ might be correct. The source text mentions "manned submersibles" but does not explicitly state that they are used to explore "deep-sea habitats near thermal vents."

Explanation: ⓘ The claim "Scientists use manned submarines to explore deep-sea habitats near thermal vents" might be correct based on the provided text for the following reasons:

1. **Mention of Manned Submersibles:** The text explicitly states, "This remarkable find, achieved through the combined efforts of robotic and manned submersibles." This sentence directly mentions the use of manned submersibles in the discovery of the hydrothermal vent sites.
2. **Collaborative Effort:** It also mentions, "A collaborative effort between a remote-operated vehicle and a human-occupied submarine has led to the identification of these hydrothermal vent sites." This sentence specifies that a human-occupied submarine was part of the effort to identify the hydrothermal vent sites. However, the evidence in the text for this claim is indirect, partial, or uncertain for the following reasons:

1. **Lack of Specific Details:** While the text mentions the use of manned submersibles, it does not

Reference sentences: ⓘ See source: <https://www.earth.com/news/five-new-hydrothermal-vents-discovered-in-the-pacific-ocean/> Here are the sentences from the source text that suggest the claim "Scientists use manned submarines to explore deep-sea habitats near thermal vents" might be correct: - "This remarkable find, achieved through the combined efforts of robotic and manned submersibles, marks a significant advance in our exploration of the ocean." - "A collaborative effort between a remote-operated vehicle and a human-occupied submarine has led to the identification of these hydrothermal vent sites."

Other sources found and considered during the online search: ⓘ

1. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say
2. <https://phys.org/news/2024-05-scientists-hydrothermal-vents-pacific-ocean.html> - Source text is not related to the claim.
3. <https://www.ebsco.com/research-starters/history/deep-sea-hydrothermal-vents-and-new-life-forms-are-discovered> - cannot say

4. <https://www.earth.com/news/five-new-hydrothermal-vents-discovered-in-the-pacific-ocean/> - cannot say

ⓘ might be correct. The source text mentions that researchers discovered "previously unknown life-forms" while exploring deep-sea hydrothermal vents, which could imply new species. However, it does not explicitly state that scientists "often" discover new species in these habitats.

Explanation: ⓘ The claim "Scientists often discover new species while exploring deep-sea habitats near thermal vents" might be correct based on the provided text for the following reasons:

1. **Discovery of New Life-Forms:** The text mentions that researchers "stumbled upon thriving biological communities that included previously unknown life-forms." This directly suggests that new species have been discovered in these environments. However, the evidence in the text for this claim is indirect, partial, or uncertain for several reasons:

1. **Lack of Specificity:** The text does not specify how often such discoveries occur. The phrase "previously unknown life-forms" indicates that new species have been found, but it does not provide a frequency or regularity of such discoveries.

2. **Single Instance:** The text describes a single instance of discovery in the Pacific Ocean. It does not provide examples from other locations or times, making it uncertain whether this is a common occurrence.

3. **Generalization:** The claim suggests a

Reference sentences: ⓘ See source: <https://www.ebsco.com/research-starters/history/deep-sea-hydrothermal-vents-and-new-life-forms-are-discovered> Here are the sentences from the source text that suggest the claim "Scientists often discover new species while exploring deep-sea habitats near thermal vents" might be correct: - "These unique ecosystems emerged as a surprise when researchers exploring potential underwater hot springs in the Pacific Ocean stumbled upon thriving biological communities that included previously unknown life-forms." - "The discovery highlighted a fascinating food chain that relies on chemosynthesis—organisms, such as specialized bacteria, utilize dissolved sulfide from the vents as their primary energy source, rather than sunlight."

Other sources found and considered during the online search: ⓘ

1. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say

2. <https://phys.org/news/2024-05-scientists-hydrothermal-vents-pacific-ocean.html> - Source text is not related to the claim.

3. <https://www.ebsco.com/research-starters/history/deep-sea-hydrothermal-vents-and-new-life-forms-are-discovered> - cannot say

4. <https://www.earth.com/news/five-new-hydrothermal-vents-discovered-in-the-pacific-ocean/> - cannot say

Add another source ▼

Reload

However, because of extreme pressure, many of these creatures are made of hard calcium shells.

Could not
check 1
claims

The sentence can be split into the following claims:

(i) cannot say

Explanation: (i) It is impossible to say whether the claim "Many creatures found near thermal vents in the deep sea are made of hard calcium shells because of extreme pressure" is correct or not based solely on the provided text for several reasons:

1. **Lack of Specific Information:** The text does not provide specific details about the composition of the creatures found near hydrothermal vents. It mentions various unique species like tube worms, ghostly fish, and shrimp, but it does not describe their physical characteristics or composition.
2. **No Mention of Calcium Shells:** The text does not mention anything about calcium shells or the presence of hard shells in the creatures living near the vents.
3. **No Explanation of Adaptations:** While the text explains how life is possible through chemosynthesis, it does not discuss the specific adaptations of these creatures to the extreme pressure or other environmental factors.
4. **No Direct Reference to Pressure:** Although the text mentions the extreme conditions of the deep ocean, it does not directly

Other sources found and considered during the online search: (i)

1. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say
2. <https://ocean.si.edu/ecosystems/deep-sea/microbes-keep-hydrothermal-vents-pumping> - cannot say
3. <https://education.nationalgeographic.org/resource/deep-sea-hydrothermal-vents/> - cannot say
4. <https://www.nhm.ac.uk/discover/survival-at-hydrothermal-vents.html> - cannot say
5. <https://ocean.si.edu/ocean-life/invertebrates/hydrothermal-vent-creatures> - cannot say
6. <https://education.nationalgeographic.org/resource/deep-sea-hydrothermal-vents/> - cannot say
7. <https://ocean.si.edu/ecosystems/deep-sea/microbes-keep-hydrothermal-vents-pumping> - cannot say
8. <https://discoverwildscience.com/the-deep-sea-hydrothermal-vents-that-may-hold-the-key-to-the-first-life-forms-1-282525/> - cannot say

Add another source ▼

Reload

As mining operations begin targeting the ocean floor, there's growing concern about how such delicate ecosystems will respond.

2 claims are controversial ▼

The sentence can be split into the following claims:

① might be correct

Explanation: ① The text suggests that the claim "Mining operations are beginning to target the ocean floor" might be correct for a few reasons:

1. **Interest from Companies:** The text mentions that "companies have long eyed the ocean floor as a potential source of metals." This indicates that there is interest from the private sector in mining the deep seafloor.
2. **Executive Order:** President Trump signed an executive order aimed at making it easier for companies to mine the deep seafloor. This suggests that there

Reference sentences: ① See source: <https://www.npr.org/2025/04/25/nx-s1-5376482/trump-seabed-mining-executive-order> Based on the provided text, the following sentence suggests that the claim "Mining operations are beginning to target the ocean floor" might be correct: - "But companies have long eyed the ocean floor as a potential source of metals like nickel, cobalt, manganese and copper, which are used in batteries for electric vehicles and other technologies." This sentence indicates that companies have been interested in

Other sources found and considered during the online search: ①

1. <https://www.sciencedirect.com/science/article/pii/S0141113614000506> - cannot say
2. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
3. <https://www.nature.com/articles/s44183-023-00029-3> - cannot say
4. <https://gobi.org/projects/hydrothermal-vent-ecosystems-2/> - cannot say
5. <https://www.npr.org/2025/04/25/nx-s1-5376482/trump-seabed-mining-executive-order> - cannot say

① might be correct. The source text discusses concern about the impact of mining on delicate ecosystems near thermal vents, but it does not explicitly mention "growing concern" or the specific response of these ecosystems to mining operations.

Explanation: ① The text suggests that the claim "There is growing concern about how delicate ecosystems near thermal vents in the deep sea will respond to mining operations" might be correct for a couple of reasons:

1. **Delicate Environments:** The text describes the environments surrounding thermal vents as "delicate and often fragile." This description suggests that these ecosystems could be easily disrupted or damaged.

2. Resource Extraction Challenges: The text mentions that the challenge lies in extracting r

Reference sentences: ⓘ See source: <https://miningworld.com/mining-the-oceans-thermal-vents-without-destroying-them/> To determine if the claim "There is growing concern about how delicate ecosystems near thermal vents in the deep sea will respond to mining operations" might be correct, we can extract specific sentences from the source text that suggest this concern:

1. "However, the challenge lies in extracting these resources without compromising the delicate and often fragile environments surrounding these vents."
2. "

Other sources found and considered during the online search: ⓘ

1. <https://www.sciencedirect.com/science/article/pii/S0141113614000506> - cannot say
2. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
3. <https://www.nature.com/articles/s44183-023-00029-3> - cannot say
4. <https://gobi.org/projects/hydrothermal-vent-ecosystems-2/> - cannot say
5. <https://sciencedigest.org/hydrothermal-vents/> - cannot say
6. <https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2019/09/deep-sea-mining-on-hydrothermal-vents-threatens-biodiversity> - cannot say
7. https:/

Add another source ▼

Reload

Generate Report