SpaceOLÉ • Voyager Challenge Cards

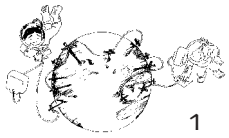
SpaceOLÉ Voyager Biochemist

Challenge Question

Life as we know it needs certain physical conditions to survive. Appropriate temperature range is an example of one of these necessary conditions. Predict what conditions on your plane/ moon will be harmful to humans.

National Science Education Standards

D1: Energy in the earth system
D2: Geochemical cycles
D4: Origin and evolution of the universe
F1: Personal and community health
F3: Natural resources
F4: Environmental quality
F5: Natural and human-induced hazards



1

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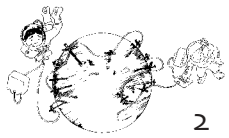
Challenge Question

Technology has allowed humankind to change the conditions around him/her to better survive. Describe what technological adaptations would be necessary to support life on your planet/moon?

National Science Education Standards

E1: Abilities of technological design
F4: Environmental quality
F6: Science and technology in local, national, and global challenges



2

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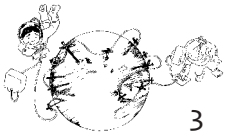
Challenge Question

Scientists believe that there is a strong correlation between the emergence of life on earth and the presence of liquid water. Why is water a good indicator of the possibility of life on another planet?

National Science Education Standards

D1: Energy in the earth system
D4: Origin and evolution of the universe
E1: Abilities of technological design
F3: Natural resources



3

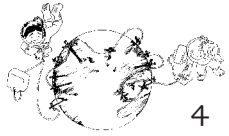
SpaceOLÉ Voyager Biochemist

Challenge Question

Determine whether there was ever any liquid water on your planet/moon. Using the information you gather, infer whether there may have been, or can be life on your planet/moon.

National Science Education Standards

D1: Energy in the earth system
D4: Origin and evolution of the universe
E1: Abilities of technological design
F3: Natural resources



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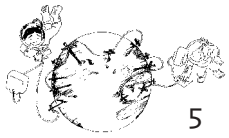
Challenge Question

Most living things on earth depend on photosynthesis to store the energy from the sun, which will eventually trickle down to many biomes. There are primitive bacteria that acquire the energy to live from acidic conditions or thermal vents. Describe what these extreme bacteria need to thrive.

National Science Education Standards

D1: Energy in the earth system
D2: Geochemical cycles



5

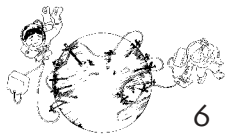
SpaceOLÉ Voyager Biochemist

Challenge Question

Some planets are so far from the sun that they receive very little sunlight. There may be a need to use other forms of energy. What can be used on your planet/moon as an energy source to support life?

National Science Education Standards

D1: Energy in the earth system
E1: Abilities of technological design
F3: Natural resources
F6: Science and technology in local, national, and global challenges



6

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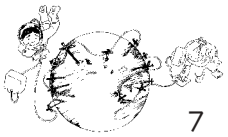
Challenge Question

The phase of compounds that are vital to life is very important. For example: if the gases in the atmosphere changed to a solid (frozen) state then we could not inhale them. Explain in what phase are some of the life-sustaining compounds are found?

National Science Education Standards

D1: Energy in the earth system
D2: Geochemical cycles
D4: Origin and evolution of the universe



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Challenge Question

NASA missions often depend on the help of biochemists (some times referred to as Astrobiologists). What contributions have biochemists made to the study of the origins of the solar system and the possible presence of life?

National Science Education Standards

D3: Origin and evolution of the earth system
D4: Origin and evolution of the universe
F3: Natural resources
F4: Environmental quality
F6: Science and technology in local, national, and global challenges

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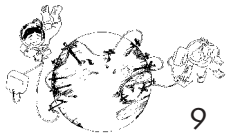
Challenge Question

National Science Education Standards



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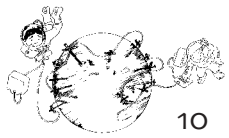
Challenge Question

National Science Education Standards



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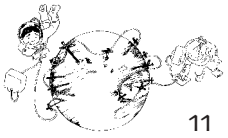

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National Science Education Standards