



Smithsonian

Living in **Sunlight Extremes**



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Table of Contents

Light and Dark	4
Day and Night	6
Living in the Light	14
Living in the Dark.....	22
Finding Solutions.....	26
STEAM Challenge	28
Glossary.....	30
Index.....	31
Career Advice	32

Light and Dark

At one time, most people woke up with light from the sun. They went to sleep when the sun went down in the sky. They lived their lives by when the sun rose and set.

Fire and candlelight made it easier for people to be awake without sunlight. Gas and electric lights made it even easier. Today, people do not depend on the sun's light to work and play. Still, the sun affects how they live. But, what if the sun never set? Or, what if darkness went on and on?



A young man reads by candlelight.



A farmer works in the dark.



A hiker uses a headlamp to see in the dark.

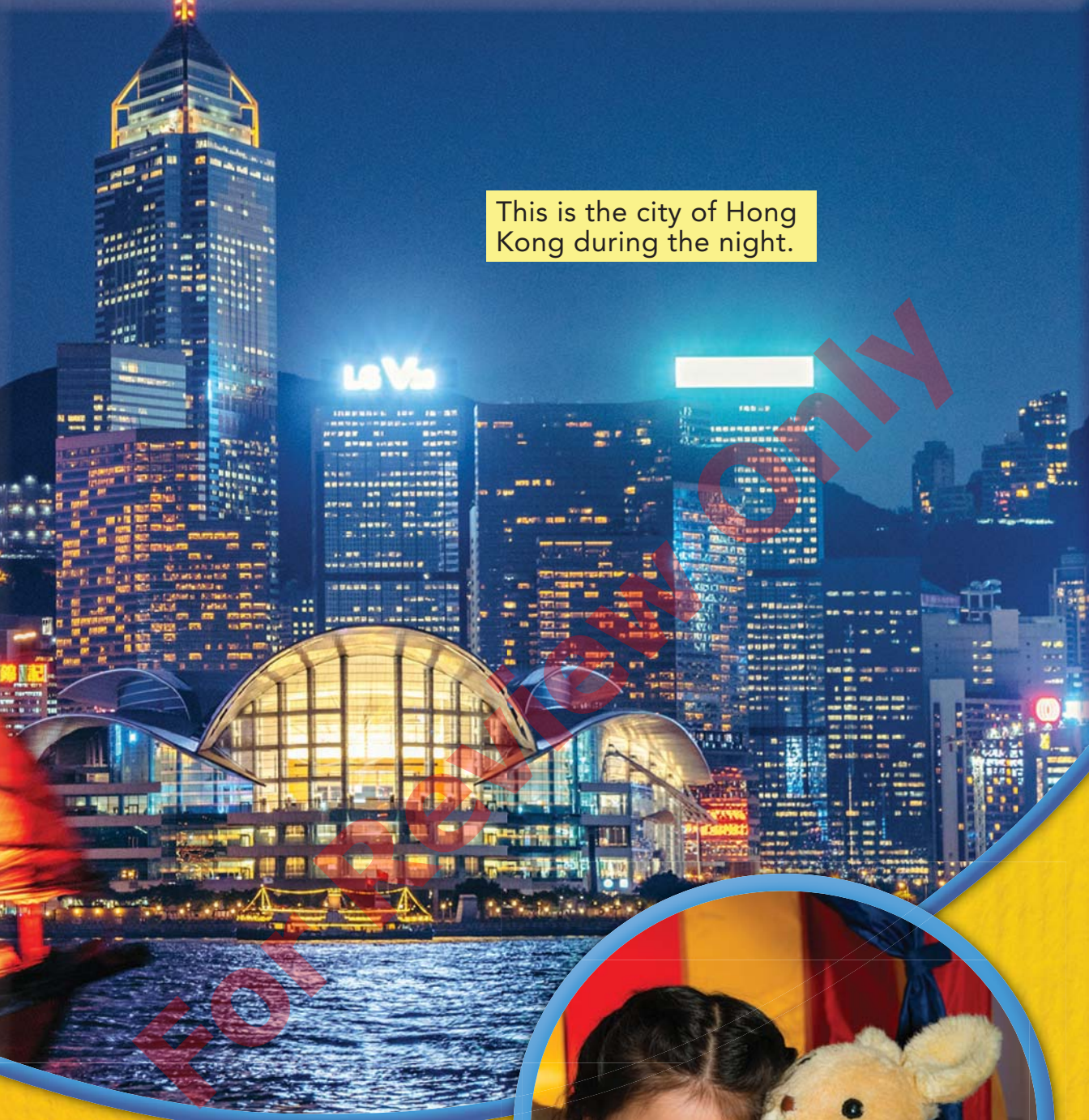
Day and Night

The sun wakes most people up every day. It tells them that their day is beginning. The sun can make it bright and warm outside. Throughout the day, the sun gets higher in the sky. As it does, the sky gets brighter. At around noon, the sun is as high as it will get.

Slowly, the sun starts to set. When that happens, people know it is time to start getting ready to sleep. When nighttime comes, the world looks dark.

This is the city of Los Angeles during the day.





This is the city of Hong Kong during the night.



When the sun is waking people in Los Angeles, people in Hong Kong are going to sleep.

Day and night happen because of how Earth and the sun affect each other. Earth has an imaginary pole going through its center. This pole is called Earth's **axis**. Earth **rotates** on its axis once every 24 hours. Think of a swivel stool spinning around its pole. This is the same idea.

As Earth rotates on its axis, part of the planet **faces** the sun and part faces away. The part facing the sun has day. The part facing away has night. Day and night change as Earth rotates.



Most people are active during the day.

Earth's Rotation

nighttime



sunlight



daytime

axis



Earth rotates on its axis, like this swivel stool rotates on its pole.



STEAM CHALLENGE

Define the Problem

The people who live in the Land of the Midnight Sun need your help. They want shade so they can exercise even on hot summer days. They have asked you to make a visor that will help block sunlight.



Constraints: You may only use craft sticks, straws, paper towel tubes, glue, tape, string, scissors, and cardboard.



Criteria: Your model must keep a friend's face covered while they do simple exercises.





Research and Brainstorm

Why do humans need sunlight and darkness? Why might people need shady spaces in the Arctic Circle?



Design and Build

Sketch a design of your visor. What purpose will each part serve? What materials will work best? Build the model.



Test and Improve

Give your visor to a friend. Have them do simple exercises, such as jumping jacks or jogging in place. Did the visor stay together? Was their face protected? Improve your design and try again.



Reflect and Share

What materials worked best? How might your design change if you wanted to create a whole hat instead of a visor?

