



JUNIOR DARK RANGER  
**CERTIFICATE**

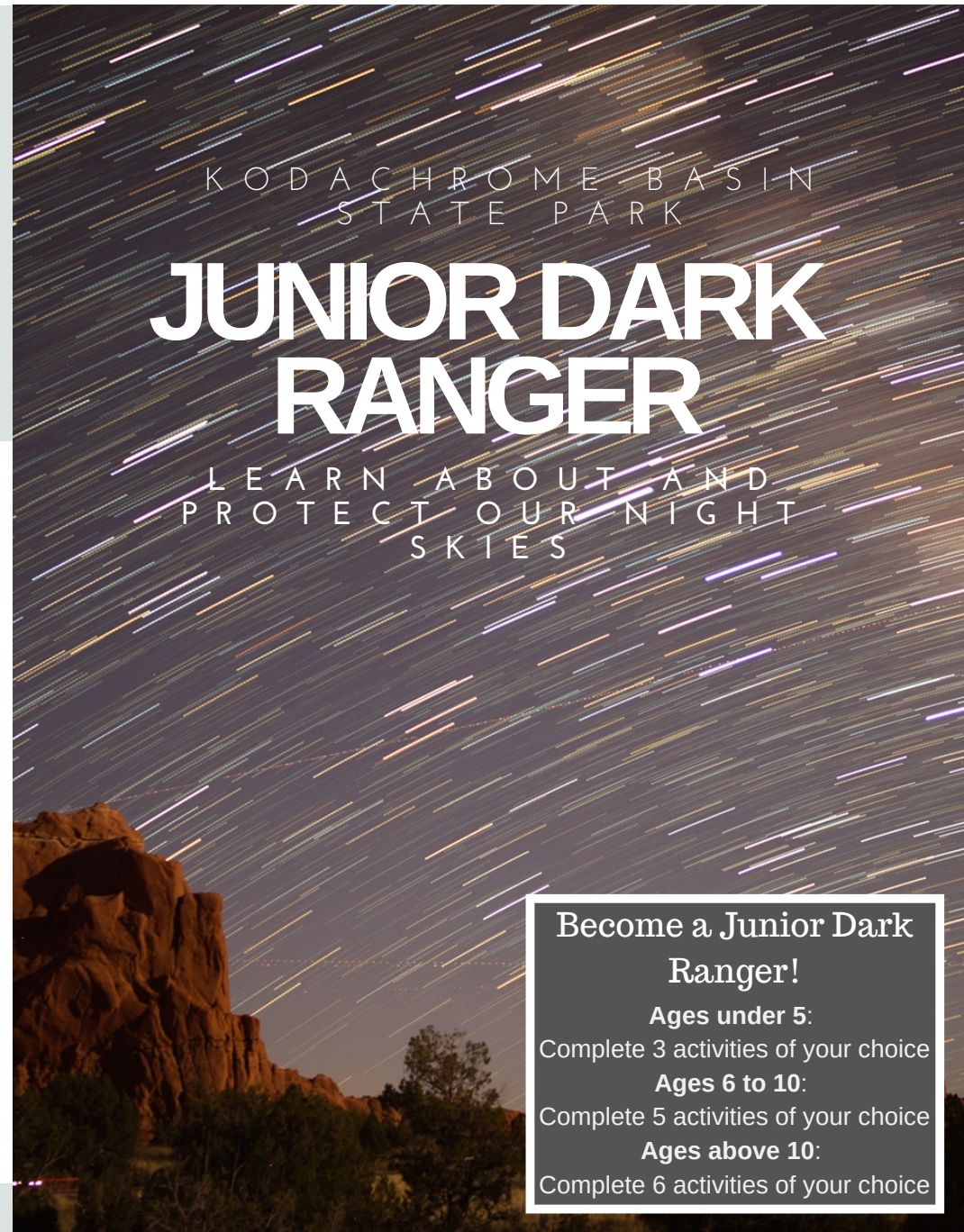
**Junior Dark Ranger Promise**

As a Junior Dark Ranger, I promise to do my part to protect parks and the night sky. I promise to continue to learn about the night sky and share what I learn with my family and friends.

This is to certify that \_\_\_\_\_  
has completed the Kodachrome Basin State Park  
Junior Dark Ranger program. Congratulations!

Park Ranger Signature

Date



KODACHROME BASIN  
STATE PARK  
**JUNIOR DARK  
RANGER**

LEARN ABOUT AND  
PROTECT OUR NIGHT  
SKIES

**Become a Junior Dark  
Ranger!**

**Ages under 5:**

Complete 3 activities of your choice

**Ages 6 to 10:**

Complete 5 activities of your choice

**Ages above 10:**

Complete 6 activities of your choice

JUNIOR SCIENTIST

# MOON OBSERVATIONS



## Activity 1 Record what you can see about the moon.

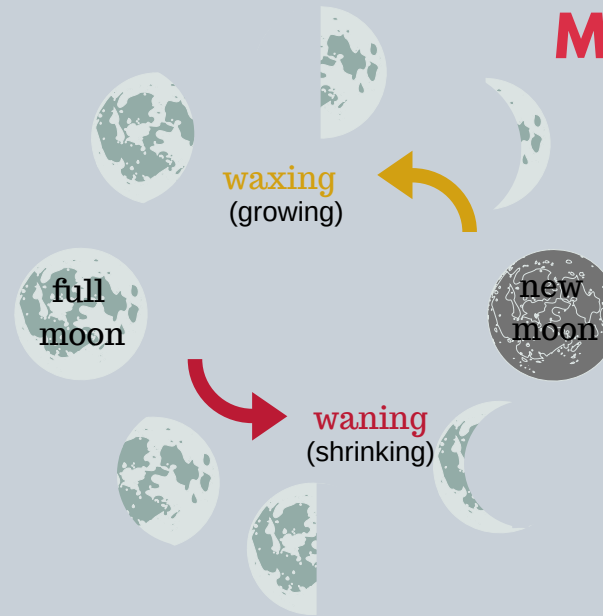
Place a check mark in the appropriate box to record your data. Come up with your own observation and write it down on the last line.

Observations	Yes	No
I can see the moon in the sky right now.	<input type="checkbox"/>	<input type="checkbox"/>
It is daytime right now.	<input type="checkbox"/>	<input type="checkbox"/>
It is night time right now.	<input type="checkbox"/>	<input type="checkbox"/>
The moon is really bright right now.	<input type="checkbox"/>	<input type="checkbox"/>
With binoculars, I can see pits and craters on the moon.	<input type="checkbox"/>	<input type="checkbox"/>
Earth has only one moon.	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

## MOON PHASES

### Activity 7

Use the information below to determine which phase the moon is in today. Circle the closest phase. Remember, the moon may be visible at night or during the day. If you do not see it now, check a moon rise calendar to see what time you should look for the moon in the sky.



The moon does not emit any light. What we see is light being reflected from the sun. The phases of the moon change based on how much of the moon appears to be lit by the sun. Half of the moon is always lit up, but we can only see portions of the light based on the moon's position in the sky.

Waning means that the surface with reflected light is getting smaller, and waxing means that we are seeing more surface of the moon reflecting light. A waxing moon will be illuminated on the right side. A waning moon will be illuminated on the left side.

Make C-shapes with your hands. If you hold your hand up to the moon, and the moon follows the C-curve of your left hand, the moon is in the waning phase. If the moon follows the backward C-curve of your right hand, the moon is in the waxing phase.

JUNIOR INTERPRETER

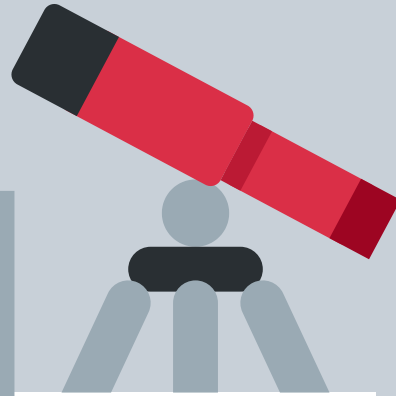
## PARTICIPATE

### Activity 6

If possible, attend a program at Kodachrome Basin State Park, and tell us what you learned with words or pictures. You may also tell us about a program that you participated in at another state or national park or tell us what you learned from our night sky panel.

**I attended:**

**I learned:**



### 1. Small Companion

IF THE EARTH WAS THE SIZE OF A NICKEL, THE MOON WOULD BE THE SIZE OF A GREEN PEA.

### 2. Constant Companion

THE MOON IS EARTH'S ONLY NATURAL SATELLITE.

### 3. Locked Up Together

THE EARTH AND MOON ARE TIDALLY LOCKED. WE ONLY SEE ONE SIDE OF THE MOON ALL THE TIME.

### 4. Can Stand on It

THE MOON HAS A ROCKY, SOLID-SURFACE. THE MOON IS COVERED IN CRATERS AND PITS FROM IMPACTS.

### 5. Bring a Spacesuit

THE MOON HAS A VERY THIN AND TENUOUS ATMOSPHERE. IT IS NOT BREATHABLE.

### 6. Moonless

THE MOON HAS NO MOONS.

### 7. Ringless

THE MOON HAS NO RINGS.

### 8. Many Visitors

IT IS THE ONLY CELESTIAL BODY BEYOND EARTH THAT HUMANS HAVE VISITED SO FAR. THERE HAVE BEEN OVER 105 ROBOTIC SPACECRAFT TO VISIT ALSO.

### 9. Potential for Life?

LIFE AS WE KNOW IT CANNOT EXIST ON THE MOON BECAUSE OF THE THIN ATMOSPHERE AND A LACK OF LIQUID WATER.

### 10. Moonwalkers


APOLLO ASTRONAUTS BROUGHT BACK 842 POUNDS OF ROCK AND SOIL FROM THE MOON. SCIENTISTS ARE STILL STUDYING THESE MATERIALS.

**MOON  
FACTS**





ty 2



Coyote

A detailed black and white line drawing of a moth, likely a species of silk moth. The moth is shown from a dorsal view, with its wings spread. The wings are large and feature several prominent eyespots (ocelli) arranged in a pattern. The body is thick and covered in fine hairs, with a small tuft of hair on the head. The legs are visible and appear to be covered in small spines or hairs. The overall appearance is that of a nocturnal insect.


Scorpion

Bat

A black and white illustration of a bat with its wings spread wide, showing the membrane and bone structure. The bat has a small, round body and a friendly-looking face.

A stylized illustration of the Moon, showing its characteristic dark, cratered surface against a light gray background. The word "Moon" is written in a bold, black, sans-serif font above the moon.


# Jackrabbit

A detailed black and white illustration of a jackrabbit's head and shoulders. The jackrabbit is facing left, with its large, upright ears prominent. The fur is rendered with fine lines and shading, giving it a textured appearance. The background is plain white.

Kangaroo Rat



Ow



Yucca

After the sun sets, the stars come out at Kodachrome Basin! We can enjoy a vibrant star-lit sky. We are trying to protect our night sky by reducing light pollution in the park. We have replaced old lighting and removed unnecessary light fixtures, among other things.

Visit one of these buildings and answer the questions. Come up with one of your own.

- Oasis Restrooms
- Basin Restrooms
- Red Dirt Wash and Dry

Questions	Yes	No
Are there outside lights on the building?		
If there are outside lights, do the lights shine only downward?		
If there are outside lights, do the lights shine only where needed?		
Are there lights inside?		
If there are lights inside, can you see the light shining from outside?		
Does the parking lot for the building have street lights?		

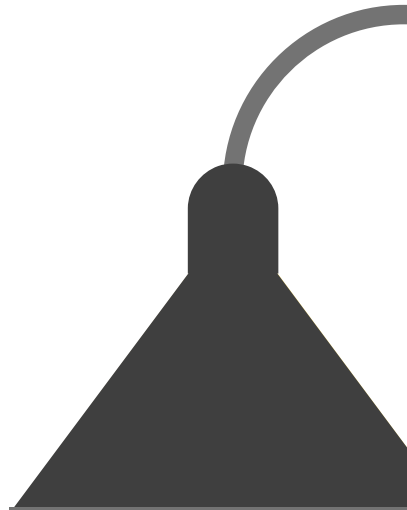
JUNIOR ANALYST

# LIGHT POLLUTION

## What is light pollution?

Just like water, air, and land pollution, light pollution hurts our planet. Light pollution occurs when people use artificial light in excessive or inappropriate ways.

Light pollution keeps us from being able to see the night sky where we live. It also affects our environment, safety, energy use and our health. At Kodachrome Basin, we are taking steps to protect our night sky.



## How to reduce light pollution:

- Point lights at the ground
- Use a timer to control lights
- Only use lights when needed
- Only use lights as bright as necessary
- Use warm color light bulbs (less blue light)

## The Yucca Plant A Unique Story

Yucca plants and Yucca moths have a very dependent relationship for their survival. Their relationship is called obligate mutualism. This means that if one of them were to disappear, the other one could not survive.

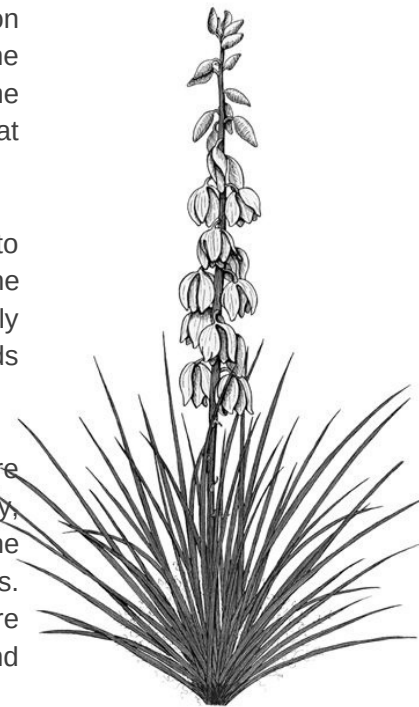
The yucca moth is a small, white moth that spends most of its life inside the flowers of the yucca plant. The yucca moth lays its eggs inside the flowers of the yucca plant, and the larvae feed on the seeds inside the flower. When fully grown, the larvae drop to the ground and go through some changes to become adult moths. They then repeat the cycle.

The yucca plant benefits from allowing the moth to lay eggs in its flowers. The moths pollinate the flowers and lay just enough eggs to feed on only part of the seeds. The moths leave enough seeds for the yucca plant to be able to grow new plants.

The yucca flowers only open for a few days. There are pollinators that visit the plant during the day, but these pollinators are not able to pollinate the yucca. They require the specialized yucca moths. To attract these moths, the flowers produce more nectar at night. The nectar smells sweet and attracts these night pollinators.

## Activity 3

As you walk the nature trail, count how many yucca plants that you see. Write the number in the circle.



# STAR CONSTELLATIONS

A constellation is a group of visible stars that form a pattern that we can see from the Earth. An asterism is a pattern that we know but is not recognized by astronomers as a constellation. Patterns can take the shape of animal, a man or woman, a mythological creature, or an object. Many cultures throughout time have myths, or stories, about the constellations.

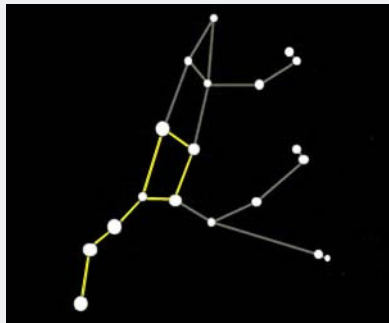
The star map on the previous page shows Ursa Major in white. The constellation of the Big Dipper is yellow and is part of Ursa Major. The dots are stars that belong to the asterism, and the lines are drawn in to help us see the pattern. Can you see how this star map looks like Callisto the great bear?

## Activity 4

**Design your own constellation!**

## URSA MAJOR, THE GREAT BEAR

### A Roman Myth



Callisto the huntress was a beautiful maiden. As she was out hunting one morning, she became tired and laid down for a rest. The god Jupiter saw her and admired her great beauty. Jupiter's wife, Juno, became jealous of Callisto and the attention she was receiving from her husband. When Juno discovered that Callisto had a son, she punished Callisto by turning her into a bear.

Juno and Jupiter raised the son, Arcas. He became a great hunter. As he was hunting one day in the forest where Callisto the bear lived, Callisto saw him and she rushed up to him to greet her son. She forgot that she was a bear. Arcas was frightened and he shot an arrow at Callisto. Jupiter saw the arrow and stopped it. To save Callisto, Jupiter turned Arcas into a bear also. He grabbed both bears by their tails and threw them into the sky so they could live at peace among the stars. Arcas became the constellation, Ursa Minor. This means little bear.

Look up at the night sky and see all of the stars. Use your imagination to make a new constellation. What do you see?

Show us what a constellation would look like if you could design one.

What would you name it?

How many stars does it have?

What is special about your constellation?

Can we see it in the summer sky? The winter sky?