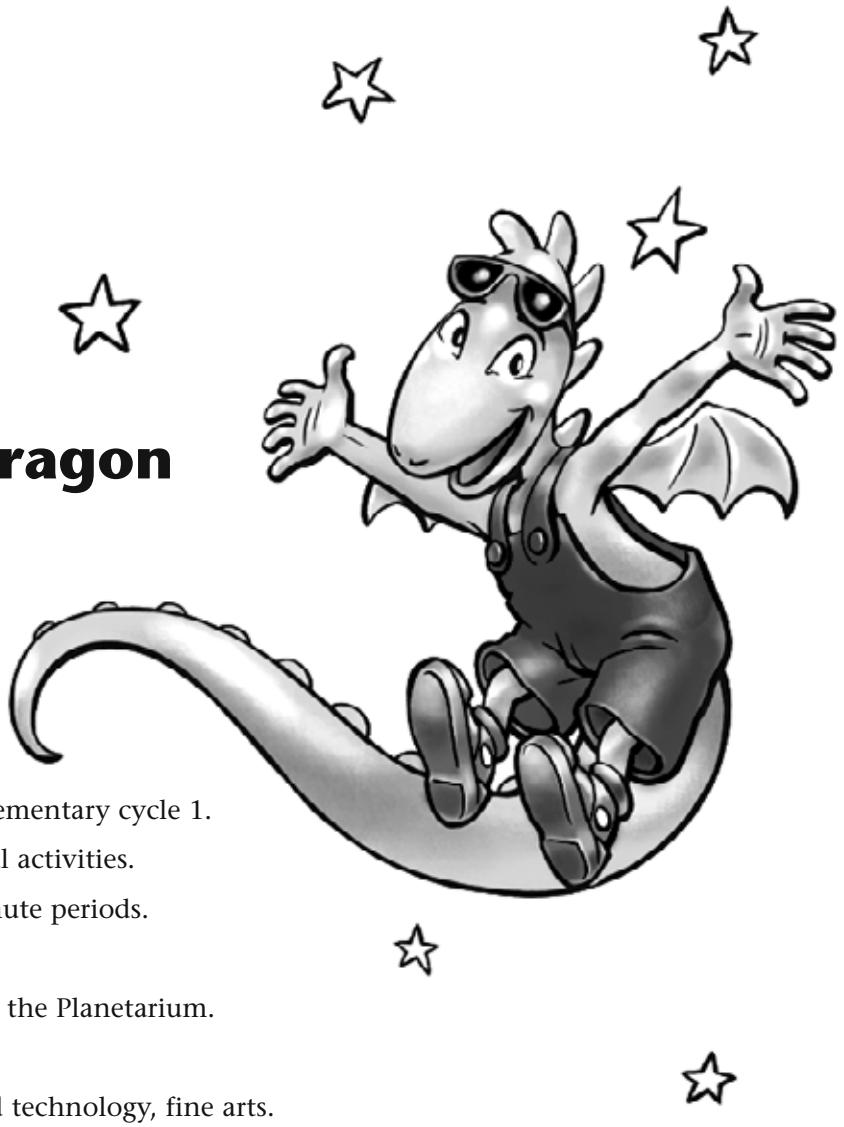
CLASSROOM ACTIVITY



Draco,
the Celestial Dragon

Help Draco find his treasure!

General Information

- ★ Grade level: preschool and elementary cycle 1.
- ★ Students per group: individual activities.
- ★ How long: one or two 60-minute periods.
- ★ Where: in class.
- ★ When: before or after visiting the Planetarium.
- ★ Type of activity: discovery.
- ★ Subjects covered: science and technology, fine arts.
- ★ Essential knowledge
  - ▷Preschool: cognitive and metacognitive strategies (observing, exploring); learning related to language development (communication games); learning related to cognitive development (the arts, science and technology, the concepts of time and space).
  - ▷First cycle: light and shadow; draw freehand; apply colour; tear, cut, coat a surface with glue; attach objects together; the language of art.
- ★ Disciplinary competencies
  - ▷Preschool: perform sensorimotor actions effectively in different contexts; communicate using language resources; build their understanding of the world; complete an activity or project.
  - ▷First cycle: explore the world of science and technology; produce individual artwork.
- ★ Cross-curricular competencies: process information; solve problems; exercise critical judgment; use their creativity; communicate appropriately.

Summary of the Show

The kids meet Draco, the celestial dragon, who has lost a valuable treasure. Along with the Planetarium's narrator, the young audience promises to help Draco find his treasure. So begins a wild trek across the sky during which the little dragon encounters constellations in the north and south hemispheres, as well as the Milky Way, the Moon, and a mysterious "ogre" that gobbles up everything within reach.

Goals

The show aims to develop children's interest in the starry sky and its constellations. Through games, drawing, and arts and crafts, the activities herein prepare youngsters for the show and introduce the many topics it covers. The activities can be used either to spark interest before a visit to the Planetarium or to complement the show after the visit.

Steps in the Activity

Preparations

Make enough copies of the activity sheets for everyone.

Supplies

For each student:
- Copies of the activity sheets.
- Coloured pencils.
- Arts and crafts material (glue, paper, scissors, tape, etc.).*
- Empty two-litre milk carton.*
- Flashlight.*

**For the activity "Build Your Own Planetarium."*

Assignments

Hand out one activity sheet at a time to the class. Introduce the activity by asking what the kids know about each phenomenon or topic addressed. Describe the activity and then give the kids enough time to complete it. Those who finish first can colour in the drawings while they wait for the others to wrap up.

Next, hand out another activity sheet and follow the same steps. With younger kids, reserve about one hour for the activity "Build Your Own Planetarium."

Basic Concepts for Topics Covered

★ Activity 1: **Constellations**

The ancients had practical reasons for observing the sky: the daily movements of the Sun, Moon and stars helped measure the passing of time. Indeed, before watches, clocks and calendars were invented, the Sun's position in the sky was their only way to determine the time of day. The lunar phases defined the months. The Sun's altitude at noon and the appearance or disappearance of certain stars or groups of stars marked the passing of seasons. In addition, travellers used certain stars to guide them across land and sea.

Though the ancients didn't comprehend the true nature of the Universe, they were so impressed by the beauty of the heavens that they attributed a mystical quality to the stars. They named certain groups of stars after gods, goddesses and mythical creatures they believed ruled their lives. These arbitrary groups of stars twinkling close together in the night sky spawned the constellations.

We know little about the origins of the constellations used today. As early as prehistoric times, different cultures grouped familiar stars into constellations and gave them names. These names, or what they represent, provide clues about their origin. For example, the constellations used today depict creatures like a lion and a scorpion. But because there are no elephants, camels, crocodiles or tigers, we know these constellations didn't originate in India, Arabia or Egypt. Nor did they come from Greece, Italy or Spain given that they include a lion.

Most experts believe the constellations used today were first created in Mesopotamia (now Iraq) several thousand years ago. But the names we use for these old constellations come from Greek. Some of these constellations turn up in Greek poetry and prose from the fourth century BC. Ptolemy, the Greek astronomer who wrote down the astronomical knowledge of his day in AD 150, listed 48 constellations in his Almagest. Most of these are still in use today.

Since the stars in the southern hemisphere were invisible from Mesopotamia and Greece, the peoples of these regions could not have named them. As for the peoples of the southern hemisphere, who invented their own constellations, their traditions were lost or unknown. The constellations in the southern hemisphere in use today were created much later by European sailors exploring the seas. These constellations often represent new inventions of the day like the microscope, telescope and compass.

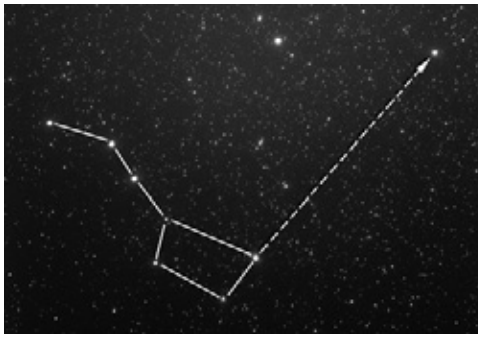
In the two centuries that followed, the list of constellations grew to over a hundred names. This list caused great confusion because often borders between constellations overlapped. In other words, a star could be part of two constellations at the same time.

In 1928, the International Astronomical Union cleared up the confusion by officially defining the constellations and trimming their number to 88. These constellations are still of unequal size (with some several times larger than their neighbours), but they cover the vault of the sky without overlapping.

The night sky is now home to 14 male or female figures, nine birds, two insects, 19 land animals, 10 sea creatures, two centaurs, one head of hair, a serpent, a dragon, a flying horse, a river and 29 inanimate objects. The total is greater than 88 because some constellations contain more than one figure.

★ Activity 2: **Ursa Major and Ursa Minor**

In the northern hemisphere, no other constellation is as easy to spot in the sky as Ursa Major (the Great Bear). But don't confuse Ursa Major with the group of seven stars called the Big Dipper. This asterism is only one part of Ursa Major (the dipper's handle and bowl form the bear's tail and hindquarters). The Big Dipper is helpful for finding the North Star (Polaris). Simply locate the two stars forming the side of the dipper opposite the handle. Extend an imaginary line upward five times the distance between these two stars (known as the Pointers) and you'll reach the North Star. Polaris is always located directly above the north on the horizon.



If your students are observant, they may notice that Ursa Major and Ursa Minor have remarkably long tails, while real bears have short tails. A Greek myth explains why.

Zeus reigned over Olympus, the home of the ancient Greek gods. Despite his love for his wife Hera, he had a roving eye. One day, he seduced a beautiful nymph named Callisto, who later bore him a son, Arcas. Hera found out about Zeus'

indiscretion with a mere mortal and flew into a rage, vowing revenge. To protect Callisto, Zeus changed her into a bear and hid her deep in the woods.

Several years later, Callisto saw her son Arcas walking in the forest. Overjoyed, she ran to embrace him. But Arcas could not recognize his mother and thought the bear was attacking him. He aimed his bow and arrow at Callisto and was about to kill her when Zeus intervened once again.

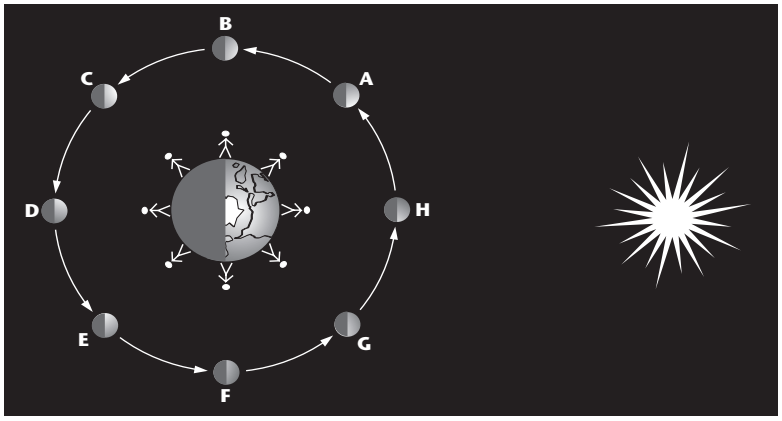
Zeus changed Arcas into a bear so that mother and son could be reunited at last. Then he grabbed both bears by their short tails and swung them around and around, causing their tails to stretch. He hurled the bears into the northern sky where they'd be safe from further danger. That's why Ursa Major and Ursa Minor can be found side by side every night above the northern horizon.

★ Activity 3: **The Phases of the Moon**

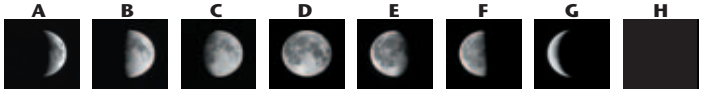
As you know, the Moon looks different from night to night. To understand the mechanisms of the lunar phases, remember that the Moon doesn't produce its own light. Instead, it reflects light cast by the Sun (picture a basketball lit by a flashlight). One half of the Moon is lit by the Sun, while the other half remains in darkness. Yet the lit half isn't always turned fully toward Earth. As the Moon orbits Earth, it reveals its lit side from different angles. How we on Earth see the Moon's sunlit portion determines the lunar phase.

For example, if the Moon shows us half its lit hemisphere and half its dark hemisphere, we see a half Moon in the sky (as in the first and last quarters, **B** and **F** in the illustration below). If the Moon turns its lit side fully toward Earth, we see a round disc or full Moon (**D**). If, however, the Moon turns its dark side toward Earth, it disappears from the sky and forms a new Moon (**H**).

The Earth-Moon system seen from far above Earth's North Pole



What we see from Earth



★ Activity 4: **Build Your Own Planetarium**

The giant projector at the centre of the Star Theatre is the real star of the Planetarium's shows. Built by the company Carl Zeiss in Oberkochen, Germany, the instrument contains over 150 fixed and mobile projectors, which operate individually or in groups. The Zeiss planetarium is like an astronomical flight simulator. It accurately replicates the night sky as seen by the naked eye from anywhere on Earth, from pole to pole.

In a sense, the Zeiss projector also functions as a time machine since it can speed up the movement of celestial objects (such as the lunar phases, the diurnal motion of the sky, and the annual motion of the Sun and planets) and simulate the sky as it appears at any time in history—past, present or future.

Auxiliary projectors are used to show the mythological figures in the constellations and indicate celestial coordinates. Finally, special-effects projectors reproduce a wide range of astronomical phenomena like a lunar or solar eclipse, a meteor shower, the aurora borealis, and the slow passing of a comet.

In a world where light pollution increasingly masks the splendour of the night sky, the Zeiss projector offers a unique chance to see over 9,000 stars, along with star clusters, nebulae and galaxies, under a sky that's always clear and cloudless.

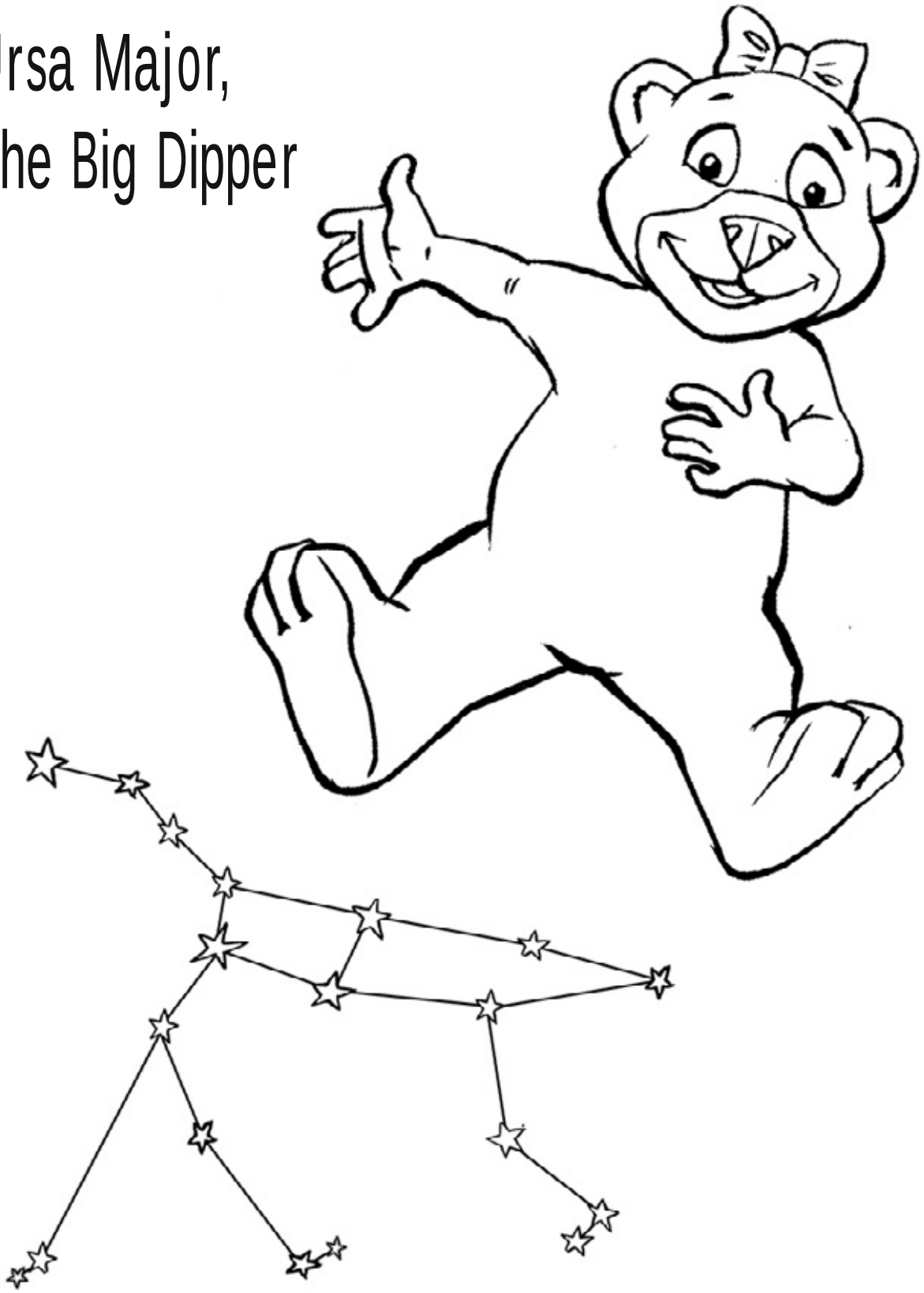
⋆ Activity 1

Colour in these drawings of major constellations in the northern sky.

Draco, the Celestial Dragon

Queen Cassiopeia

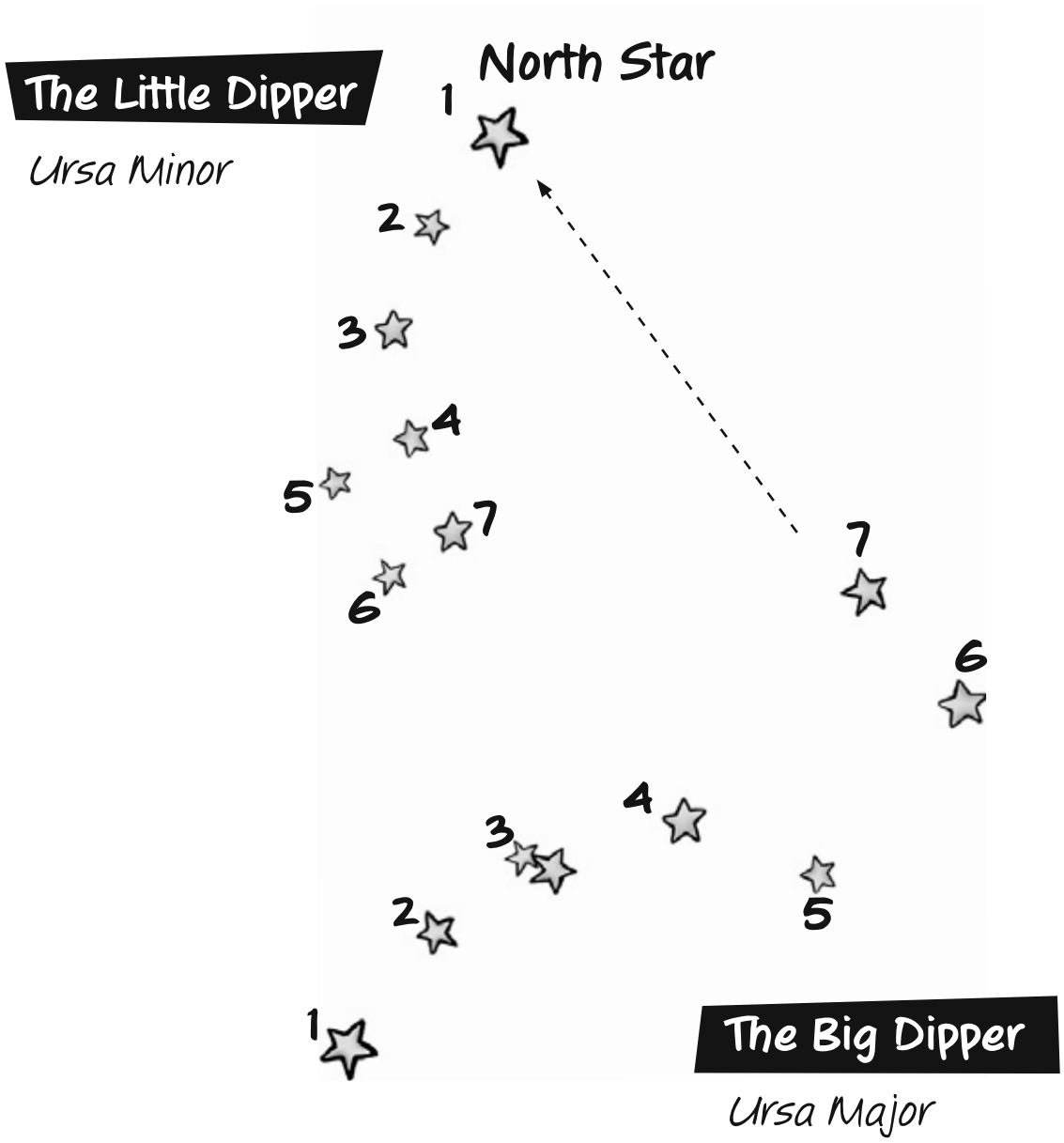
Ursa Major, The Big Dipper



URSA MAJOR AND URSA MINOR

⋆ Activity 2

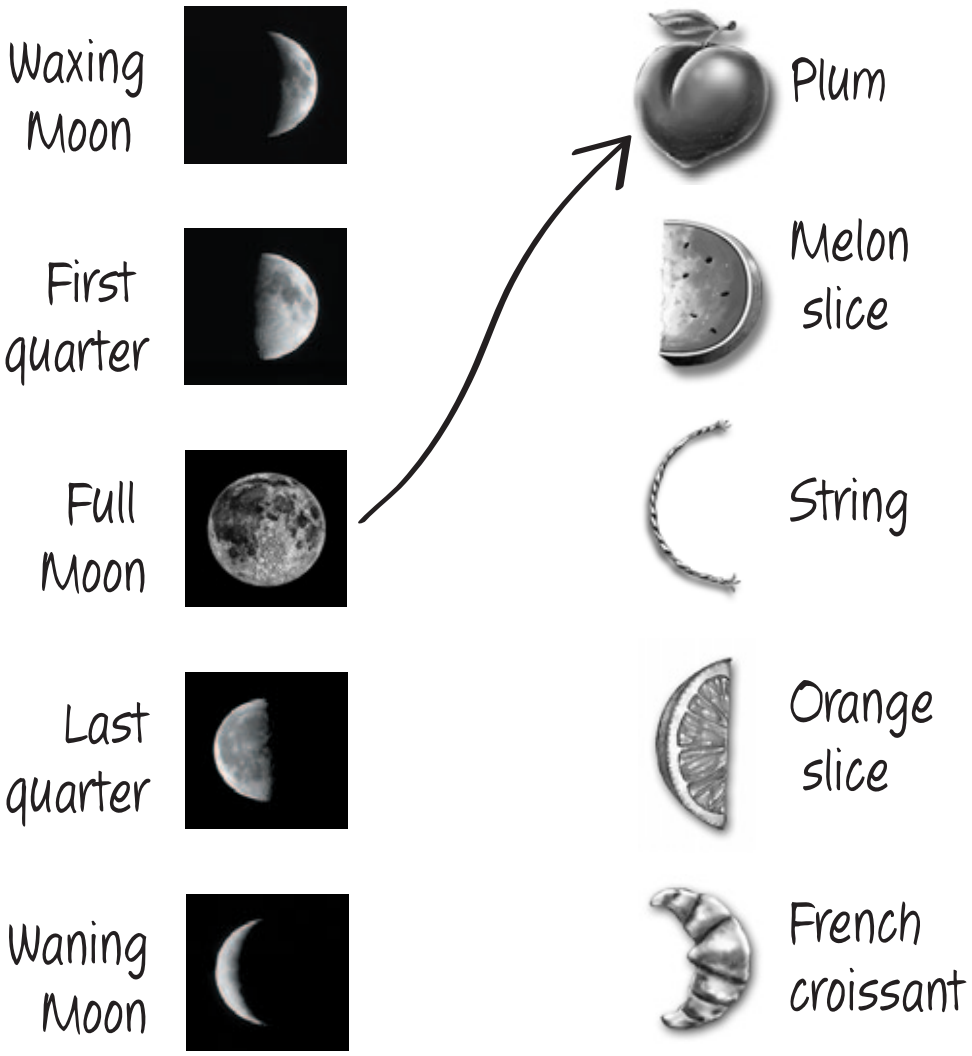
Connect the stars 1 to 7 and discover the shape of these two constellations. Can you find Polaris, the North Star?



PHASES OF THE MOON

★ Activity 3

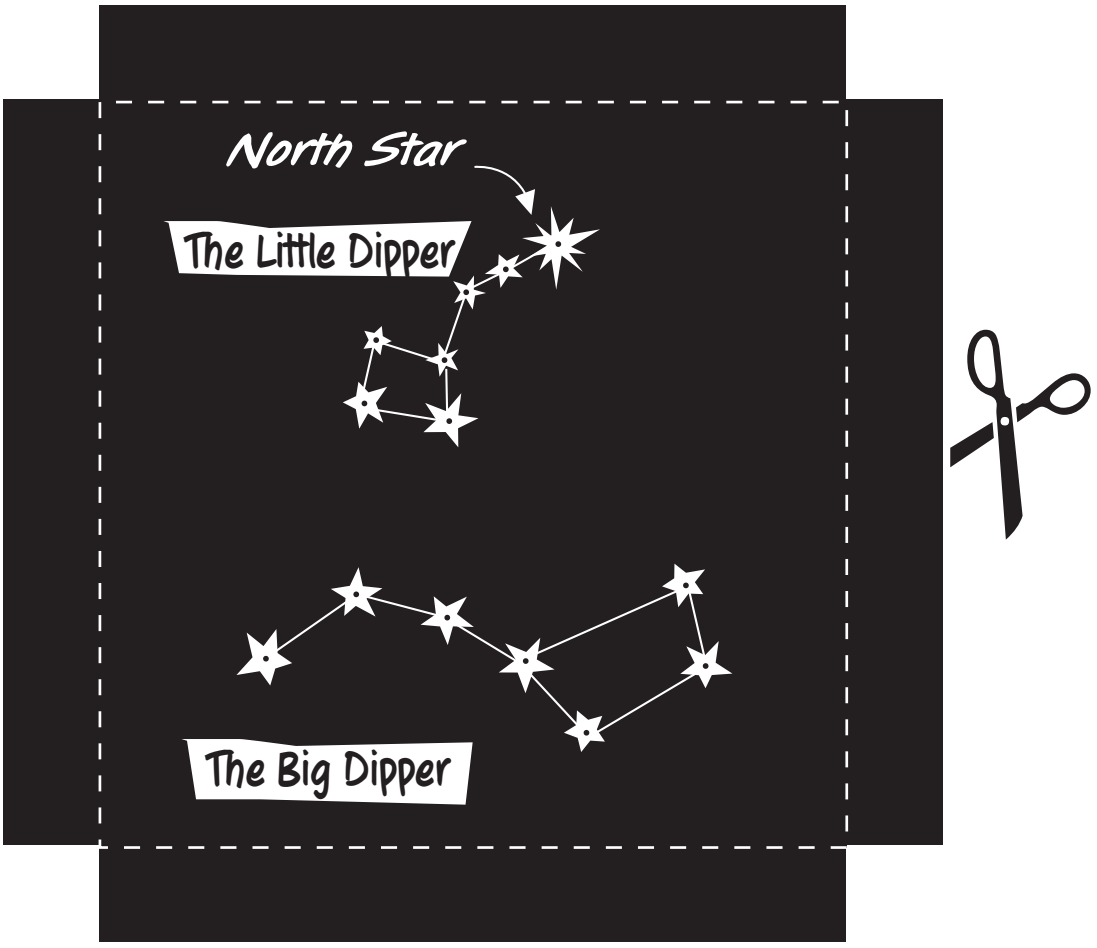
Match the shape of these objects with the phases of the Moon.



BUILD YOUR OWN PLANETARIUM

★ Activity 4

❶ Using scissors, cut out the drawing below, leaving the side tabs intact. Then cut off the bottom of a two-litre milk carton that is empty and clean. Ask an adult for help. Open the carton's other end by peeling apart its spout.



❷ Using a sharp pencil, poke a hole at least 2 mm wide in the centre of each star in the drawing above.

❸ Place the constellation drawing over the carton's open bottom (with the drawing facing inside). To prevent light from escaping, fold the drawing's side tabs up the outside of the carton and tape them down.

❹ Once your star projector is completed, turn the lights off in the room. Insert your lit flashlight inside the carton. Project your stars on a wall or ceiling. Wait a few minutes for your eyes to adjust to the darkness. Your star projector works better if you aim your flashlight at the carton's sides rather than directly at the constellation drawing.

❺ Have fun creating other projectors to display your favourite constellations or even constellations you invent yourself.