Roper Mountain Science Center

Teaching Guide: Roper Mountain Reality Check

Join our Roper Mountain Reality Fact Check Team. Our episode will tackle one student's tough question about the cause for seasons. We will compare temperatures and amounts of sunlight received for different parts of the world to determine the cause of the seasons.

Pre Activities:

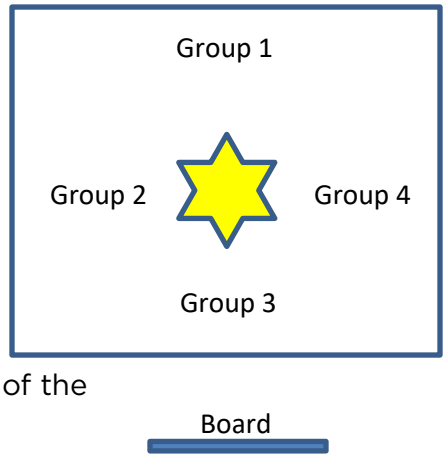
- Show Roper Mountain Reality Check promo video. Explain to the students that they will be joining the team to support with answering a student's tough science questions.
- Vocabulary- season, temperature, sunlight, axis, revolution, orbit, sphere, North Pole, South Pole, latitude, longitude

Before the Program Instructions:

- Print 12 Sunlight, 12 Temperature, and (6- cut apart)Map sheet pages (3 for each group)
- Talk with the students about the program. Remind students of their roles during the program. They will be part of the fact checking team. Their job will be to analyze data to provide evidence for what causes the seasons.
- Have an object ready in the room to represent the Sun (yellow paper, basketball)

Instructions for Day of the Program:

- Arrange students in 4 groups and number them 1-4. Assign partners or group of 3 within each group. They will analyze data in partners and then come back to their larger group during the program to share what they discovered.
- Each group and student will ideally be visible from the webcam.
- Distribute 3 copies of each data sheet (map, amount of sunlight and temperatures) to each group face down. Please ask students not to touch them until told to do so.
- Place object to represent the sun in the very middle of the room. Students will be moving towards the end of the program to locations around the room.



Post Activity

- Dipper Finder Activity – This activity shows students how to locate select constellations in the sky. It also illustrates how we can identify that the tilt of the Earth remains relatively constant pointing towards the North Star regardless of season or orbital path location.
- Light intensity activity- You will need a flashlight for each group. Determine if the distance of 6 inches will work with your flashlights and adjust distance, if necessary. This is designed to show students how angles of sun affect the amount of energy the Earth receives.
- Career Connection – Astronomer, Climatologist, Researcher, Scientist, Engineer

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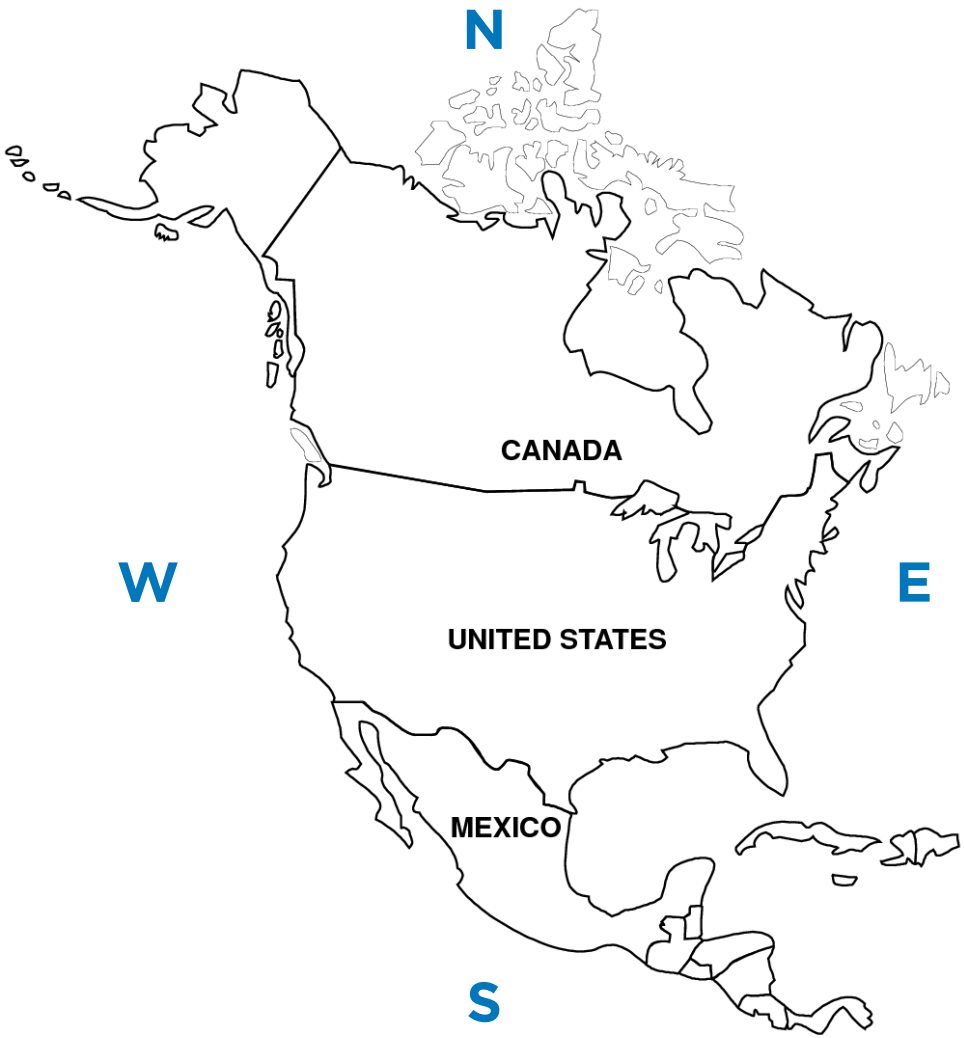
Roper Mountain Reality Check: Seasons



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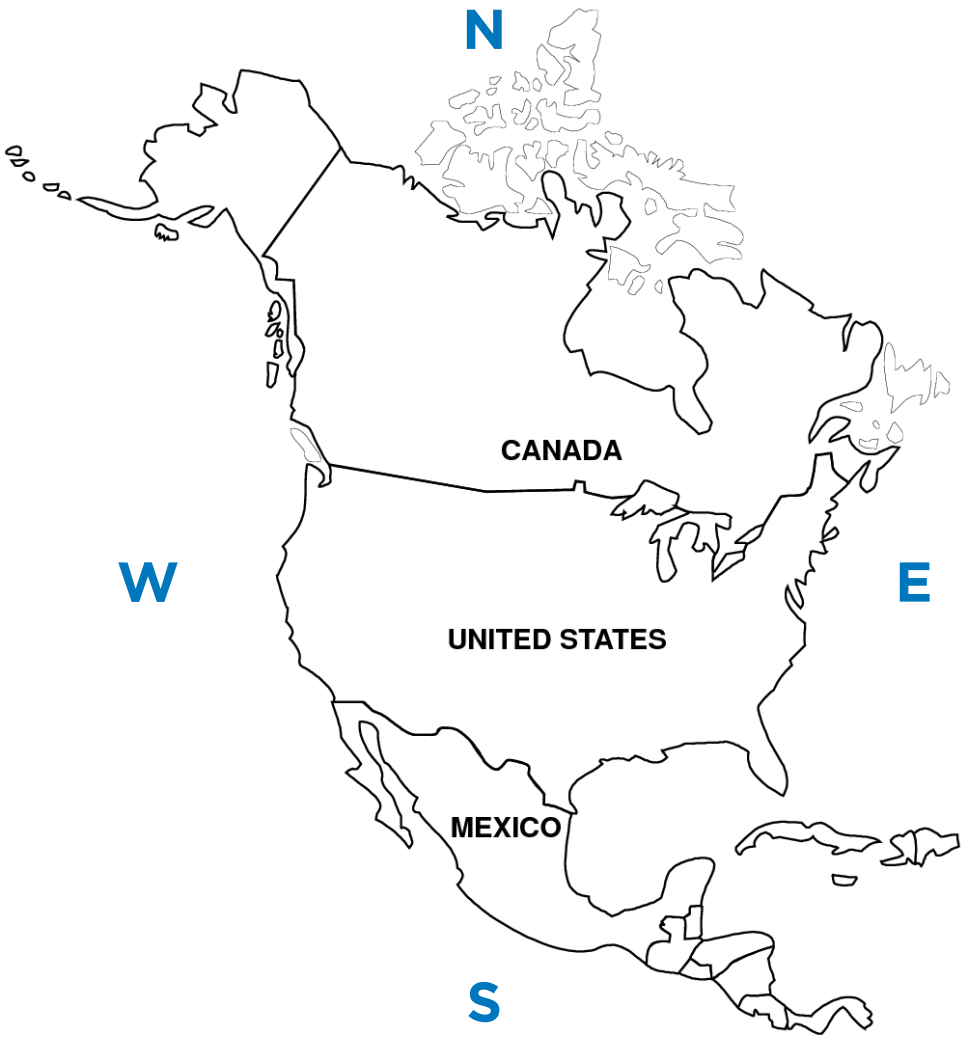
Roper Mountain Reality Check: Seasons



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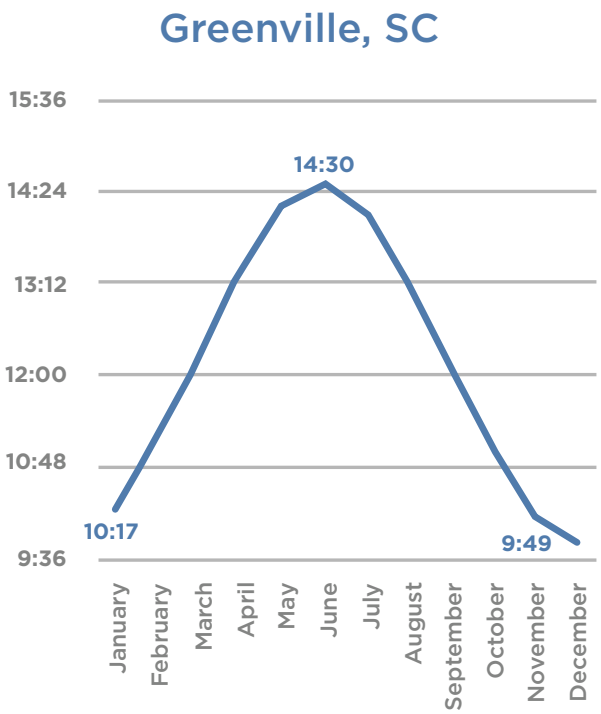
REALITY CHECK

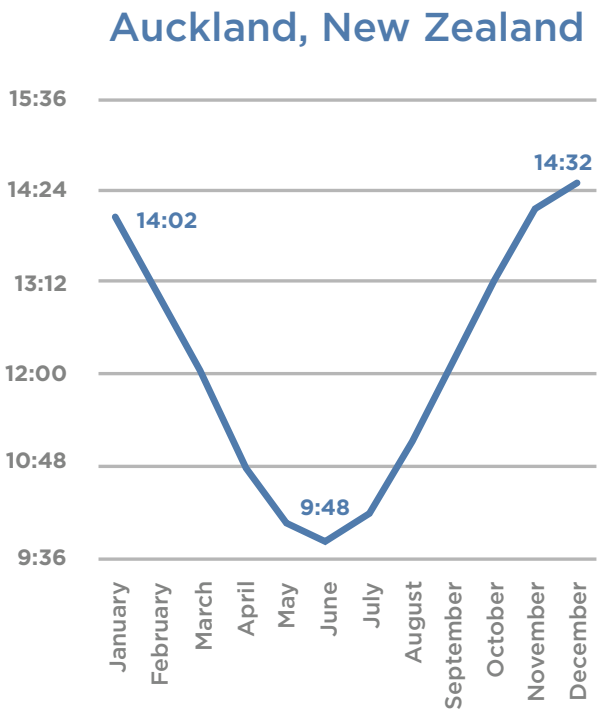
Average Hours of Sunlight

Greenville, SC USA	Hours of Sunlight
January	10:17
February	11:16
March	12:17
April	13:22
May	14:12
June	14:30
July	14:05
August	13:10
September	12:04
October	11:01
November	10:08
December	9:49



NOTES

Auckland, New Zealand	Hours of Sunlight
January	14:02
February	13:01
March	12:00
April	10:54
May	10:06
June	9:48
July	10:12
August	11:06
September	12:11
October	13:16
November	14:11
December	14:31



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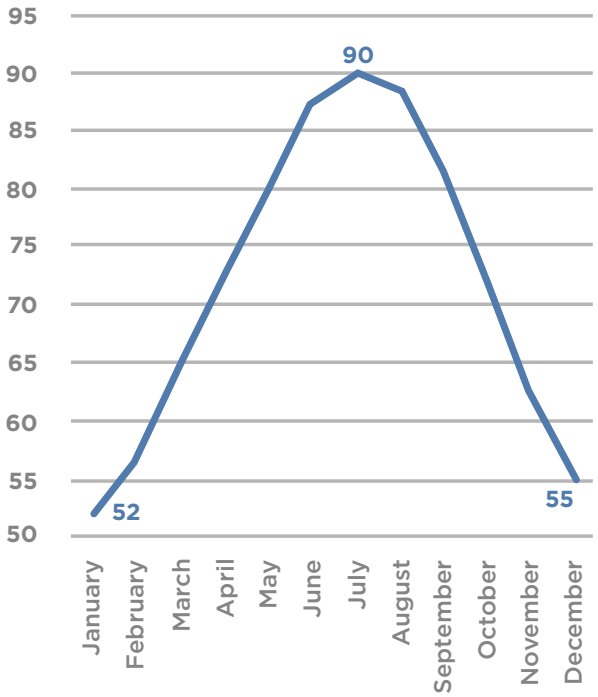
REALITY CHECK

Average High Temperatures

NOTES

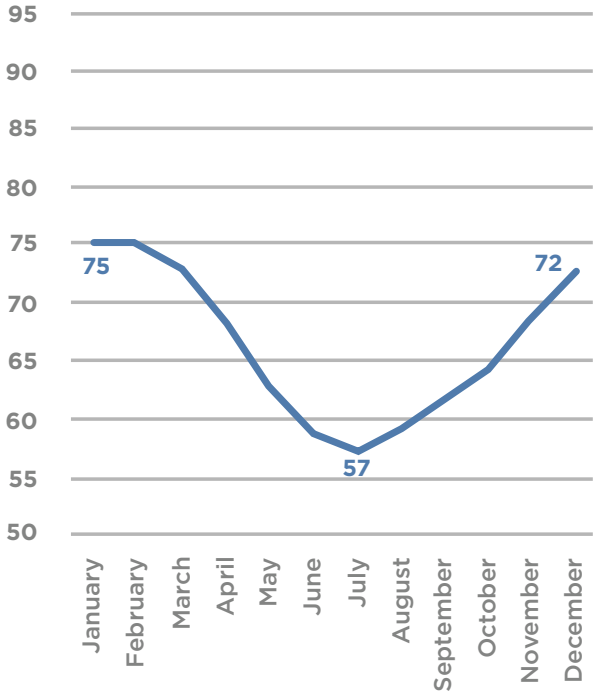
Greenville, SC



Greenville, SC USA	Temperatures Fahrenheit
January	52
February	56
March	65
April	73
May	80
June	87
July	90
August	88
September	82
October	72
November	63
December	55

NOTES

Auckland, New Zealand



Aukland, New Zealand	Temperatures Fahrenheit
January	75
February	75
March	73
April	68
May	63
June	59
July	57
August	59
September	61
October	64
November	68
December	72

Name:_____

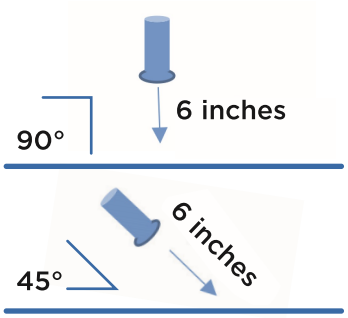
Light Intensity

Observe how changing the angle of light affects how the lights hits the surface

Materials: **Flashlight** **Paper** **Pencil** **Ruler**

Optional: Protractor to determine angle

1. Shine a flashlight directly (90 degrees) 6 inches above the paper.
2. Trace the outside edge of the light from the flashlight.
3. Shine the flashlight at a 45 degree angle 6 inches from the center of the paper and trace the outer edge of the light.



Name:_____

Light Intensity Reflection

1. When you changed the angle of the light what affect did it have on the shape of the light on your paper?

_____

_____

_____

2. Which flashlight angle produced more direct light? What season would this represent?

_____

_____

_____

3. What are some of the characteristics of the Northern hemisphere during the summer? (Use the following words in your answer: hours, light, angle, tilt)

_____

_____

_____

4. In your own words, what causes the different seasons we experience?

_____

_____

_____

_____

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REALITY CHECK

NAME _____

DATE _____

CLASS _____

Dipper Finder

In this activity, learn how to find the Big Dipper, the Little Dipper, Cassiopeia, and the North Star (Polaris). By creating a Dipper Finder, students will have their very own chart of the Northern night sky, which they can spin and change to fit the exact date and time they are looking at the stars!

Materials

- Dipper Finder Main Page (circle of times)
- Dipper Finder Constellation Page (circle of dates)
- Scissors
- Brass fastener

Directions

Use scissors to cut out the main circle of dates and constellations on the Dipper Finder Constellation Page. Poke a small hole in the middle of the circle where the four-pointed star is. Also poke a hole in the middle of the circle on the Dipper Finder Main Page where the four-pointed star is (but do not cut out the circle from this sheet!). Place the cut-out circle of dates on top of the circle of times. Use the brass fastener to fasten the two sheets together by pushing it through the holes at the center of the two pages. You now have a complete Dipper Finder!

To Use Your Dipper Finder

Stand so that you are facing North. Hold your Dipper Finder in front of you so that you can read the words right-side-up. Spin the date circle around until the current date lines up with the current time. You will now see the constellations in the orientation they are in the sky on that date and time. You can use the Big Dipper to find the North Star by following the last two stars of the cup towards the North until reaching the star at the tip of the handle of the Little Dipper (on your completed Dipper Finder, this star is marked by the brass fastener). The star at the tip of the handle of the Little Dipper is the North Star!

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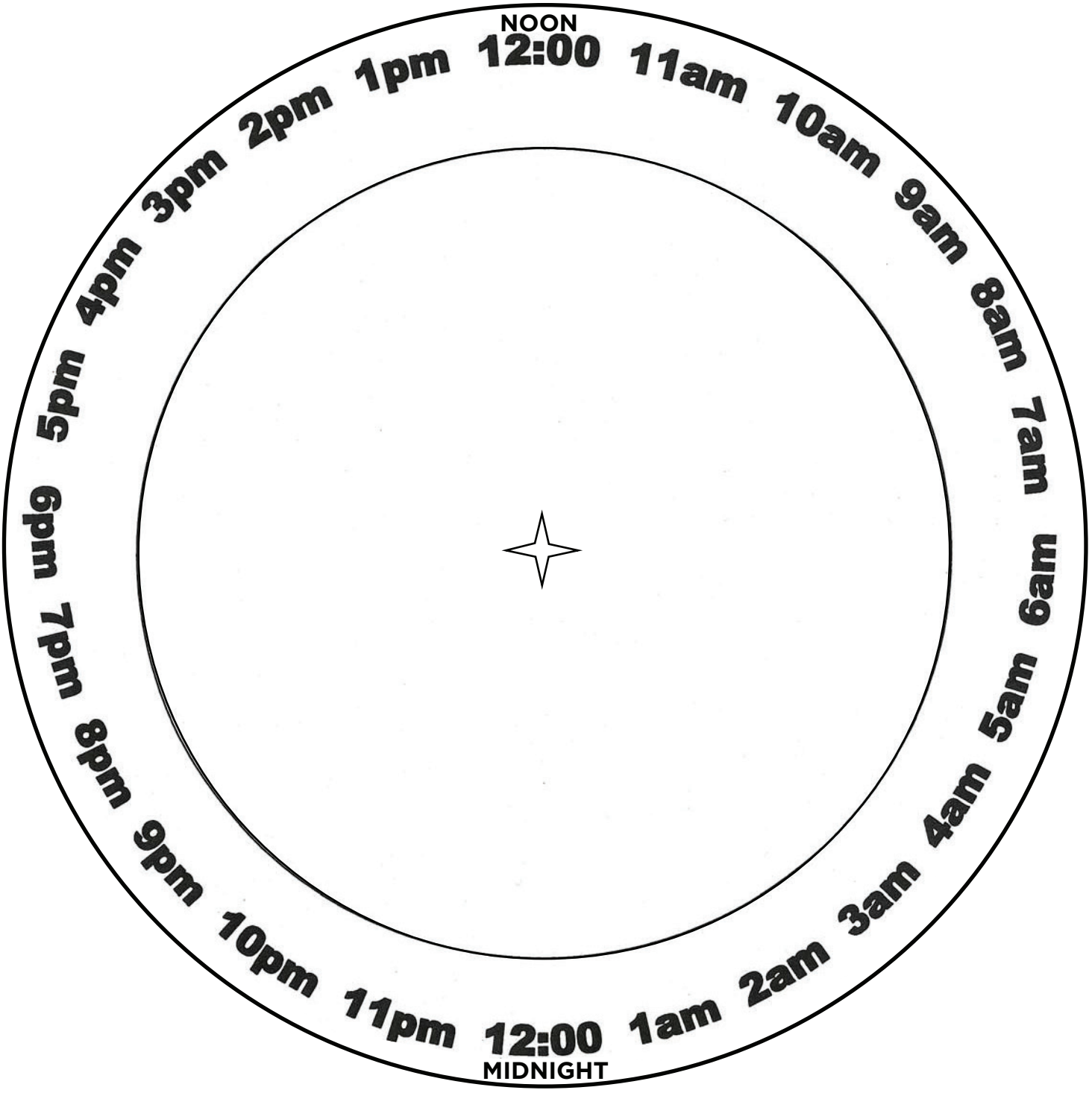
NAME _____

DATE _____

CLASS _____

REALITY CHECK



HOLD SO YOU CAN READ THE WORDS
FACE NORTH

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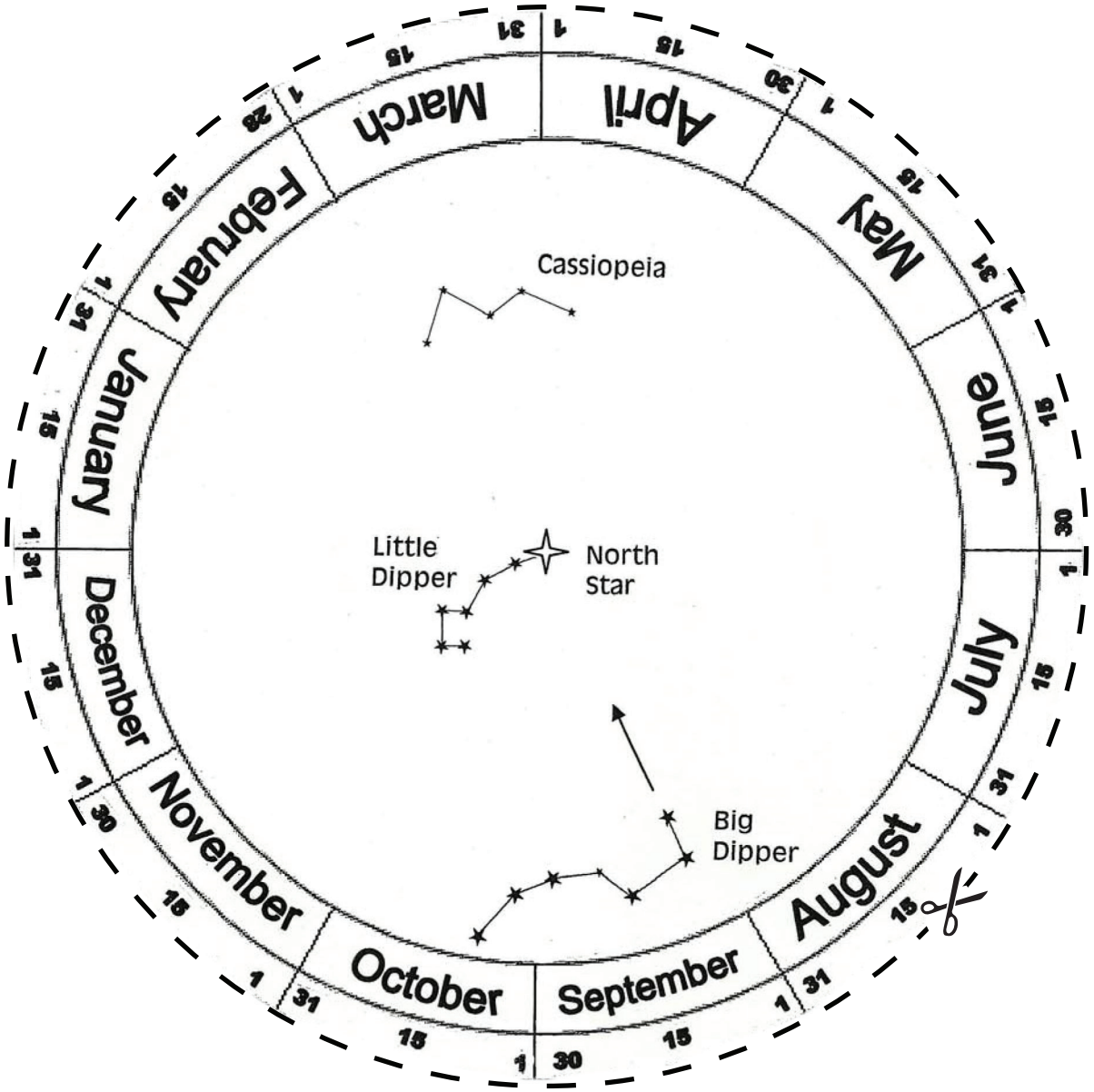
NAME _____

DATE _____

CLASS _____

REALITY CHECK



Times on the Dipper Finder are in Eastern Standard Time. If you are using the Dipper Finder during Daylight Savings time, set your Dipper Finder to one hour earlier than the time you are actually looking at the sky.