

STAR GAZING ACTIVITY BOX

INSTRUCTION SHEET

CONTENTS

Within this box you will find:

- 1 Instruction Sheet
- 1 Set of instruction on using the Star Sphere
- 1 Setting the date and time activity sheet
- 1 Star Sphere
- 1 Sony CD Walkman containing edu-science planetarium CD
- 1 I-Want-It Speaker connected to CD
- 1 Night Vision LED flashlight
- 1 set of instructions for using the Planispheres
- 4 Glow-in-the-Dark Planispheres
- 1 Constellation Guide containing 52 Detailed Constellation Cards
- 1 Constellation Guide for Star Deck
- 1 Star Deck with 52 Constellation Cards
- 1 Moon map
- 1 Book entitled "Stargazing 2014"
- 1 Book entitled "Exploring Stars and Planets"
- 1 Book entitled "My First Book of the Solar System"
- 1 Book entitled "The Night Sky - Month by Month"

Please return the box and its contents in the same condition you found it, such that the next group can have the same amount of enjoyment using it.

If there is anything missing please notify the Warden so the box can be replenished.

INSTRUCTIONS

There are several activities within the Activity Box to provide flexibility depending upon the size and age of the group. If you have a large group split up into small groups and create bases and rotate round the activities below spending about 20-30 minutes on each.

Star Sphere

Set up the Star Sphere and play the CD. **Follow the Star Sphere instructions.**

Planisphere

Use the Glow in the Dark Planisphere and the Detailed Constellation Cards to identify various stars in the sky. **Follow the Planisphere instructions set.** Hand out the colour coded Detailed Constellation Cards depending on the time of year to get individuals to identify and learn about different constellations, get individuals to read out the details of their constellations.

Star Deck

Use the Star Deck to map out the star constellations relative to each other for the northern hemisphere. Deal out the cards play a game of Dominos going round placing cards with adjacent constellations next to each other or even play a game of Top Trumps with the information on the cards.

Moon Map

Study the Moon Map and if a full moon see if you can locate the key land marks.

Books

Browse through the books to research the star and planets further, learn how to measure the skies using your hands.

THE STAR SPHERE INSTRUCTIONS

The Star Sphere is a replica in miniature of the largest and brightest objects in space surround our planet. Groups of 4 or 5.

OPERATING THE STAR SPHERE

- Place the Star Sphere on a table - charge the stars on the surface with a bright torch. Try and avoid looking at the bright light.
- Rotate the Star Sphere so that N (North) on the compass lines up with the raised dot.
- Date selector is located on the light wand. To set your planetarium for the beginning of the audio tour, rotate the light wand until Autumn lines up with the pointer on the base. At various breaks during the audio tour you will be asked to pause the CD and adjust your planetarium for the next season.
- Ensure the CD is in the CD player and the speaker is switched on - then start the audio CD. Suggest playing track; 3 - Autumn, 4 - Winter, 5 - Spring or 6 - Summer. If your group is more than 4 or 5 then continue with any of the additional tracks.
- If you have a small group and they start to get restless - stop the CD and give them the following instructions sheet on **Setting the Date and Time on the Star Sphere**.
- Please remember to switch OFF the speaker.

If you have a small group

1. Help the group set the date and time. But give them time to work it out first.
2. Get the group to see if they can spot any of the constellations in the night sky. Refer to the Star Sphere and the Night Sky as you ask the following questions (if the stars aren't out, project the star sphere onto canvas).

3. *Can anyone see the North Star? What is it called? **Polaris***

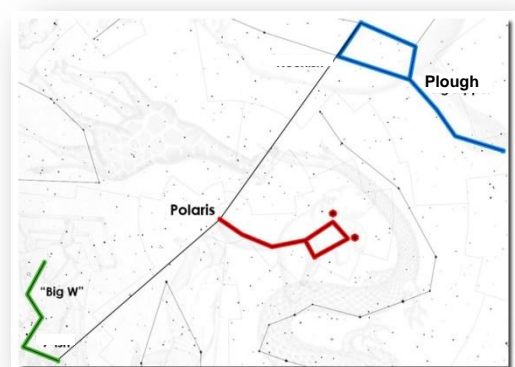
4. *Does anyone know how to find the North Star?*

Look for the Plough which is part of URSA Major (The Great Bear)

5. *What does the Plough look like?*

Follow the edge of the saucerpan straight up to the North Star.

6. *Can anyone see a big W - near the North Star? **This is called Cassiopeia.***



THE MOVING SKY

Explain that because of the Earth's orbit that goes around the sun once a year the sun seems to move against the background of stars. The path the sun appears to take is called the ecliptic (see activity sheet). The zodiacal constellations lay along the ecliptic, which made them very important star patterns to the ancient people who relied on the night sky as their calendar. Notice these are the names of star signs for birthdays. Although we can't feel it, the earth rotates eastwards at about 800 miles an hour at its surface. The stars, sun and moon appear to us to move westward when, in fact, we are the ones that are moving eastwards. Because of this, it seems like any given constellation or star takes 24 hours to make one round trip around Earth. Ask the following questions:

1. Can everyone find their star sign or zodiac constellation?
2. Can everyone see what time of year they can see their constellation in the Night Sky?

FINDING THE CONSTELLATIONS ON THE ACTIVITY SHEET

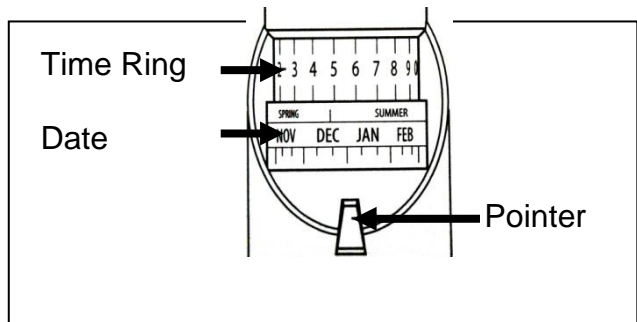
Help the group find other constellations



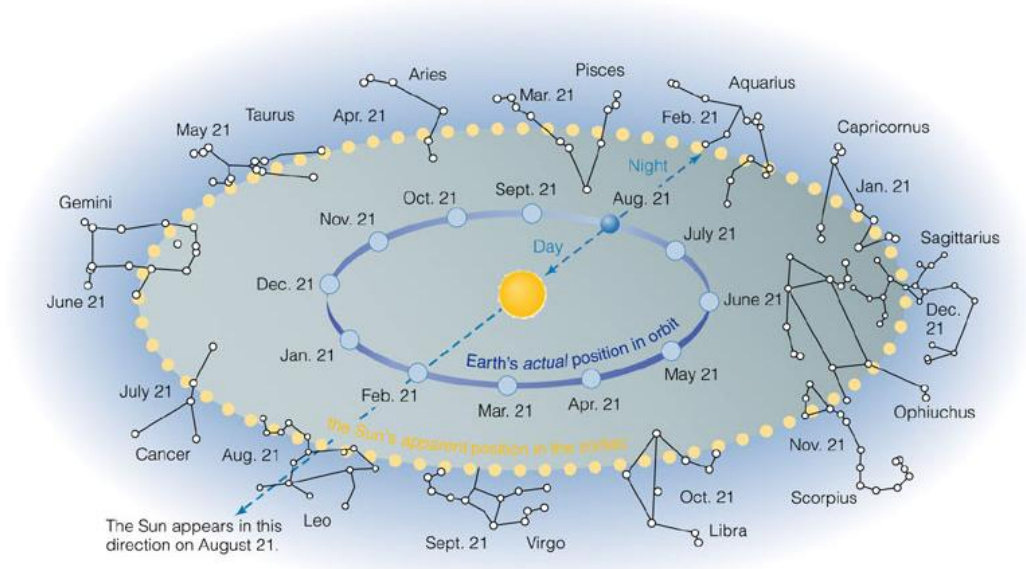
SETTING THE DATE AND TIME ON STAR SPHERE

Set the star sphere to project the night sky for any date and hour.

- Setting the time: With the projection lamp off, turn the light wand until the month you want lines up with the pointer on the date selector. Below the month, there are markings indicating the 1st, 10th and 20th of the month. Turn the light wand to the left (So that the Star Sphere turns to the west) until the date you want lines up with the pointer
- Setting the time: Once you have selected the month and date, rotate the time ring - without turning the light wand - so that the time at which the sun sets lines up with the pointer. The time the sun sets can be found on a table at the back of this manual. Note: The months and dates will change on the date selector as you select the time; once you've selected the date and set the time ring for sunset, the time selection function takes over. You can set your planetarium to project the stars for any time of the night. You can even see what stars are up during the day, when they are not visible.



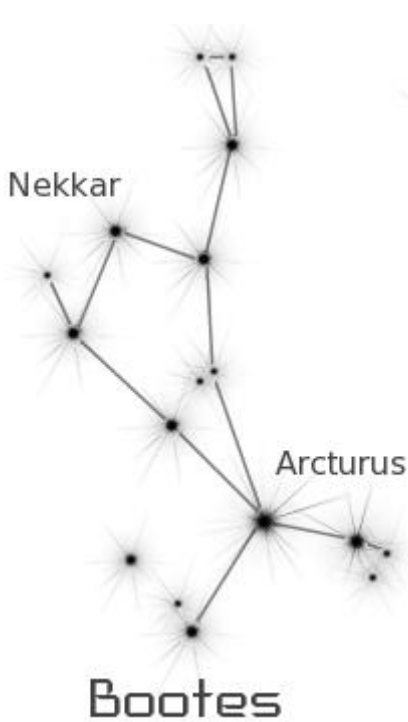
ZODIACAL CONSTELLATIONS



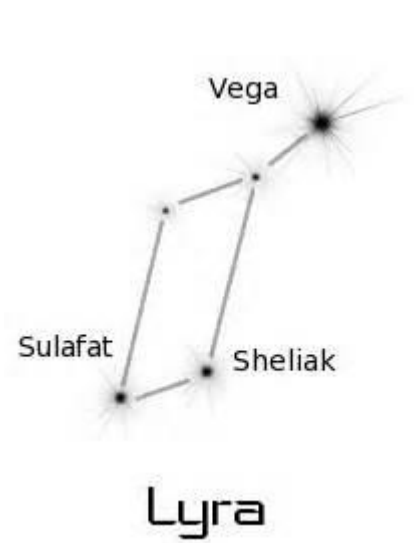
What constellations are visible on your birthday?

ACTIVITY

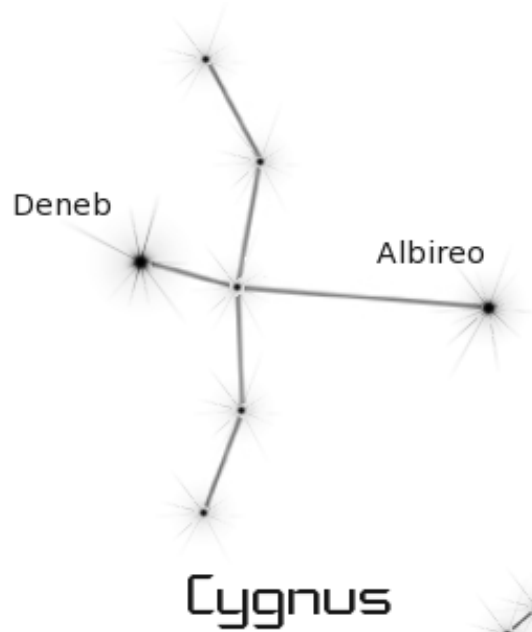
Look for the following constellations on the Star Sphere and then see if you can see them in the Night Sky.



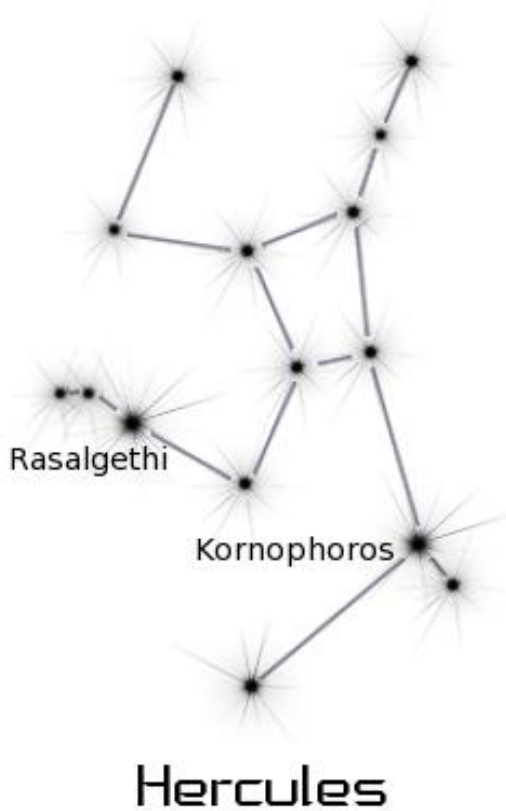
Corona Borealis



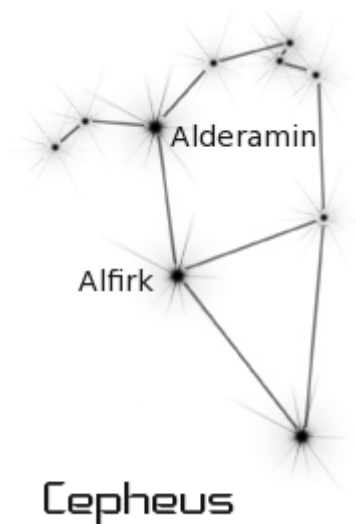
Lyra



Cygnus



Hercules



Cepheus



HALLOWTREE!
SCOUT ACTIVITY CENTRE
What did you do this weekend?



GLOW IN THE DARK PLANISPHERES

The Planispheres show exactly what stars and constellations (star patterns) are in the sky for any date and time.

DEMONSTRATE HOW TO USE THE PLANISPHERE

- Show the group how to find the date from the scale on the outside edge, and the time of night on the overlay, then turn the overlay so that the time when you will be observing is next to it. Explain that when you are in British Summer Time you need to subtract one hour from the time on your watch to get the correct planisphere time. So if you are observing at 10pm set the time to 9pm.

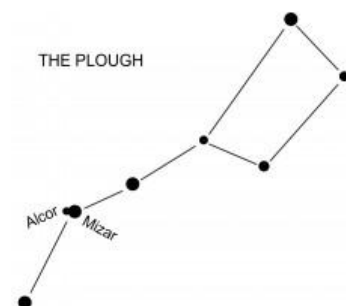
Ask the group if we are in British Summer Time?

- Show how you hold the planisphere over head, map facing downwards, with the Midnight time mark pointing north.

Ask the group which way is North?

Show how the oval window on the overlay now displays the whole sky visible, with the horizon around the edge the middle of the map window is immediately overhead, marked with a little blue cross. Explain why East and West appear to be reversed compared with maps - because the planisphere is designed to use over your head.

- Explain how you can now start to pick out the stars and constellations shown on the map. The bright stars are shown with larger dots on the map and the lines between the stars which are there to help you pick out the patterns. Explain that because the map shows the whole sky - what looks like a small pattern can actually be a very large pattern in the sky.
- Identify one star pattern or constellation first and work from there. One good starting point is the pattern of seven stars in Ursa Major, which is always somewhere in the sky. These stars are known as the Plough or the Big Dipper.
- Now get the group to do the same again using the planispheres themselves.
- Hand out the Detailed Constellation Cards to the group for the appropriate season and ask each person to find their constellation, first on the planisphere then in the night sky.
- Once found get each person to read out their card.
- If time, swap the cards around and get each of them to help each other find alternative constellations.



THE BRIGHTEST STARS



Below are listed the 22 brightest individual stars in order of their *average* apparent magnitudes in the visible spectrum as seen from Earth in the Northern hemisphere. Stellar brightness in this selected table is limited to brighter than +2.50 magnitude, mostly as the available number of observable stars increases almost exponentially as the magnitude increases. To the naked eye on a clear dark night, in a location far from cities and lights, the total number of stars visible is around 9000.

For comparison, the non-stellar objects in our Solar System with maximum visible magnitudes below +2.50 are the Moon (-12.92), Venus (-4.89), Jupiter (-2.94), Mars (-2.91), Mercury (-2.45) and Saturn(-0.49).

Ranking	Visible Magnitude	Constellation	Proper name	Distance Light Years
0	-26.74		(Sun)	0.000 016
1	-1.46	Canus Major	Sirius	8.6
2	-0.04	Boötes	Arcturus	37
3	0.03	Lyra	Vega	25
4	0.08	Auriga	Capella	42
5	0.12	Orion	Rigel	770
6	0.34	Canes Minor	Procyon	11
7	0.42	Orion	Betelgeuse	640
8	0.50	Eridanus	Achernar	140
9	0.77	Aquila	Altair	17
10	0.85	Taurus	Aldebaran	65
11	0.96	Auriga	Capella B	42
12	1.04	Virgo	Spica	260
13	1.09	Scorpius	Antares	600
14	1.15	Gemini	Pollux	34
15	1.25	Cygnus	Deneb	1,550
16	1.35	Leo	Regulus	77
17	1.51	Canes Major	Adara	430
18	1.58	Gemini	Castor	52
19	1.79	Ursa Major	Dubhe	120
20	1.97	Ursa Minor	Polaris	430
21	2.14	Leo	Denebola	36
22	2.23	Ursa Major	Mizar	78