Worksheet answers

Part 4: Classifying galaxies

1. Find and zoom in on each of the following galaxies. Classify them according to their shape.

ELLIPTICAL GALAXIES	SPIRAL GALAXIES	IRREGULAR GALAXIES
M 89	NGC 5194	NGC 5195
M 110	M 74	
M 87	M 91	

2. Were any of these galaxies difficult to classify? Why?

    M 89 and M 87 are round, like a spiral, but lack spiral arms so are classified as elliptical galaxies. Maybe the images of these galaxies are too low resolution to detail any spiral arms that may be present.

Part 5: Exploring the motion of stars across the sky

3. Describe what you see.

    Planets and stars move towards the horizon at an angle that is not perpendicular to the horizon.

4. Move your cursor so that you are facing other directions and observe the direction the Sun and stars move across the sky. What do you see when you are facing:

    East?   *Planets and stars rise above the horizon at an angle that is not perpendicular to the horizon.*

    North? *Planets and stars move right to left across the screen in an arc.*

    South? *Planets and stars move in a clockwise direction around a point above the horizon.*

5. Where is the south celestial pole located when viewed from Singapore?

    The south celestial pole is in line with the Equator.

6. Describe the movement of the Sun and stars across the sky when viewed from a location close to the equator.

    West — Stars and planets set perpendicular to the horizon.

    East — Stars and planets rise perpendicular to the horizon.

    North — Stars and planets rotate counter clockwise about a point close to the horizon.

    South — Stars and planets rotate clockwise about a point close to the horizon.

7. What happens to the position of the Southern Cross (Crux) over a period of 24 hours?

    The Southern Cross rotates clockwise around a point above the equator. The long axis points towards the centre of rotation so the orientation of the Southern Cross in the sky constantly changes.

8. Sketch the Southern Cross

    Answers will vary.

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Part 6: The celestial sphere

9. Write down the RA/DE (J2000) information for Sirius at 9:00 pm.

   RA = 6 h 45 m 8.7 s   DE = -16 ° 43 ' 05.2 "

10. What do you notice about Sirius' position in relation to the celestial sphere?

    The position of Sirius remains constant on the celestial sphere.

11. Find the RA/DE (J2000) information for Sirius at 11:30 pm.

    RA = 6 h 45 m 8.7 s   DE = -16 ° 43 ' 05.2 "

12. These two sets of RA/DE values are the same. Why do you think this is so?

    RA/DE values originate from the celestial sphere and celestial sphere coordinates are fixed for each object.

13. Why do you think astronomers use the celestial sphere and RA/DE coordinates to describe the position of objects in the sky?

    This system avoids confusion. Every object in the sky has a unique RA/DE coordinate that identifies that object to all astronomers.

Part 6: What is the best time of night to image a celestial object?

14. The Rosette nebula crosses the celestial meridian at *11:08 pm (23:08).* This is the best time to image it on 15 January 2014 because:

    The Rosette nebula is at its highest point in the sky where atmospheric disturbance, dust, pollutants and bright lights are at their minimum.

15. Write your answer in the table below. Repeat for other dates in the table.

DATE AND TIME	TIME ROSETTE NEBULA CROSSES THE MERIDIAN
25 January 2014	*22:29*
30 January 2014	*22:09*
5 February 2014	*21:45*
15 February 2014	*21:06*
1 March 2014	*20:11*

16. The best time to image an object is when it crosses the meridian. What do you notice about these times as you advance the date and time?

    The Rosette nebula crosses the meridian earlier each night from January to March.

17. Does this same observation apply to the time the Rosette nebula crosses the meridian throughout the rest of the year?

    Yes. The Rosette nebula appears to cross the meridian earlier each night, throughout the year.

18. Do other celestial objects follow this pattern? Pick one or two objects to try. Record some values 1-2 months apart. (Hint: Don't use the Sun or planets in the Solar System.)

    Yes (times will vary depending on object/s selected)