National 4 and 5 Physics   Unit 1- Dynamics and Space   LOs

Name_____   Teacher_____

✓	**I am confident that I understand this and I can apply this to problems**
?	**I have some understanding but I need to revise this some more**
✗	**I don't know this or I need help because I don't understand it**

National 4 outcomes are in lighter font.   **National 5 outcomes are in bold**

1.1 Motion	Covered (✓)	How well can you do this?		
1. What is meant by the term speed?		✗	?	✓
2. Can I carry out calculations involving the relationship between distance, time and average speed (d=vt)?		✗	?	✓
3. Can I describe how to measure an average speed?		✗	?	✓
4. Can I describe how to measure an instantaneous speed?		✗	?	✓
5. Can I calculate the instantaneous speed of an object?		✗	?	✓
6. Can I describe one example where the average speed of an object is measured in everyday life?		✗	?	✓
7. Can I describe one example where the instantaneous speed of an object is measured in everyday life?		✗	?	✓

	Covered (✓)	How well can you do this?		
8. Can I identify situations where average speed and instantaneous speed are different?		✘	?	✓
9. What is meant by a scalar quantity?		✘	?	✓
10. What is meant by a vector quantity?		✘	?	✓
11. Can I identify the scalar and vector quantities from the following? **Force, speed, velocity, distance, displacement, mass, time and energy.**		✘	?	✓
12. What is the difference between distance and displacement?		✘	?	✓
13. What is the difference between speed and velocity?		✘	?	✓
14. Can I calculate the resultant of two vectors in: **a) a straight line** **b) at right angles?**		✘	?	✓
15. Can I carry out calculations involving the relationship between displacement, time and average velocity (s=vt)?		✘	?	✓
16. What is meant by the term acceleration?		✘	?	✓
17. Can I carry out calculations involving the relationship between initial velocity, final velocity, time and uniform (constant) acceleration?		✘	?	✓

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	Covered (✓)	How well can you do this?		
18. From a speed-time graph, can I identify when an object has: a) increasing speed; b) decreasing speed; c) constant speed?		✗	?	✓
19. From a speed-time graph can I calculate the distance travelled by an object?		✗	?	✓
20. Can I plot a velocity-time graph given a set of data?		✗	?	✓
21. From a velocity-time graph can I identify when an object has: **a) increasing velocity** **b) decreasing velocity** **c) constant velocity?**		✗	?	✓
22. From a velocity–time graph involving more than one constant acceleration, can I calculate the acceleration of an object?		✗	?	✓
23. From a velocity–time graph involving more than one constant acceleration, can you calculate the displacement of an object?		✗	?	✓

1.2 Forces	Covered (✓)	How well can you do this?		
1. When a force is applied to an object, what effect will it have on it? (i.e. what will it change?)		✘	?	✓
2. Can I describe how to measure a force using a Newton Balance?		✘	?	✓
3. Can I define the Newton?		✘	?	✓
4. **Is force a vector or a scalar quantity?**		✘	?	✓
5. In which direction does friction act in relation to the motion of an object?		✘	?	✓
6. Can I describe and explain situations in which attempts are made to increase or decrease the force of friction?		✘	?	✓
7. What is meant by the term balanced forces?		✘	?	✓
8. Can I use free body diagrams to analyse the forces on an object?		✘	?	✓
9. **What is meant by the resultant of a number of forces?**		✘	?	✓
10. Can I explain how an object travels at a constant speed? (Think of Newton's first law of motion and frictional forces)		✘	?	✓

	Covered (✓)	How well can you do this?		
11. Can I apply Newton's first law of motion to explain constant velocity?		✘	?	✓
12. Can I predict what will happen to the acceleration of an object if only the mass changes?		✘	?	✓
13. Can I predict what will happen to the acceleration of an object if only the force changes?		✘	?	✓
14. Can I use the equation F=ma when only one force is acting?		✘	?	✓
15. Can I use the equation F=ma when more than one force is acting?		✘	?	✓
16. Can I use Newton's laws to explain: **a) the motion of an object during free-fall and** **b) why it reaches terminal velocity?**		✘	?	✓
17. What is work done a measure of?		✘	?	✓
18. **Can I carry out calculations involving the relationships between Work done, force and displacement (Ew = F s)?**		✘	?	✓

	Covered (✔)	How well can you do this?		
19. What is weight an example of?		✘	?	✔
20. What does weight mean?		✘	?	✔
21. Do I know the difference between weight and mass and what is the unit of each quantity?		✘	?	✔
22. Can I explain what is meant by gravitational field strength?		✘	?	✔
23. Can I carry out calculations involving the relationship between weight, mass and gravitational field strength including situations where g is not equal to 10 Nkg^{-1}.		✘	?	✔
24. Can I carry out calculations involving the relationship between weight, mass and gravitational field strength during interplanetary rocket flight?		✘	?	✔
25. Can I state Newton's 3rd law of motion?		✘	?	✔
26. Can I apply Newton's 3rd law of motion to explain motion resulting from a 'reaction' force?		✘	?	✔

1.3 Satellites and Projectiles	Covered (✔)	How well can you do this?		
1. What is meant by the period of a satellite?		✘	?	✓
2. How does the period of a satellite depend on the height of its orbit?		✘	?	✓
3. How does the height of orbit of a geostationary satellite compare with other satellites?		✘	?	✓
4. At what speed do radio (or microwave) signals travel during satellite communication?		✘	?	✓
5. Can I use the relationship between distance, speed and time when applied to satellite communications?		✘	?	✓
6. Can I name at least 3 applications of satellites?		✘	?	✓
7. Can I describe how parabolic (curved) reflectors are used in satellite communication to: a) transmit and b) receive signals?		✘	?	✓
8. Can I explain how satellites have developed our understanding of the global impacts of our actions?		✘	?	✓
9. How can a satellite be used to monitor environmental changes on the Earth?		✘	?	✓

	Covered (✓)	How well can you do this?		
10. Can I explain how projectile motion can be treated as two independent motions?		✘	?	✓
11. Can I carry out calculations of projectile motion using: **a) appropriate formulae;** **b) graphs?**		✘	?	✓
12. Can I explain how a satellite orbits in terms of projectile motion?		✘	?	✓

	Covered (✓)	How well can you do this?		

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1.4 Cosmology	Covered (✓)	How well can you do this?		
1. What is a star?		✘	?	✓
2. What is a planet?		✘	?	✓
3. What is a moon?		✘	?	✓
4. What is a solar system?		✘	?	✓
5. What is a galaxy?		✘	?	✓
6. What is an exo-planet?		✘	?	✓
7. What is the universe?		✘	?	✓
8. What does a light year measure?		✘	?	✓
9. How many metres are in 1 light year?		✘	?	✓
10. Can I calculate the number of metres in 1 light year?		✘	?	✓

	Covered (✓)	How well can you do this?		
11. What is the distance in light years from the Earth to: a) The Sun; b) The next nearest star; c) The next galaxy; d) The edge of the known universe?		✗	?	✓
12. What conditions are required for an exo – planet to sustain life?		✗	?	✓
13. What is the name of the theory of the origin of the universe?		✗	?	✓
14. Can I describe what happened when the universe began?		✗	?	✓
15. What evidence is there to support the hot big bang model of the universe?		✗	?	✓
16. How old do we think the universe is? What evidence is there to suggest the age of the universe?		✗	?	✓
17. Do I know that radiation from space is received in a variety of forms?		✗	?	✓
18. What is the electromagnetic spectrum		✗	?	✓
19. What do all the waves in the electromagnetic spectrum have in common?		✗	?	✓

	Covered (✓)	How well can you do this?		
20. Can I list the waves of the electromagnetic spectrum in order of a) frequency; b) wavelength?		✘	?	✓
21. Can I name an example of a detector for each of the waves in the electromagnetic spectrum?		✘	?	✓
22. Why have astronomers developed telescopes to detect different parts of the electromagnetic spectrum?		✘	?	✓
23. What information have astronomers obtained from using these telescopes?		✘	?	✓
24. Can I identify a continuous spectrum from a picture?		✘	?	✓
25. Can I identify a line emission spectrum from a picture?		✘	?	✓
26. Can I use line spectra to identify the elements present in stars?		✘	?	✓

1.5 Space Exploration	Covered (✓)	How well can you do this?		
1. What have we learned about planet Earth as a result of space exploration?		✗	?	✓
2. What have we learned about the Universe as a result of space exploration?		✗	?	✓
3. How has our model of the universe changed over time?		✗	?	✓
4. What evidence is there to support our understanding of the universe now?		✗	?	✓
5. Can I apply Newton's Second Law (F=ma) to describe the motion and the forces acting on a space rocket during: a) launch b) motion in space and c) landing?		✗	?	✓
6. Can I list at least 4 technologies that were developed as a result of space exploration?		✗	?	✓
7. Can I describe how some of the technologies developed as a result of space exploration impact on our everyday lives?		✗	?	✓

	Covered (✓)	How well can you do this?		
8. Can I list some of the benefits associated with space exploration?		✘	?	✓
Section on Specific Heat Capacity will be covered in S4 Electricity & Energy Unit				
9. What are the challenges faced by a space craft when re-entering a planet's atmosphere?		✘	?	✓
10. Can I identify which materials could be used on the thermal protection system on a space craft to protect it on re-entry and state why they should be used?		✘	?	✓
11. Can I describe the need for thermal protection systems to protect spacecraft during re – entry?		✘	?	✓
12. Can I describe the challenges of re – entry to the Earth's atmosphere?		✘	?	✓
13. Can I list some of the risks associated with space exploration?		✘	?	✓