

# SECONDARY WORKBOOK

# INFORMATION FOR SCHOOLS AND TEACHERS

A visit to a round of the Repco Supercars Championship provides fantastic opportunities for students to engage with and get excited about STEM education. In an environment where they can see, hear and smell STEM in action, students can make meaningful connections between the Australian Curriculum and the action on track. This booklet has been designed to be completed either independently or collaboratively and can be utilised both on the day and back in the classroom.



## Alignment with the Australian Curriculum Year 7 – 10

### Curriculum Area: Science

Physical sciences	Change to an object's motion is caused by unbalanced forces, including Earth's gravitational attraction, acting on the object (ACSSU117)
Science inquiry skills	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (AC SIS124)

### Curriculum Area: Design Technologies

Knowledge and understanding	Investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions (ACTDEK043)
Processes and production skills	Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques (ACTDEP036)

### Curriculum Area: Mathematics

Number and algebra	<p>Round decimals to a specified number of decimal places (ACMNA156)</p> <p>Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)</p> <p>Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)</p> <p>Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)</p>
Statistics and probability	Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)
Measurement and geometry	<p>Solve problems involving duration, including using 12 and 24-hour time within a single time zone (ACMMG199)</p> <p>Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163)</p>

General Capabilities:

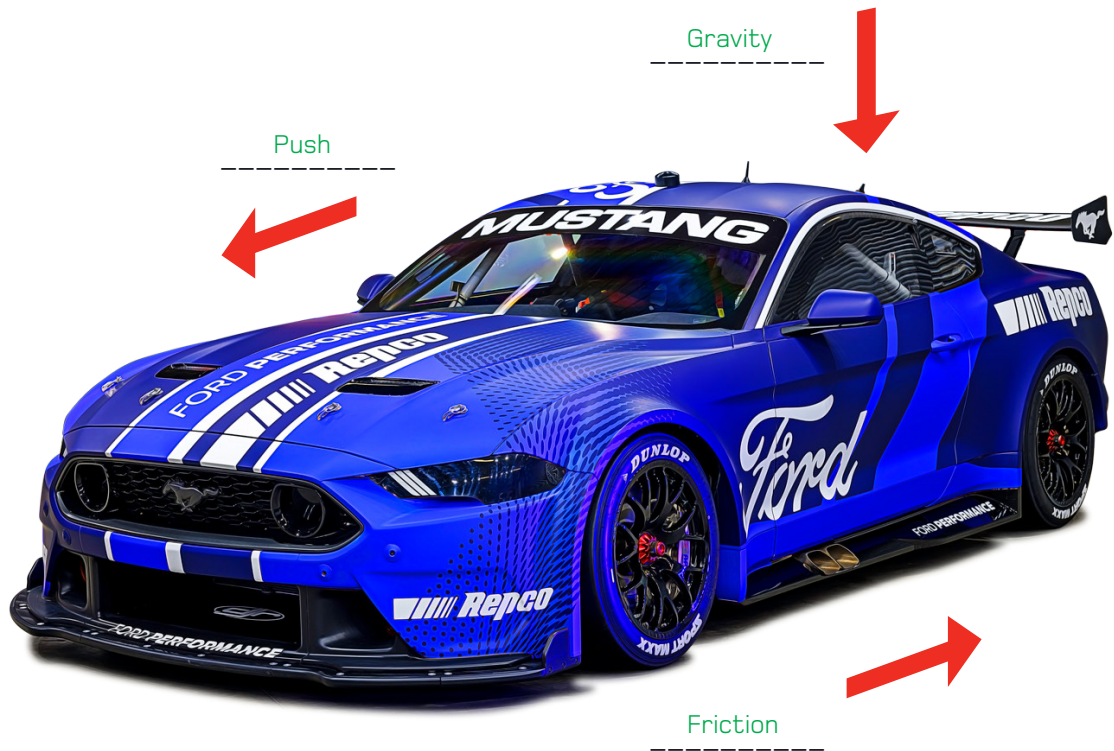
- Literacy
- Numeracy
- Critical and creative thinking
- Personal and social capability

Cross Curriculum Priorities:

- Sustainability

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au)

1. Complete the force diagram by adding the correct labels to the force arrows.



**FRICION**

**GRAVITY**

**PUSH**

2. Explain the features of a Supercar control tyre that improve its performance when compared to a normal road tyre.

Smooth, greater surface area, wider - better grip/traction

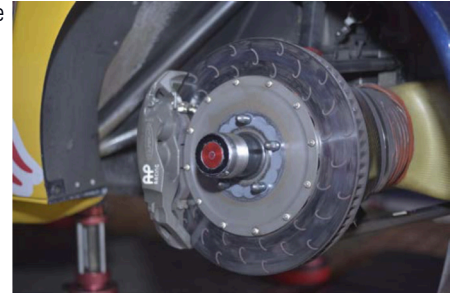






3. What factors need to be considered when selecting the materials for the brake setup?

Extreme temperatures – must be heat resistant, lightweight, strong, durable



- 4.A In what ways could the force of friction be beneficial to a Supercar driver?

Brakes use friction to slow down, tyres use friction to grip the road, spoiler converts air resistance to downforce to help with traction

- 4.B In what ways could friction be an obstacle to performance?

Air resistance slows car, brakes overheating, wear and tear on tyres

5. What design features does a Supercar have that make it faster than an ordinary road car?



Streamlined shape – more aerodynamic, lightweight, spoiler/splitter control air flow, more powerful engine

6. What design features do Supercars have that improve the safety of the driver?

Roll cage, six-point safety harness, specialised race seat

7. What design features does the race track that you are at have to improve safety for spectators?

Safety barriers, no-go zones, high fencing, speed restrictions

8. A Supercar can complete a maximum of 145km on one tank of fuel. How kilometers could be covered on 4 tanks of fuel.

580km



9. David Reynolds' Bathurst lap record is 2m06.2769. Round this time to the nearest...

a) Second

2m06

b) Tenth of a second

2m06.3

c) Hundredth of a second

2m06.28

10.A If a race started at 11.30am and has completed half of the total number of laps by 12.15pm, what time can the race be expected to finish?

1pm

10.B What is that time in 24-hour time?

1300

11. If a driver has completed 100km of a 500km race, what fraction of the race have they completed?

1/5

12.A If  $\frac{1}{2}$  of a race is completed on tyre set A and  $\frac{1}{4}$  is completed on tyre set B, what fraction of the race is left to complete on set C?

1/4

12.B What is that fraction as a percentage?

25%

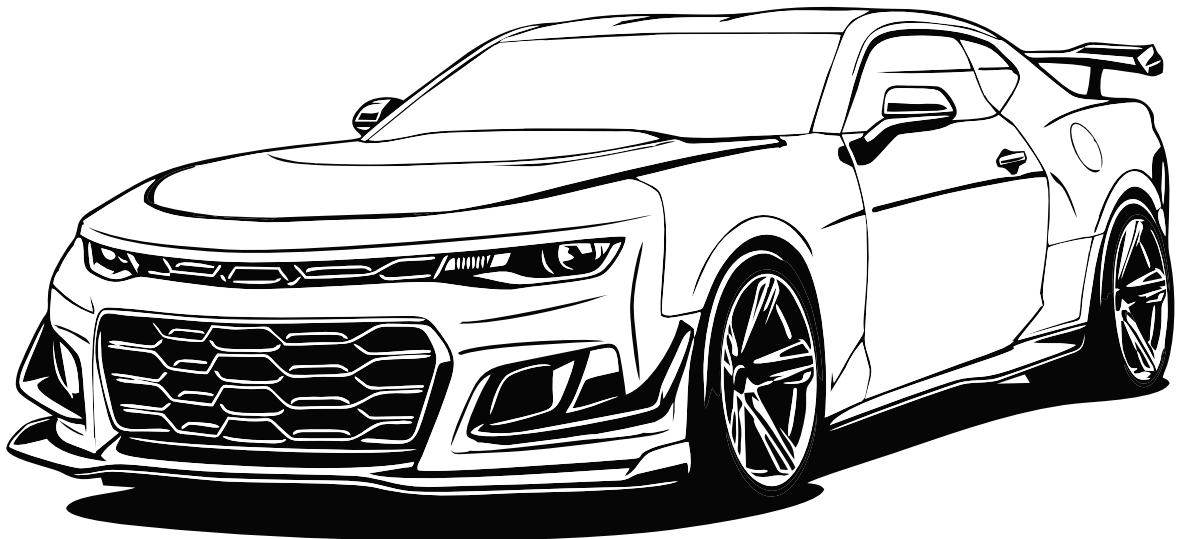
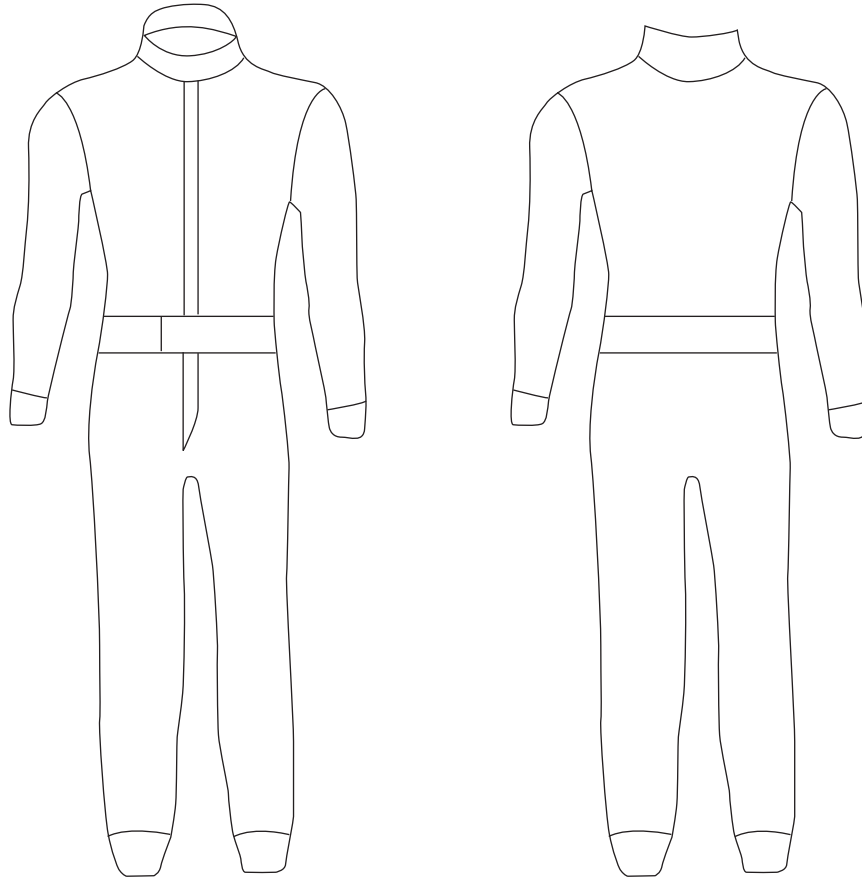
12.C Record 10 different lap times for one driver during the race. Calculate the mean, mode and median for that driver. *Answers will vary*

Lap Times				
1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

Mean: \_\_\_\_\_ Mode: \_\_\_\_\_ Median: \_\_\_\_\_

Imagine you are starting your own race team!  
Come up with a design for your car and race suit.

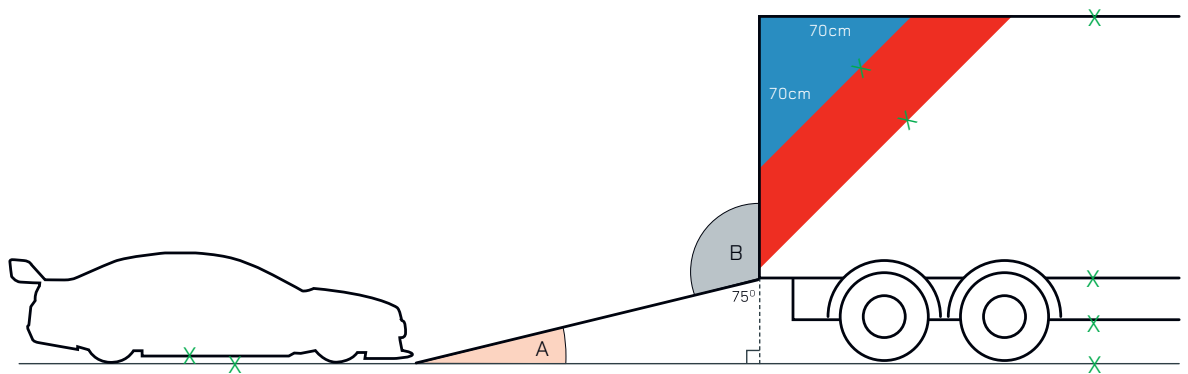
Answers will vary



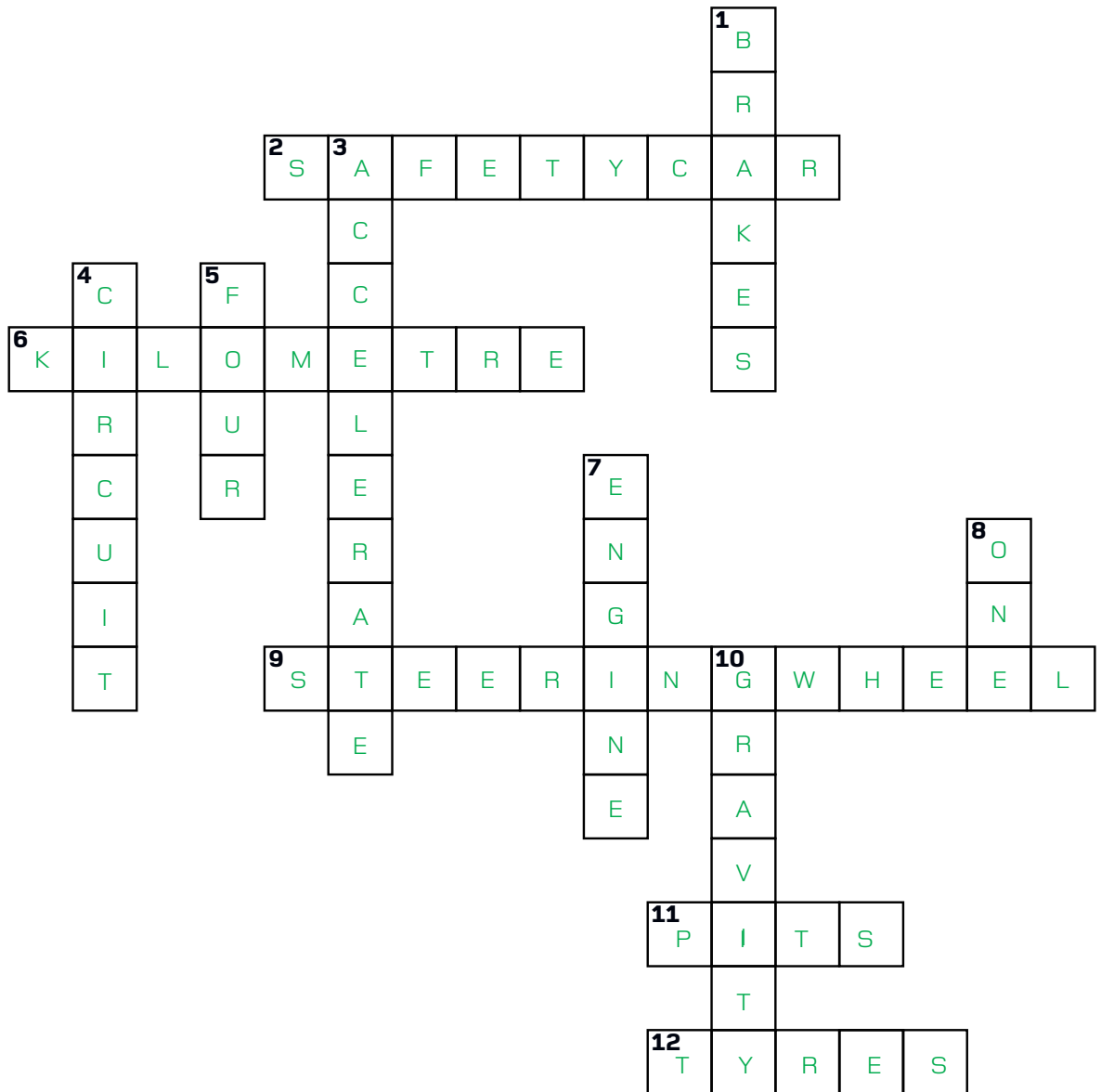


**Study the diagram and answer the questions.**

1. Mark an X on a pair of parallel lines.
2. Calculate angle A – the angle of the ramp the Supercar needs to climb.  
150
3. Calculate angle B – the angle of the ramp opening.  
1050
4. Name the shape that is formed by the red stripe on the truck.  
Trapezium
5. What is the area of the blue triangle?  
2450cm<sup>2</sup>



# SUPERCARS CROSSWORD PUZZLE



## Across

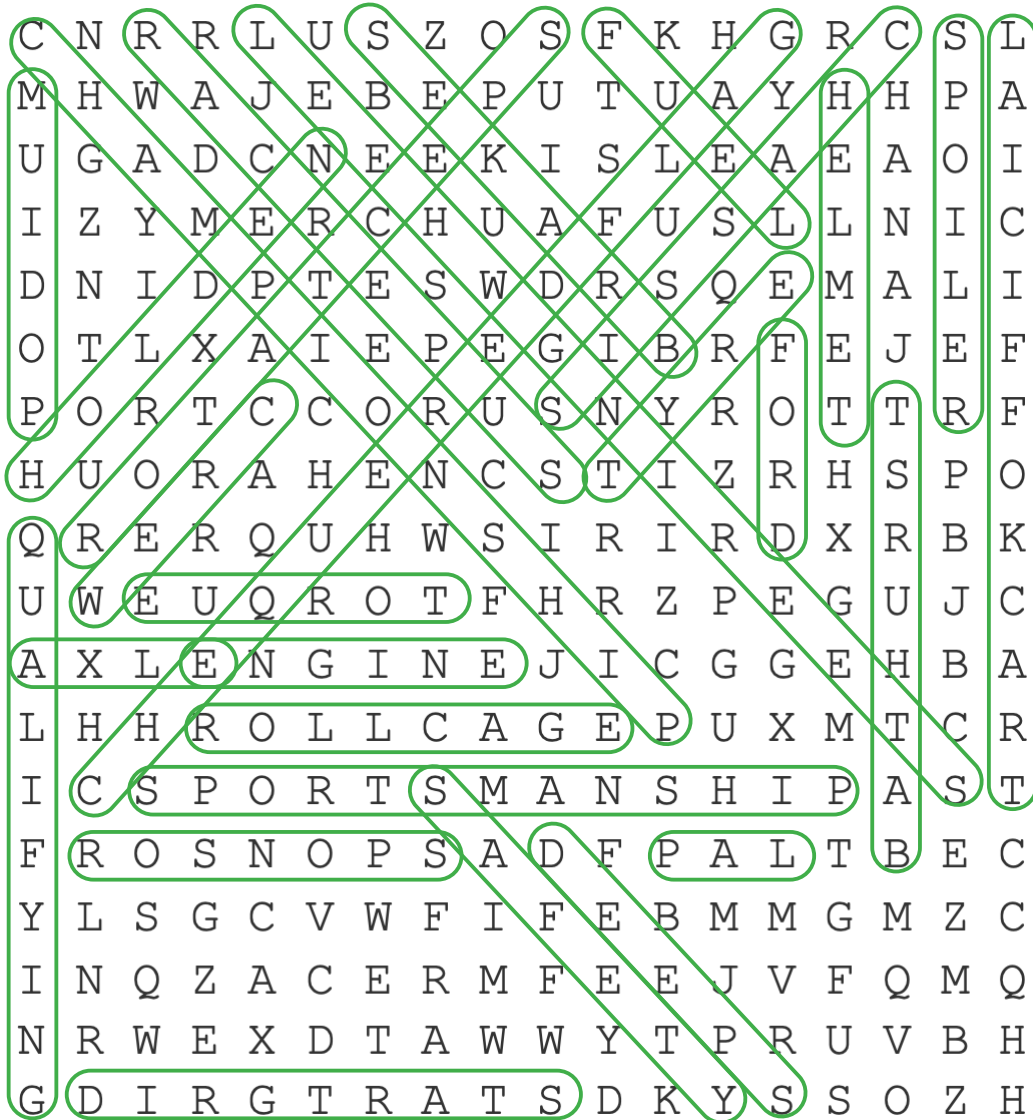
2. Comes onto the track after a crash
6. Equal to 1,000 metres
9. Turns the car
11. Where Supercars go for repairs
12. Help the Supercar grip the road

## Down

1. Used to slow the Supercar down
3. Move faster
4. Another name for a race track
5. Number of wheels on a Supercar
7. Gives the Supercar its push force
8. Number of people in a Supercar when it is racing
10. The force that pulls objects towards Earth



# SUPERCARS WORD SEARCH PUZZLE



**AXLE**

**BATHURST**

**BRAKES**

**CHAMPIONSHIP**

**CHASSIS**

**CHEQUERED FLAG**

**CIRCUIT**

**CREW**

**ENGINE**

**FORD**

**FUEL**

**HELMET**

**HOLDEN**

**LAP**

**PIT**

**PODIUM**

**QUALIFYING**

**RACE SUIT**

**ROLL CAGE**

**SAFETY**

**SPECTATOR**

**SPEED**

**SPOILER**

**SPONSOR**

**SPORTSMANSHIP**

**START GRID**

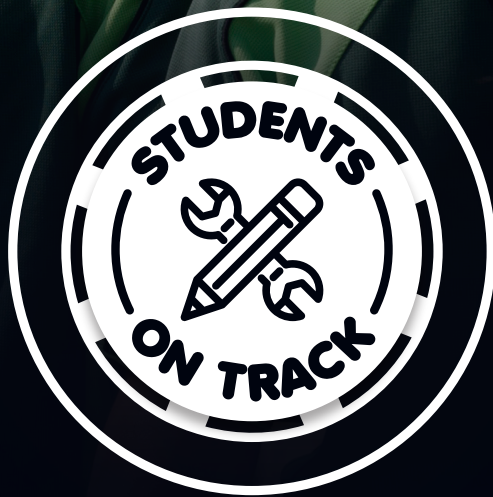
**STEERING WHEEL**

**SUPERCAR**

**TORQUE**

**TRACK OFFICIAL**

**TYRE**



**SUPERCARS**  
CHAMPIONSHIP  
**Repco**