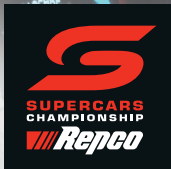
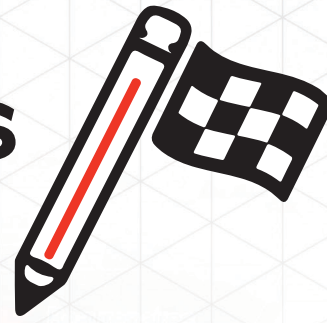


# STUDENTS ON TRACK



SECONDARY  
ANSWER BOOK

# INFORMATION FOR SCHOOLS AND TEACHERS

A visit to a round of the 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, children can make meaningful connections between the Australian Curriculum and the action on track. This booklet has been designed to be completed by students either independently or collaboratively and can be utilised both on the day or back in the classroom.

STUDENTS  
ON TRACK




## Alignment with the Australian Curriculum Year 7 - 8

### Curriculum Area: Science

<b>Physical Sciences</b>	Investigate and represent balanced and unbalanced forces, including gravitational force, acting on objects, and relate changes in an object's motion to its mass and the magnitude and direction of forces acting on it (AC9S7U04)
	Classify different types of energy as kinetic or potential and investigate energy transfer and transformations in simple systems (AC9S8U05)

### Curriculum Area: Design and Technologies

<b>Investigating and Defining</b>	Analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes to create designed solutions (AC9TDE8P01)
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### Curriculum Area: Mathematics

<b>Number</b>	Round decimals to a given accuracy appropriate to the context and use appropriate rounding and estimation to check the reasonableness of solutions (AC9M7N05)
<b>Algebra</b>	Recognise and use variables to represent everyday formulas algebraically and substitute values into formulas to determine an unknown (AC9M7A01)
<b>Measurement</b>	Solve problems involving the circumference and area of a circle using formulas and appropriate units (AC9M8M03)
	Solve problems involving duration, including using 12 and 24-hour time across multiple time zones (AC9M8M04)
<b>Statistics</b>	Demonstrate that the interior angle sum of a triangle in the plane is $180^\circ$ and apply this to determine the interior angle sum of other shapes and the size of unknown angles (AC9M7M05)
	Acquire data sets for discrete and continuous numerical variables and calculate the range, median, mean and mode; make and justify decisions about which measures of central tendency provide useful insights into the nature of the distribution of data (AC9M7STO1)
	Create different types of numerical data displays including stem-and-leaf plots using software where appropriate; describe and compare the distribution of data, commenting on the shape, centre and spread including outliers and determining the range, median, mean and mode (AC9M7STO2)

### General Capabilities

- Literacy
- Numeracy
- Critical and Creative Thinking
- Personal and Social Capability

### Cross Curriculum Priorities

- Sustainability

Source: Australian Curriculum Version 9, <https://v9.australiancurriculum.edu.au/>

# ESCAPE THE SUPERCARS GARAGE CHALLENGE!

## Scenario:

Oh no! You've been locked in a Supercars garage and need to escape. The door to get out is controlled by an eight-digit security keypad. To escape you must solve eight questions to reveal the secret security code and unlock the mechanism.

## Rules:

- You can work independently, in pairs, or in small groups.
- Think carefully to answer each question.
- Write your answer down on the recording sheet.
- Once you have all the numbers for the keypad, check it with your teacher to find out if you can escape the garage!



1 Look at this picture of race tyres.

The number of tyres that make half of this group is the first number in the code.

G R A V I T Y

A I R

R E S I S T A N C E



P U S H

F R I C T I O N

F O R C E

2 This data shows one Supercar's lap times over the first 7 laps of a race. Calculate the mean lap time.

The digit in the tenths place is the second digit in the code.

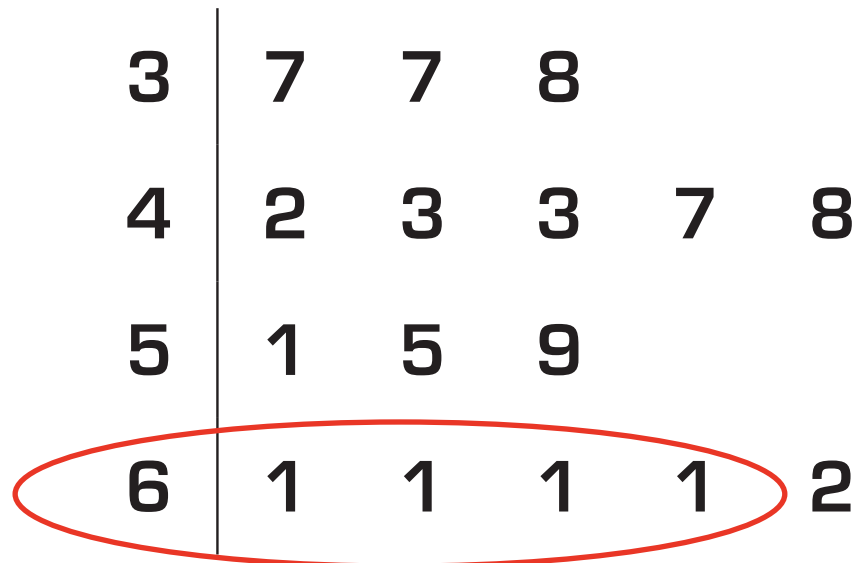
**Mean = 52.129, the 1 is in the tenths place.**

Lap 1	Lap 2	Lap 3	Lap 4	Lap 5	Lap 6	Lap 7
53.856	51.988	51.936	52.554	52.168	51.755	50.643

3 This stem and leaf plot shows the temperature taken inside a Supercars car at regular intervals during a race.

The number of times the temperature was recorded at 61°C is the third digit in the code.

**61°C was recorded four times.**



Key 5 | 1 = 51°C

4 The radius of this Supercars wheel is 336mm. Use the formula  $C = 2\pi R$  to work out the circumference of the wheel.

Round the circumference to the nearest meter to find the fourth digit in the code.

**Circumference =  $2 \times 3.14 \times 336 = 2.110\text{m}$ , round to 2m.**



**R = 336mm**



- 5 If the Bathurst 1000 race starts at 11:15 AEST and people watching the race in Perth see the cars cross the finish line at 15:35 AWST, how long did the race take?

Round to the nearest hour to find the fifth digit in the code.

**The race started at 9:15 AWST, it lasted 6 hours and 20 minutes, round to 6 hours.**

- 6 A Supercar starts a race with 133 Litres of fuel. It needs to stop to refuel after 60 laps. Use the formula,  $\frac{F}{l} = x$  where F = fuel and l = laps to find the number of litres the Supercar uses per lap (x).

Round the answer to the nearest whole number to find the sixth number of the code.

**133 ÷ 60 = 2.22, round to 2.**

- 7 Read these statements about types of energy involved in a Supercars race. Fill in the blanks to complete each statement.

The highlighted letters need to be rearranged to form the seventh digit in the code.

**The highlighted letters spell out the number eight.**

1. Chemical energy is the primary source of energy in a Supercar. It is stored in the **F U E L** which undergoes a chemical reaction to release energy.
2. Mechanical energy is generated by the Supercar **E N G I N E ' S** pistons and crankshaft.
3. Electrical energy is stored in the Supercar's **B A T T E R Y** which is used to power the ignition and electrical systems.
4. **K I N E T I C** energy is the energy that results from the mechanical energy from the engine allowing the Supercar to move.
5. Thermal energy is created in the form of **H E A T** produced by the Supercar engine's combustion as well as friction in its moving parts.



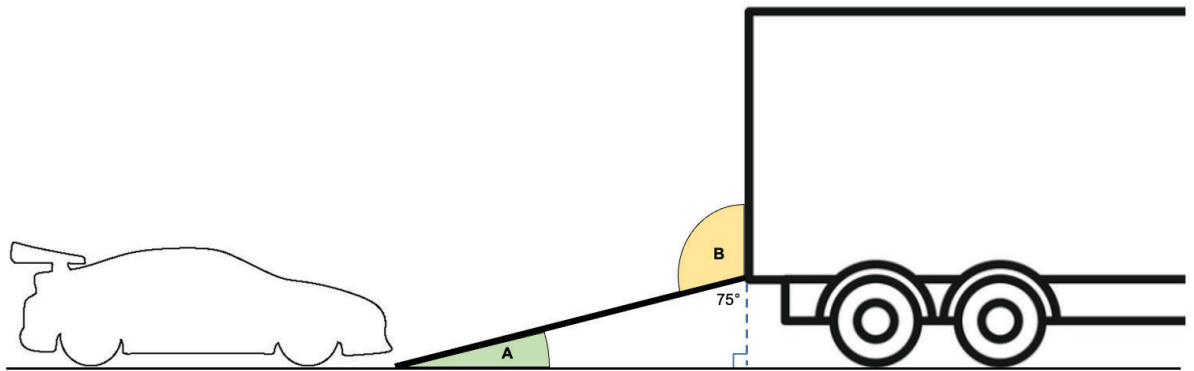
- 8 Review the diagram below. Calculate the size of both angle A and angle B.

Add angle A to angle B, then divide the total by 20 to find the eighth and final digit in the code

Angle A is calculated by the formula  $180 - (75 + 90) = 15$ .

Angle B =  $180 - 75 = 105$ .

$105 + 15 = 120$ .  $120 \div 20 = 6$ .



# ESCAPE THE SUPERCARS GARAGE RECORDING SHEET

STUDENTS  
ON TRACK 

1st Digit

7

2nd Digit

1

3rd Digit

4

4th Digit

2

5th Digit

6

6th Digit

2

7th Digit

8

8th Digit

6







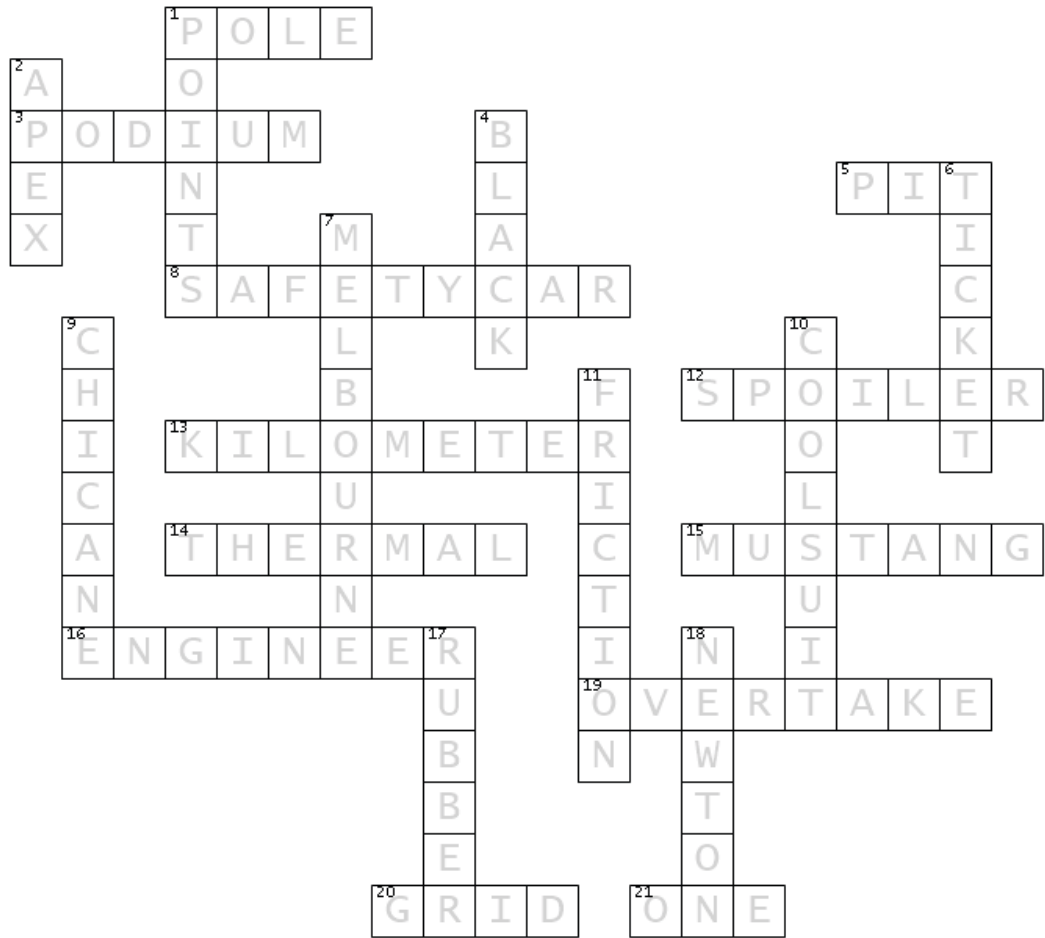
# DESIGN YOUR OWN SUPERCAR!

Use this page to draw your design. Label the features that improve its speed, performance and safety.



# SUPERCARS CROSS WORD PUZZLE!

STUDENTS  
ON TRACK

## ACROSS

1. Starting position at front of grid.
3. Place where top 3 race finishers collect awards.
5. Place to refuel, change tyres.
8. Comes onto the track after an incident.
12. Adds downforce to a Supercar.
13. Unit used to measure length of race track.
14. Type of energy that produces heat.
15. Ford model, free-roaming horse.
16. Person skilled in working with vehicles, machinery.
19. Pass another car during a race.
20. Formation of Supercars at start of race.
21. Number of people in a Supercar during a race.

## DOWN

1. Awarded to drivers for finishing in top 10 of a race.
2. Point on a turn where Supercar is closest to the inside of the track.
4. Colour of flag used to indicate a driver penalty.
6. Spectators need this to watch the race.
7. City where Sandown 500 takes place.
9. Sharp double-bend in a race track.
10. Special suit worn by drivers to keep cool during race.
11. Contact force between tyres and track.
17. Material that Supercar tyres are made of.
18. Unit that forces are measured in.

# SUPERCARS SPOT THE DIFFERENCE!

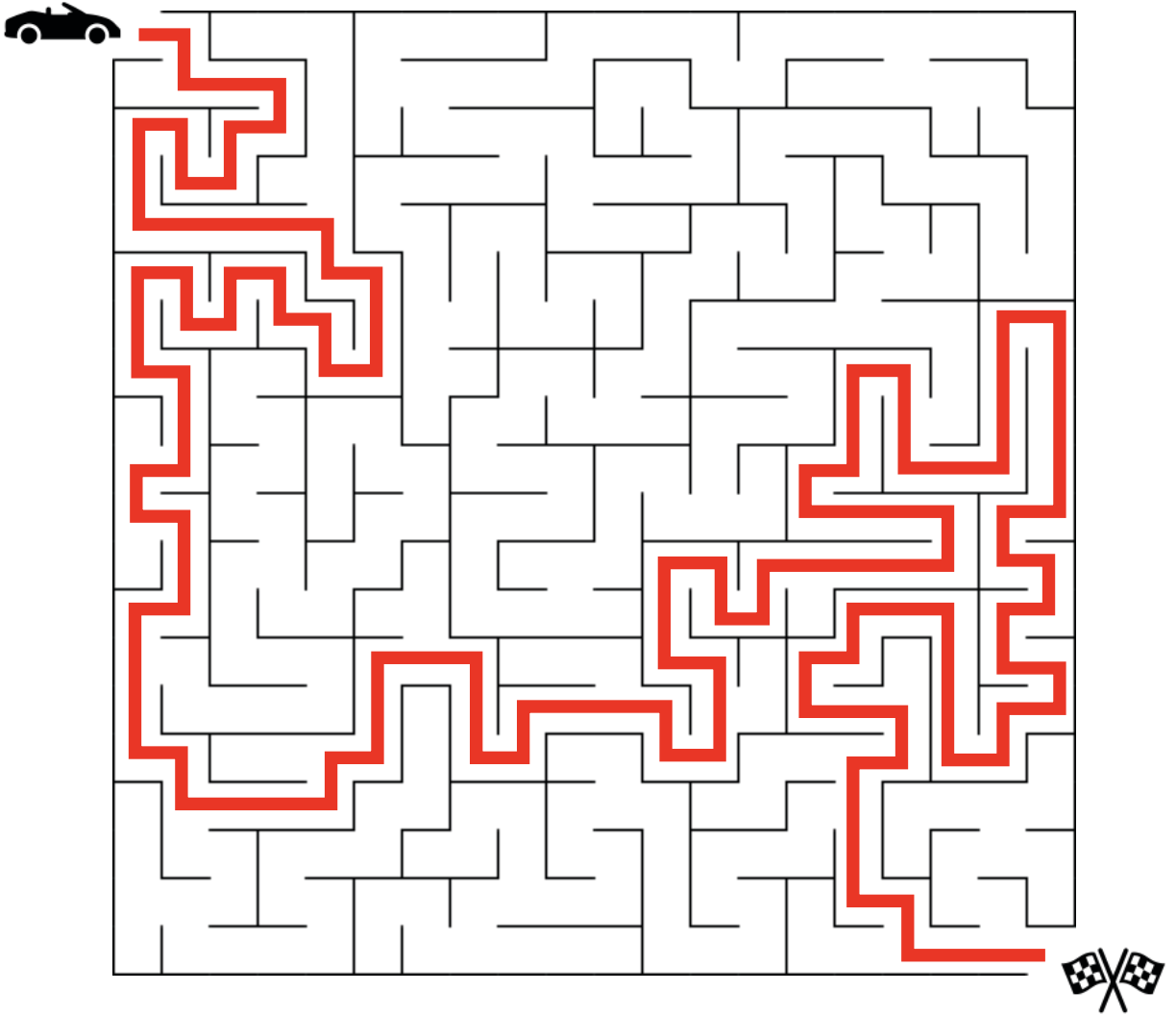
There are 10 differences to find between the two photos.

STUDENTS ON TRACK

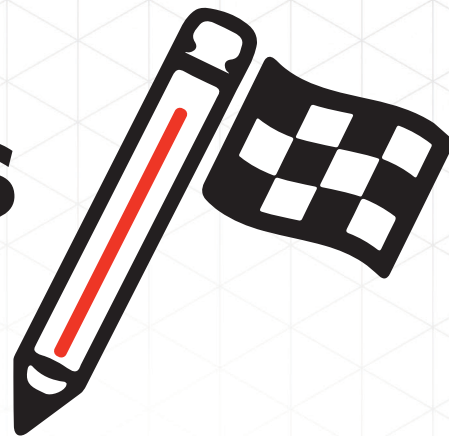


# CAN YOU FIND YOUR WAY THROUGH THE MAZE TO THE FINISH LINE?

STUDENTS  
ON TRACK



# STUDENTS ON TRACK



[SUPERCARS.COM](http://SUPERCARS.COM) #REPCOSC

