Samuel Allsopp
Primary & Nursery School

MEDIUM TERM PLAN

TERM: Autumn 2		YEAR GROUP: Year 4	SUBJECT: D&T mechanical systems: Making a slingshot car
WEEK 1 **DATE: 04.11.24** L1: Chassis and launch mechanism	**WEEK 2** **DATE: 11.11.24** L2: Designing the car body	**WEEK 3** **DATE: 18.11.24** **L3: Making the car body.**	**WEEK 4** **DATE: 25.11.24** L4: Assembly and testing
LO: To build a car chassis **Success Criteria:** I understand that car designs have developed over many years. I know that a chassis is the frame of a car on which everything else is built. I know that all moving things have kinetic energy. I know that kinetic energy is the energy that something (an object or person) has by being in motion, e.g., the energy that a swing has to keep moving; any object in motion uses kinetic energy. **Main Event:** Demonstrate building the chassis of the car as demonstrated in the *Teacher video: Chassis and launch* mechanisms (see Watch). You could show *Pupil video: Chassis and launch mechanisms* (see Watch) to demonstrate to the children how to make their chassis. Emphasise that they are making the chassis not the body of the car (as that will be made in the next lesson). Emphasise safety issues surrounding the glue gun, elastic bands, and classroom behaviour. PVA glue can be an alternative if you are uncomfortable with glue guns; more time will be needed to allow it to dry. Give the pupils the rest of the lesson to make their chassis to test in the ''Wrapping up' section of *Lesson 2: Designing the car body* when the glue will have fully dried.	LO: To design a shape that reduces air resistance. **Success Criteria:** I can design a suitable car body to cover my chassis by: Drawing a net to create a structure from. Choosing shapes that increase or decrease the speed of the car as a result of air resistance. Adding graphics to personalise my design. **Main Event:** Demonstrate Show the class your demonstration car. Tell the children that their car's body will be made similarly to those in previous 'structures' projects – using card, nets, tabs and glue. Tell the children that they'll be making their car panels out of nets that they will design this lesson and create next lesson, so they need to bear this in mind when creating their designs and be aware of any design limitations. To see how how the car panels are made, see the Teacher video in *Design and Technology, Mechanical systems, Making a slingshot car, Lesson 3: Making the car body* (see Watch). Finally, as a class, brainstorm some examples of race car graphics that children can apply after they have designed the shape and draw these on the board. The children's ideas might include numbers, flames, and images from famous cars or films. Design	LO: To make a model based on a chosen design **Success Criteria:** I can make the body of my car by: Remembering that nets are flat shapes that can be turned into 3D structures. Measuring, marking and cutting the panels (nets) against the dimensions of my chassis. Including tabs on my net so I can secure them to the panels of my chassis Decorating the panels. **Main Event:** The children have the lesson to create all the panels and apply the graphics to them, either by drawing designs and colouring them in or by glueing different coloured paper/card onto the panels. **Support** Might need help to draw around their car chassis. **Challenge:** Will work independently and should be creating sophisticated car body designs.	LO: To assemble and test my completed product. **Success Criteria:** I can assemble the panels of the body to the chassis correctly. I can remember that smaller shapes create less air resistance and can move faster through the air. I can evaluate the speed of my design based on the understanding that some cars are faster than others as a result of the following: • Body shape. • Stored energy in the elastic band. • Accuracy of the angle in the chassis and axle.` **Main event:** The children need to assemble their completed car bodies and attach these to the chassis they made in lesson 1. Tidying up and instructions The children tidy up the classroom and prepare the space for the time trials. The trials are best conducted in small groups of four – explain to the children how to carry them out and record the results using the *Activity: Time trial and evaluation sheet*. Time trials The children should carry out the time trials in their groups and record the results. If there is a longer time then hold different competitions; for example, the best graphics, the furthest distance travelled, the straightest line travelled, etc. **Support:** Will need more assistance with glueing the pieces of the body together and to the chassis. They might need

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Support: For pupils with poor working memory, use slides 6-11 in the *Presentation: Slingshot cars* as a step-by-step visual progression. **Challenge:** Can understand the benefits of adding extra reinforcement bars across the chassis – and explain how they are of benefit. Although, counter this positive with the fact that too much added weight might slow their vehicle down.	Ask the children to identify five design criteria for their car bodies based on the design brief specified in *Lesson 1*: '*To make a self-powered 'Slingshot Car', including the design and construction of the car body, to race against those of my classmates'.* Decide on one or two of these as a class, such as: It must not slow the car down It must fit securely onto the chassis It must have a fun/ bright/engaging design Ask the children to communicate their design ideas by drawing the car bodies on the *Car Body Design Template* in 2D from different angles (front, bird's eye and side view). Bird's eye view means from above, or from a high angle (as if a bird in flight would see). The children should also include graphics and label additional features in their designs. **Support:** May need support to apply air resistant shapes to their car. **Challenge:** Will apply their understanding of reducing air resistance to create a car shape that will travel faster.		further prompting to identify why some cars are faster than others. **Challenge:** an also test other aspects of their design, such as: Testing it over a bumpy track, i.e.: over a single layer of corrugated card. How straight a line it travels in (if the axle/chassis isn't straight, it will travel in a curve). How far it can travel.