

Engineering challenge – Building a model car

Challenge

The eRally team has asked you to design and build a scaled, working prototype for a rally car. Your design should be focused on high performance and your prototype should be able to travel along a track that will test the car's: speed, safety (roll cage), landing after a jump, ability to cope with different terrain.

There are some constraints which you must meet:

Like all rally cars, your final design must have four wheels and should hold a driver and navigator. It should be powered by a battery and include circuitry which performs one of the following functions: turning lights off and on, allows the car to be switched to reverse.

Your design should be limited to the resources provided but modifications are allowed.

The car will roll tested to assess the strength/safety of the frame.

It does not need to resemble traditional rally cars in terms of body design. Creativity is welcomed in this area.

It does not need to incorporate steering because the track will not include any corners.

Challenge stages

The challenge is divided into a number of stages. Before your final presentation, you and your team will:

- Draw upon your research into rally cars
- Apply your knowledge of batteries and circuits
- Be responsible for planning and carrying out a number of experiments/tests
- Record the results of these experiments/ tests and use this knowledge in designing your car
- build a working, scaled model of your prototype
- gather a portfolio of your work which could include, photographs, sketches, videos and notes

You will then create and make a presentation to the eRally team who have commissioned you to outline your design and demonstrate your model and explain what you have learned (see challenge presentation below).

Testing and Competition

- The class will come together to design a test track. _Points to consider are:
- length of track, gradient of slopes, different type of surface
- Aspects will affect the speed of the car could include:
- weight: construction and material
- friction, tyre types,
- Ability to handle different terrain for example, sand, gravel, water, ice, oil,
- a jump
- circuit design
- Awards will be presented for different aspects of the challenge. These will be based on success criteria which will be discussed at the beginning of the project.

Challenge presentation

- In addition to fulfilling the brief and testing your car, your team needs to submit evidence to the eRally team so that they can understand the design behind your concept.
- This evidence will include
- team name, team members and roles
- information on planning
- sketches of Initial ideas
- photos/videos of team work during prototyping
- video of test runs
- documentation of improvements
- team reflection based on skills, learning and working together