



Using the British Schools Karting Championship as a vehicle for STEM club learning

Entry into the British Schools Karting Championship is a highly effective and motivational vehicle for STEM club activities. With entries opening for the championship in September, the racing starting in January and the finals at the end of March, the opportunity to undertake extended STEM study into Karting and Kart driving is clear.

The following programme of STEM study is recommended:

STEM Club Session	Activity/ Study Area	Content	Practical Activities
1	What is the BSKC?	Analysis of the rules of the competition Makeup of the team Location of the regional heats, semi finals and finals Organisation and planning required to compete Cost of competing analysis	Mapping of journey required to compete to the finals Cost analysis of total cost of competing
2	The difference between Karts and road going cars	Size Form Function Properties and Uses Suspension and comfort Safety Considerations	Internet research for properties/ uses and design considerations of cars and karts Production of Safety rules for Kart drivers and spectators
3	Types of kart and their uses	Evaluation of the different types of kart available in the UK Analysis of top speeds, engine sizes and types of circuits raced on	Internet research of Karts types Database production of kart types, specifications, engines and top speeds Mapping of local, regional and national kart centres
4	Chassis design	Standard kart chassis design Chassis flexing to allow bump control Seat and engine fixing Methods of construction and manufacture	Demonstration of pipe bending, metal jointing Testing of tube flexing Design of seat fixings
5	Steering design	Evaluation and analysis of kart steering design, including mechanism, steering arms and mounting	Experiment on effects of changing the length of a steering arm on the “speed” of the steering Experiment on the effects on required strength of changing the diameter of the steering wheel
6	Unwanted Friction - Axles and Bearings	Study of methods and structures to reduce the friction within the drive train and mountings	Experiment of friction produced between axles in tubes and bearings Experiment of the effect of oil and grease in reducing friction
7	Necessary grip - Tyres and cornering	How do tyres work? Which tyres do what in corners?	Experiment on friction produced between rubber and different types of road surface Analysis of cornering effect on tyres
8	Motors	The internal combustion engine – 2	How a motor works



		stroke and 4 stroke	The difference between four and two stroke engines Gearing the output to be most effective
9	Coping with circuit bumps	Chassis flexing in action	Analysis of how the chassis flexes to enable better cornering Tyre pressures and the effect on coping with bumps
10	Driver safety – helmet design	The structure and purpose of a crash helmet	Analysis of different designs of helmet Analysis of the properties of different materials used to make helmets Evaluation of the data and information available with helmets
11	Driver safety – racing suits	Fire and abrasion proofing	How fire proofing works – Nomex vs. Proban Experiment – testing the ability of a material to cope with abrasion
12	Lap times analysis and what information it generates	Analysis of lap information, segment times and overall speed calculations	Calculations of lap times and segments from Formula 1 data
13	BSKC race information analysis	Analysis of data from the previous year’s BSKC finals	Calculation and analysis of speeds and lap time data from the previous year
14	Skills, abilities and strengths needed to drive well	Strength Stamina and reaction times	Evaluation of the relative level of strength required to drive a kart Why stamina is essential The need for fast reactions
15	Human reactions – testing	Testing and analysis of reaction times	Experiment – measurement and evaluation of reaction times using computer reaction tester or metre ruler
16	Human reactions – improving	Methods and strategies used in improving reaction times	Evaluation and testing of training based reaction improvements Discussion on the use of drugs and chemicals that change reaction times
17	Hydraulic Systems	How hydraulic systems work	Experiment on transmission of pressure through a liquid Analysis of where hydraulic systems are used in industry
18	Braking Systems	Design and use of different braking systems	Review of the different braking systems on a bicycle, car and kart Analysis of the stopping force required for each
19	Forces and motion – improving acceleration and braking	Newton’s laws of motion	Experiment and discussion on forces and acceleration
20	Forces during motion – cornering and its effect	G forces in corners Circular motion	What g force really means Finding the centripetal force required to make a mass rotate in a circle
21	Evaluating our performance	Celebrating our successes and planning for improvement	Analysis of performance against target Identification of improvements needed in order to win the next year