



# The Annual Science & Technology Competition 2023-24 Marble roller-coaster run-off challenge

## Design Brief

1) The aim is to design and make a **roller-coaster for a marble** capable of enabling the marble to run-off as it exits the roller-coaster. The focus is on:

- \*The number of turns within the roller-coaster (see detail below)
- \*Directional focus as it exits,
- \*Ability to enable the marble to run-off as far as possible,
- \*Re-usability after each 'ride'.

2) The marble roller-coaster must be self-assembled and we encourage the use of **recycled items**. Commercially made marble run parts will not be accepted nor will any form of remote control. Parts of construction kits i.e. Lego Technic, Knex, Meccano may be used.

3) The number of turns required are stated as a minimum as follows: minimum of **4 turns for KS1 (Years 1 and 2)**, minimum of **5 turns for LKS2 (Years 3 and 4)** and minimum of **6 turns for UKS2 (Years 5 and 6)**. If you work in a team where the members are from different key stages, you need to focus on the number of turns for the eldest child and enter your roller-coaster for that category.

3) The marble roller-coaster should start with the marble being dropped/placed in and enable the marble to run-off as it exits as far as possible in a (generally) forwards projection.

- 4) The finished marble roller-coaster (including the base) must **not be**:
- a) Longer than 50 cm.
  - b) Wider than 50 cm.
  - c) Higher than 50 cm.

Some possible methods for creating the marble roller-coaster might be:

- Straws to form a track.
- Kitchen roll/toilet roll innards, possibly cut in half.
- Egg boxes or fruit cartons to make corners/turns.
- Pencils to form a track.
- Knex or Strawbees to form a track,
- Any other safe method.

5) The marble roller-coasters will be placed on the starting line on one of two lanes (1m wide) laid side by side. The lanes will be made of jigsaw floor tiles to create some friction as the marble exits

the rollercoaster. The sides of the lanes will be higher than the marble ensuring that as the marble is released from the roller-coaster, it will run along the side of the lane so its 'run-off' distance can be measured (in a forwards direction). Access to the school hall for testing and for the heats, prior to competition week, will be arranged.

### **Layout of the Course and Scoring**

6) The layout and dimensions of the course (plan view) are shown on the attached diagram **Figure 1**. Please study this carefully. Each lane is 1m wide and separated by a central reservation. The marble roller-coaster must be reusable (no long periods of repair will be permitted before its next run.)

7) If the marble doesn't get released from the roller-coaster then it will not score points on that run.

8) The prime aim is to ensure that the marble runs-off as far as possible – with general straight line distance being measured from the start line. In the heats, each team will have one practice run and three scored runs. The most successful run of the three scored runs (i.e. the one where the marble travels furthest from the start line) will be regarded as the 'score' for that marble roller-coaster. The team can opt to make fewer runs if they wish to preserve the life of their roller-coaster. In the event of a tie, the roller-coaster with the most consistently high scores will win (i.e. the highest average).

9) The 'score' will be calculated in centimetres as the distance that the marble travels along the floor after exiting the roller-coaster. The distance will be measured in a straight line from the start line regardless of the angle that the marble exits its roller-coaster.

10) Children may work as individuals or **groups of up to six** in the design and manufacture of their roller-coasters. Only two members of the team may operate the roller-coaster for each go.

11) All children have received an initial briefing from Miss Bussey & Mr Sawford in an introductory assembly.

12) Miss Bussey's/Mr Sawford's decision on entry qualifications is final.

13) The **heats** will be held in the week beginning **Monday 4<sup>th</sup> March 2023**.

14) **The final** will be held on **FRIDAY 15<sup>th</sup> March 2023**. In the finals, each roller-coaster will again be offered one practice run and then three test runs – with the highest scoring run counting. Finalists may repair damage to their roller-coasters (2 minutes only), but re-building or major modification will not be permitted on the day. **So strength is key!**

15) Parents of the qualifying entries will be invited into school for the final. In the heats, I am sorry but there will not be room for spectators.

16) There will be a **winning roller-coaster** for UKS2, LKS2 and KS1. A special prize will also be awarded for the **most ingenious roller-coaster** in each phase of KS2. This part of the competition will be judged by our esteemed judging panel. A prize for the **most aesthetically designed and finished roller-coaster** across all of the phases will also be awarded, judged by students from the West Bridgford School.

May I take this opportunity to wish you every success with your entry. I look forward to seeing the roller-coasters in action. Happy designing and happy building!

Miss Bussey and Mr Sawford