

**Roller Coaster Exploring Engineering Challenge**

**Shopping List per class of 30-32 pupils**

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| **To be bought/printed/requested /gathered** | **ordered** | **delivered** |
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| **In advance**  |  |  |
| Group students with a mix of gender/ability  |  |  |
| Tables are adjusted to accommodate teams of 4 students |  |  |
| Hall/open space booked at least for The Challenge so you have a wide flat space to test the roller coaster buggies (or long section of clear floor space, at least 3m) |  |  |
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| **Introduction (Session 1)** |  |  |
| USB pen with all Roller Coaster Challenge ppts on it |  |  |
| 35 Civil Engineers Make My Day cards from Rochester Bridge Trust. Request how many you need to be sent to you at education@rbt.org.uk  |  |  |
| Toilet roll tube |  |  |
| Small length of string |  |  |
| Selection of materials with different properties: eg a piece of sponge, a clear plastic bag, a piece of hard plastic/flexible plastic, a piece of elastic, a piece of foil or metal |  |  |
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| **PRE TASK 1 (Challenge 1)** |  |  |
| 2 packs of 30 Tech Card bases (so you have enough for demos and mistakes too): <https://www.ypo.co.uk/product/detail/510128>  |  |  |
| 1 pack of 180 mixed cardboard wheels with 6mm holes in the middle: <https://www.ypo.co.uk/product/detail/510133>  |  |  |
| 80 axles 6x100mm dowel (this allows spare in case some go missing) - For example 1 pack of this 6mm diameter wooden dowel will do for the axles and for the ramp rung (listed below):<https://www.ypo.co.uk/product/detail/533114> **\*** |  |  |
| 8 small pots of PVA with spreader (could be small amount in yogurt pot or old vitamin pot with lid and piece of thick card for spreading) PVA glue: <https://www.ypo.co.uk/product/detail/749125> |  |  |
| 32 paper clips |  |  |
| 8 reels of easy-peel double sided tape (to be used in Challenge too \*) |  |  |
| 8 reels of masking tape (to be used in Challenge too \*) |  |  |
| 8 Pritt Sticks (to be used in Challenge too \*) |  |  |
| 8 copies of ‘Roller Coaster Challenge Pre Task 1 Joining Methods Log.doc’ (handout) |  |  |
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| **PRE TASK 2 (demos in session 2)** |  |  |
| 8x 5m tape measures \* |  |  |
| 1 reel masking tape (to mark the start line on the floor) |  |  |
| 8 copies of ‘Roller Coaster Pre Task 2 Test Log.doc’ (handout) |  |  |
| Magnetic tape/small magnets (could be adhered to the demo buggy)[www.amazon.co.uk/Magnets-Assorted-Shapes-Strips-Fridge/dp/B00IJ7DL6Q/ref=sr\_1\_3?ie=UTF8&qid=1544697410&sr=8-3&keywords=assorted+craft+magnets](http://www.amazon.co.uk/Magnets-Assorted-Shapes-Strips-Fridge/dp/B00IJ7DL6Q/ref%3Dsr_1_3?ie=UTF8&qid=1544697410&sr=8-3&keywords=assorted+craft+magnets)  |  |  |
| Plastic syringe[www.amazon.co.uk/Plastic-Syringe-10ml-5-Pack/dp/B00CX6VVA2/ref=sr\_1\_3?ie=UTF8&qid=1544697423&sr=8-3&keywords=small+plastic+syringe](http://www.amazon.co.uk/Plastic-Syringe-10ml-5-Pack/dp/B00CX6VVA2/ref%3Dsr_1_3?ie=UTF8&qid=1544697423&sr=8-3&keywords=small+plastic+syringe)  |  |  |
| Ping pong ball or light weight ball |  |  |
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| **Making all the test rigs (Session 2)** |  |  |
| 1 copy of ‘Roller Coaster Challenge Test Rig Instructions’ |  |  |
| 16x pine 26x26x350mm (part A) |  |  |
| 8x pine 20x100x250mm (part B) |  |  |
| 8x wooden dowels 6x300mm (part C) This can be cut with sharp secateurs from the longer lengths listed above from YPO.**\*** |  |  |
| 16x size 4x50mm length countersunk screws (part D)[www.diy.com/departments/avf-yellow-zinc-plated-steel-woodscrew-dia-4mm-l-50mm-pack-of-200/255969\_BQ.prd](http://www.diy.com/departments/avf-yellow-zinc-plated-steel-woodscrew-dia-4mm-l-50mm-pack-of-200/255969_BQ.prd)  |  |  |
| 8 pieces of hardboard 3x185x640mm (Part E). Some hardware stores or small wood merchants will cut this for you from a large sheet of hardboard if you visit in person. |  |  |
| 32 pieces of rectangular section ‘Softwood Stripwood’ 8x20x300mm (part F). You could request in the shop that this is cut down to 300mm lengths: [www.diy.com/departments/smooth-stripwood-t-6mm-w-21mm-l-2400mm-pack-of-1/1793523\_BQ.prd](http://www.diy.com/departments/smooth-stripwood-t-6mm-w-21mm-l-2400mm-pack-of-1/1793523_BQ.prd) |  |  |
| 32 pieces of rectangular section ‘Softwood Stripwood’ 8x20x200mm (part G). You could request in the shop that this is cut down to 200mm lengths: [www.diy.com/departments/smooth-stripwood-t-6mm-w-21mm-l-2400mm-pack-of-1/1793523\_BQ.prd](http://www.diy.com/departments/smooth-stripwood-t-6mm-w-21mm-l-2400mm-pack-of-1/1793523_BQ.prd) |  |  |
| 96x panel pins 15mm length (part H)[www.diy.com/departments/avf-panel-pin-dia-1-25mm-l-15mm-125g-pack-of-731/247178\_BQ.prd](http://www.diy.com/departments/avf-panel-pin-dia-1-25mm-l-15mm-125g-pack-of-731/247178_BQ.prd)  |  |  |
| Sandpaper |  |  |

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| **Challenge (Session 3 and 4)** |  |  |
| 8x Tech card bases (as above – there will be spares) |  |  |
| Remaining mixed wheels from above |  |  |
| 16x axles 6x100mm dowel rods (as above) |  |  |
| 32 paper clips (reused from session 1) |  |  |
| Recycled cardboard materials  |  |  |
| Coloured card approx. 250 micron. For example: [www.ypo.co.uk/product/detail/136905](http://www.ypo.co.uk/product/detail/136905)  |  |  |
| Tissue paper. For example: [www.ypo.co.uk/product/detail/135727](http://www.ypo.co.uk/product/detail/135727)  |  |  |
| String  |  |  |
| Elastic bands. For example: [www.ypo.co.uk/product/detail/753696](http://www.ypo.co.uk/product/detail/753696)  |  |  |
| 8 tomatoes roughly the same size about 50-60mm wide |  |  |
| 1 copy of ‘Roller Coaster Challenge Test Log’ (handout) |  |  |
| Pritt Sticks, double sided tape, small pots of PVA, masking tape as used in session 1 /pretask 1 \* |  |  |
| 8x Ramps and stands built for session 2/pretask 2 above |  |  |
| 8x tape measures as used in session 2 \* |  |  |
| Access to basic class equipment listed above |  |  |
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| **PRESENTATIONS (Session 4)** |  |  |
| 35 Certificates (print some spare in case names are written incorrectly) ‘Roller Coaster Challenge Certificate’ (printout as whole page slides) |  |  |
| 6 Certificates for the winning team (2 spares) ‘Roller Coaster Challenge Winning Team Certificate’ (printout as whole page slides) |  |  |

**Tools you will need to make the ramps and stands:**

* Electric drill and 3.5mm, 4.5mm and 7mm drill bits
* Clamps such as G Clamps or sash clamps
* Electric screwdriver to fit the wood screws
* Hammer
* Sandpaper
* Sharp secateurs, a Tennon saw and bench hook or band saw