



KS4 Re-Inventing Wheels - Guidance for Students Activities

The following activities can be used for home learning. You can decide if you keep the activities in line with what you are completing in school or you can set this as a mini topic to be enjoyed at home with your family.

You are going to create a vehicle powered by elastic band(s) using sustainable and re-cyclable items.

1. Look at Resource 1 – STEM Vocabulary. This is to refresh your memory for some important words' definitions. Complete the matching exercise. You will need to use these words in some of the activities you will do later.
2. Type into YouTube 'constructing air powered cars' and 'constructing rubber band cars' Watch some of these YouTube videos, they may give you some ideas on ways to construct your vehicle.
3. Consider the shape of cars. Are they aerodynamically shaped? Write down how this can affect speed and distance travelled.
4. Draw a "bottle shape" in your book and list the features of the bottle and ideas you have which suggest why this shape is appropriate for a car. Use as many of the key words from Resource 1 as you can in your explanation.
5. Now list the components that their car will require if it is to successfully travel by elastic band-power!
6. Once you have made your list, sketch your car on paper (you may like to take up two pages in your book if you need lots of room).
7. You must remember that you are constructing your vehicle out of re-cyclable materials and it will probably look very different to the cars in the YouTube videos.

TIP: Provide measurements in your diagram: this will be helpful if you decide to construct your car from scratch using thin cardboard. Consider appropriate materials for each component part.

8. Now, go and seek out your materials! Here's where you may have to get really creative!

Below is a list which might inspire you, but the list is really endless. Please remember to check with the other people in your house that it's OK to use whatever you have selected.





Materials:

- Plastic bottle(s) – washing up liquid, shampoo etc
- Elastic bands
- Wooden BBQ skewers (you could use pencils or old paint brushes)
- Cocktail Sticks
- Bottle tops – metal or plastic
- Aluminium foil
- Old CDs
- Cardboard (of different thicknesses)
- Cardboard Boxes
- Paper
- Paper clips
- Dried pasta (hollow)
- Toilet roll tubes

Useful tools:

- Sellotape
- Blue-tac
- Glue-gun
- Pens
- Scissors

9. **Now for the bit you've been waiting for ... construct your car!**
This part will take you some time (maybe two hours!), but the more you plan, and measure, the easier this part will be.

10. **Once you've completed your vehicle... share your findings with either a willing member of your household or one of your friends via the internet. Things to consider might be:**

- What worked well
- What you found most challenging
- What could be improved upon
- How you adapted design or materials to accommodate needs
- How far you think their car will "travel"

11. **You will need to find a relatively smooth surface – ideally a kitchen floor or a hallway – you could use the top of a dining table. Now you can experiment with your car.**

Complete Resource 2 – Extension task. You may like to keep testing the distance your car travels ... see how far you can make it go. You could design a graph to display the distances travelled.

12. **Complete Resource 3 which will ask you to consider friction advantages and disadvantages.**





13. Your final task will be to create a new vehicle which has less friction than your car design – you may like to take some ideas from Resource 3 as inspiration.
14. When you have come up with your new design, complete Resource 4 – Less Friction.
15. You may like to get in contact with friends via Skype or Facetime and see their constructions – you could compare timings and see whose car goes farthest.

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