



WHAT THEY'LL LEARN

- Develop design ideas for functional products aimed at particular users
- Communicate ideas through annotated sketches and exploded diagrams
- Select from and use a wider range of tools and equipment to perform practical tasks accurately
- Create a simple circuit with a switch

Develop design ideas for a new wheelchair



David Baddiel's new book *The Taylor Turbochaser* can help raise awareness of people with disabilities, says **Abby King**

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David Baddiel's latest book, *The Taylor Turbochaser*, provides an ideal opportunity to investigate equality and disability in the classroom. The main protagonist, Amy, is a wheelchair user and car enthusiast who is craving a new design for her wheelchair. Asking the children to design and make a prototype for Amy's new chair gives them the chance to explore the needs and perspectives of people with disabilities.

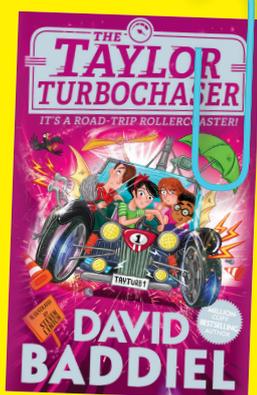


START HERE

Use the first two chapters of *The Taylor Turbochaser* as a hook into designing a new prototype for a wheelchair. Talk about the character of Amy and make a list comparing her old wheelchair with her new wheelchair.

Why is her new one better?

What features does it include? Ensure the children understand what wheelchair users need to support their mobility. If possible, invite a wheelchair user into the class to talk about their experiences. Use resource 1 (see Free resources) to support and extend the children's understanding. Be aware that this will require sensitive handling, particularly if you have any wheelchair users in the class.



MAIN LESSON

1 | FOCUSED PRACTICAL TASKS

Set up different stations around the classroom so the children can explore each element of their product. At the first station, ask the children to investigate making circuits with switches. Include two types of switches: paperclip/paper fastener switches and push switches, made with foil and cardboard (see resource sheet 2 for examples). The second station should be set up to investigate how battery-powered motors can make wheels move. Ask the children to explore how a wooden pulley and a rubber band might be attached to a circuit with a motor to make it

turn. This is the most complex task, so any adult support is best focused here. At the third station, give the children a range of different materials, such as wood, wadding, cotton, felt, plastic and card. Ask them to explore how the chair could be made. What are the benefits and downsides of using each material? If you've got an extra adult, you could also ask the children to practise their cutting and joining techniques for the wood they will use to make their chassis late in the lesson. At each station, ask the children to note down their ideas using resource sheet 3.

2 | DESIGN IT

Once the children have had a chance to explore the different processes, they'll be ready to design their prototype wheelchair. As a class, generate the success criteria for the chair, referring back to needs of

“Show the children an exploded diagram and model how to create your own designs”

wheelchair users identified at the start of the session. Ensure the children consider the ease of use, practicality, comfort and style elements of their design. Show the children an example of an exploded diagram and model how to create your own design. In pairs, ask the children to create and label each part of their diagram using resource sheet 4. They should use accurate measurements where possible, and make a list of the equipment they will need to make their product. Children who need a further challenge could be asked to justify their design choices, linking back to the success criteria established previously. Children who might need more support could be given a sheet to help them structure and record their ideas.

3 MAKE IT

When the investigation and design stages are complete, bring the children back together and discuss some of their ideas. During the discussion, allow children to refine their designs if needed, as this will offer support to those who need it and ensure the best possible end result. Talk about the steps needed for making the chassis with motor-powered wheels and remind the children about the design brief you created together. At this point, they'll be raring to go, so let them loose! Stop the children at various points if you need to model a particular skill. It can be helpful to train up a few 'experts' in making circuits work before the lesson to support other children if necessary. Make sure the children focus not only on the technical aspects of the design, but also how they are going to make it comfortable and stylish. Refer back to Amy's love of cars, for example, and ask the children to think about how they can incorporate that into their product.

Abby King has worked in KS1 and 2 and currently teaches at an inner-city primary school in Birmingham.

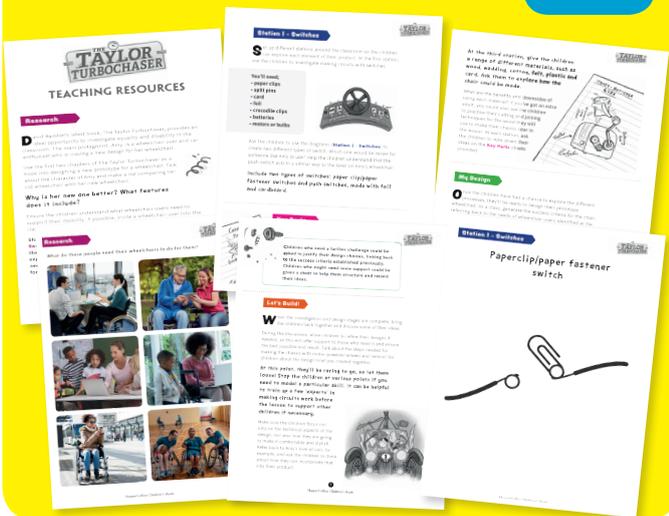
EXTENDING THE LESSON



- Ask the children to evaluate their prototypes using the success criteria established in the lesson. What was effective? What would you change if you did this again? If you're feeling adventurous, you could invite a wheelchair user in to give their feedback on the children's designs!
- Use this lesson as a starting point to explore other kinds of disabilities, including ones that can't be seen. Introduce the children to a range of books exploring disability and diversity, such as *Wonder* by R.J. Palacio and *Mockingbird* by Katherine Erskine. Ask the children to write a diary entry as if they were Amy, from *The Taylor Turbochaser* or a character from one of the other books.
- Investigate other types of equipment that disabled people might need and design and make prototypes for them using the skills learned in this lesson.

Free online resources

Download our free set of resources to help you deliver this lesson from [teachwire.net/turbochaser-plan](https://www.teachwire.net/turbochaser-plan)



USEFUL QUESTIONS

- What are the success criteria for our designs?
- How could we improve this part of the design?
- Why might your circuit not be working? How can you test the different elements of it?
- How could this work for a wheelchair user?