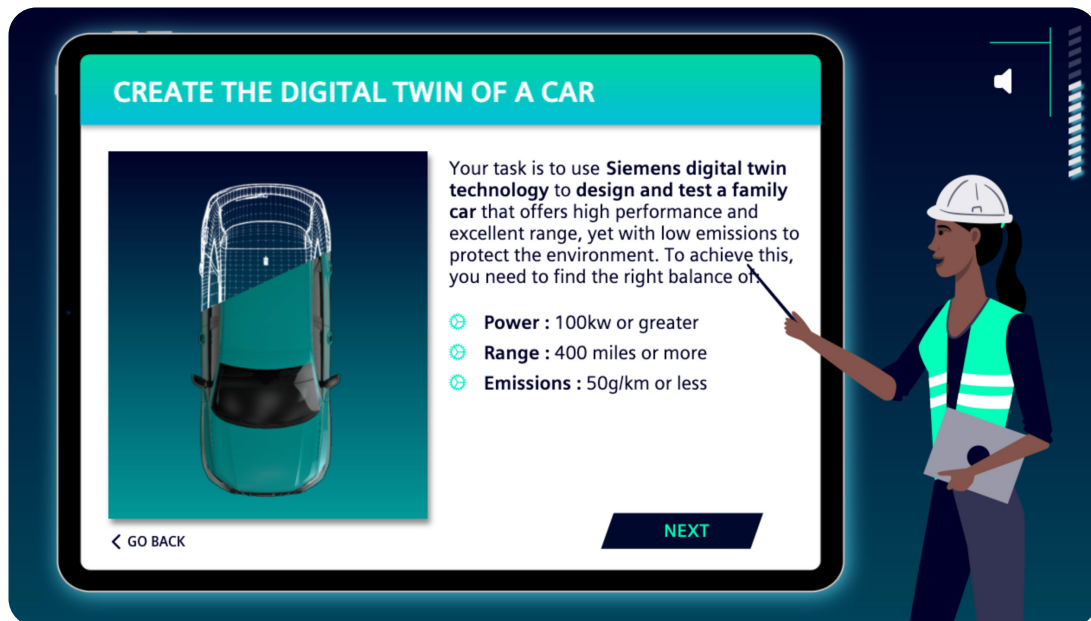
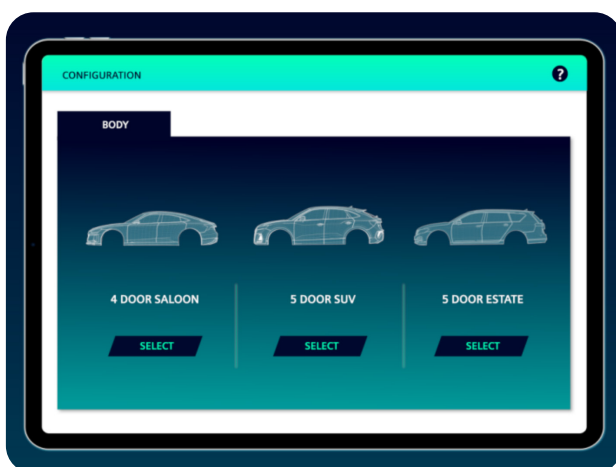


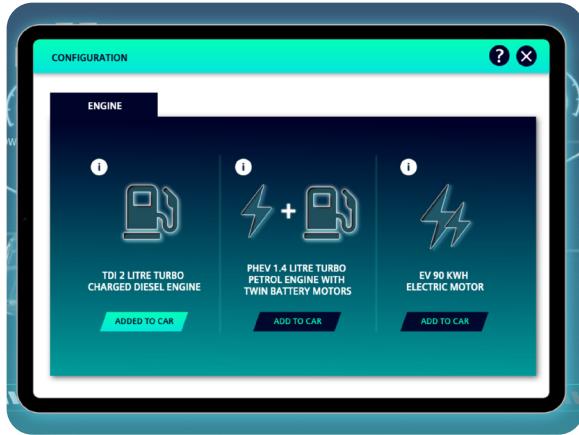
Digital Twins



You see here that the design engineers have a specification they have to work to. It tells them what they must try and achieve, but not how they should do it. That's their decision; they (and you) can use a digital twin to help.



Sometimes the factors in the specification will influence the design in different ways. For example, making a car more powerful is relatively easy and reducing the emissions can usually be achieved but doing both at the same time is trickier. Being able to explore options and combinations easily and quickly is important. Using a digital twin is important because it can save money by reducing the need for expensive physical prototypes and it's also more sustainable. This means it can help reduce waste and energy use, which is better for the environment.

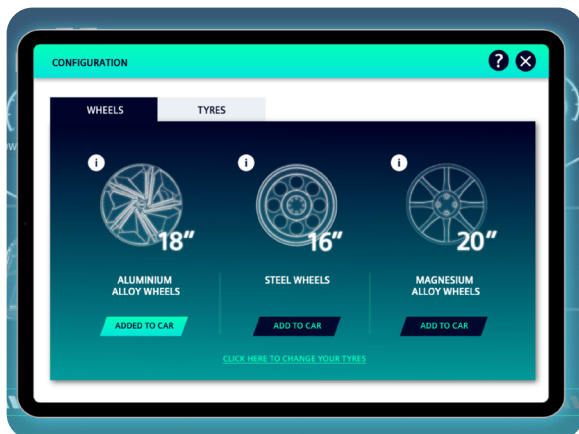


1

A choice you can make using the digital twin is the body. Look at the options and suggest which of the key factors of power, range and emissions you think might be affected by changing the body style.

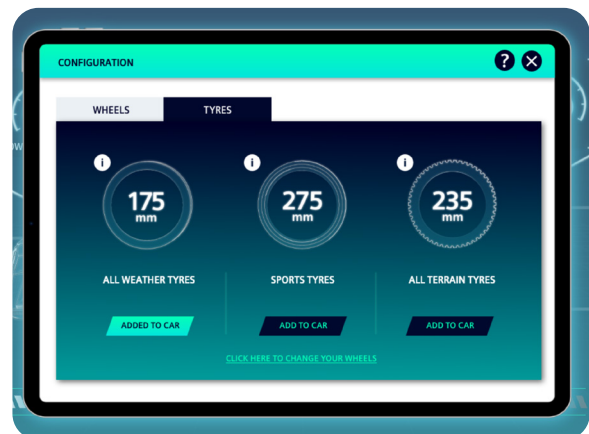
2

The engine choice will also make a difference. Suggest how this decision might affect each of the key design factors.



3

You can also change the wheels and tyres. Suggest how each of these might affect how well your design meets the design factors.



4

You have now had an opportunity to explore what digital twins are and how they are used. Suggest why it is that so many design teams now use digital twinning in their work.

5

This process only works if the digital twin is an accurate mimic of the real object. Suggest why car designers are still likely to build a full-size working prototype of a new car before it goes into production.

**Why this technology is important:**

Digital twins eliminate the need for physical prototypes, reduce development time and improve quality by combining multi-physics simulation, data analytics and machine learning to demonstrate the impact of design changes, usage scenarios, environmental conditions and other variables.

Digital Twins are used in many ways:**Manufacturing**

Digital twins of manufacturing processes and equipment can optimise production schedules, predict equipment failures and improve overall efficiency.

Smart cities

Digital twins of urban infrastructure, such as transportation networks and utilities, can enhance traffic flow, manage energy consumption and enhance public services.

Healthcare

Digital twins of patient physiology and medical devices can support personalized treatment plans, monitor health metrics remotely and simulate surgical procedures.

Energy

Digital twins of power plants and renewable energy systems can optimize energy production, predict equipment failures and manage grid stability.

