# Lesson 20 – Smart Robotics Project Mechanical Engineering

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Understanding the basic principles of engineering and properties of the materials which we use | * Begin to understand the key principles of mechanical engineering * Identify the materials to develop our self-driving car * Take into consideration the safety of the occupants and pedestrians in the material choices * Choose materials for wheels taking into consideration friction and grip |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Lots of opportunities to research here * Lots of opportunities to feel different materials and explore their properties | **Expected Progress:**   * Learners can discuss the key principles of engineering   **Good Progress:**   * Learners have experimented with different materials for the use as wheels   **Exceptional Progress:**   * Learners are able to confidently present their ideas and discuss the ethical issues related to material choice and recycling |
| Key Concepts | Key Words |
| * Material properties * Recycling * Friction | * Engineering * Material * Source & Origin * Composite * Properties * Friction * Thrust * Resistance * Torque * Product Life * Disposal * Recycling |
| Differentiation | Resources |
| Some Learners will struggle to grasp the negative impacts of recycling | * Lesson 20 ppt * Lesson 20 Activity Sheet * PC * Internet Access * Access Make Code * Materials for wheels * Range of materials and adhesives |
| Lesson Flow | |
| * Share objectives and remind Learners of the project aim * Discuss the importance of engineering and the link between mechanical engineering and the body design of the car * Categorise key materials, where possible have examples for Learners to look at and touch * Talk about different properties, give the Learners an opportunity to research the materials and their properties * Encourage Learners to consider the car’s occupants and pedestrians when considering the material the car is made from. * Discuss the properties of different fixing components and adhesive. Discuss the risks and dangers related to using certain type of glue * Discuss force and movement in relation to the car – talk about friction and reducing friction to make it easier to move but requiring grip to apply torque to the wheels * Experiment with different materials to make wheels of different sizes and from different materials * Get Learners to log the performance difference for the wheels they create. * Discuss product life span from both consumer and manufacturer perspective. Use the Apple battery scandal as an example * Discuss disposal of waste and recycling. Ensure both negative and positives are covered. Use the Daily Mail or a YouTube video to highlight dangers of transporting waste to Africa for unsafe disposal * Get some Learners to present their findings to the group | |
| Making | |
| * Wheels from different materials | |