Daisy Mechanical Engineering: Model Car Badge

Pillar: STEM
Outcomes: Strong Sense of Self

When you've earned this badge, you will know what mechanical engineers do, like brainstorming and designing things. You'll know how to build something, test it and make it better. You will also learn about the kinds of things engineers make and understand scientific ideas like force and friction.

Daisies will earn their badge by:

1. Design and build model cars. Engineers have been creating cars for hundreds of years – now it's your turn!
    a. Get prepared to become an **engineer**! An engineer is a person who designs and builds things people use every day like computers, phones, roads, bridges and cars. Click on this link to learn more about types of engineers.
    b. When designing an item, engineers get together and **brainstorm.** That means they try to think of any possible new ideas and the best way to solve those ideas. Watch this video to learn how to brainstorm.
    c. Features are parts of a product that are designed to make them more useful. For example, windshield wipers or the CD player/radio are common features of a car. What kind of features would you like your car to have? Brainstorm with an adult.
    d. What are some ways you and your family use a car? What kinds of cars do you see often? Take some time to brainstorm with your family what materials you want to use to build your miniature model car. Then, get your supplies together and begin building your model car!

2. Use model cars to test the friction of different surfaces. Engineers always test their inventions to understand how they work in different situations.
    a. **Force** is the strength or energy that creates movement. Push and pull are examples of force. **Friction** is a force that slows down movement and happens when two surfaces move across each other. Watch this video to learn more about force and friction.
    b. When an engineer builds a model of their product, they make a **prediction** of what will happen when they test the model product. It's important to test only one thing at a time and test all the inventions the same way to be sure the test is fair. What prediction(s) can you make about what will happen when you test your model car? How do you think different surfaces will affect how fast your car goes? Test your model car on different surfaces and see how friction affects the movement of your car. Use this worksheet to keep track of your experiment.

3. Race your cars!
    a. Race your car against other items or people in your house! If you want an extra challenge, you or another house member can build another model car to race against your car! Try racing on different surfaces to see which car moves the best.
    b. Now try using ramps to see how gravity affects the speed of your racecar. **Gravity** is a force that pulls everything towards the center of Earth. Use this worksheet to test this experiment out several times.

Additional online resources:

- Daisy Pinterest Board

When you're finished: Congratulations, you have earned your badge! You can purchase by emailing shopdept@gsksmo.org or at https://www.girlscoutshop.com/Daisy-Model-Car-Design-Challenge

No shipping charges apply at this time.