TEACHER'S RESOURCE PACK
KS3: AGES 11 TO 14

Use this pack alongside our **MAD Museum Activity Pack: KS3, Marvellous Minds** to enhance your pupils' learning experience **during** and **after** your visit to **The MAD Museum**.

Together, both packs cover **physics, design and technology,** and elements of **art** and **design**, with ideas on how to bring these subjects to life in the classroom.

DURING YOUR VISIT

Make sure each pupil has a copy of pages 1 to 6 of our **MAD Museum Activity Pack: KS3, Marvellous Minds**. It's packed with questions about our exhibits to encourage your class to get up close to our creations, and to fully explore and understand how they work.

Ask your pupils to find examples of energy transfer in The MAD Museum other than the one in our LED Panel.
Set them a challenge to find examples of:

- **Sound energy**
- **Kinetic energy**
- **Potential energy**

DURING YOUR VISIT CONTINUED...

Invite your pupils to put what they've learnt about **energy**, **forces** and **motion** into action by making four types of marble runs on our **giant marble run wall**:

1. A run that allows a marble to build up enough **potential energy** to roll upwards for at least 3 seconds.

2. A run with a ramp and a gap in it, forcing the marble to jump the gap. **How wide can you make the gap before the marble runs out of energy?**

3. A run using sections which force the marble to change speed and direction of motion.

4. A run that releases marbles from different heights to see the effect this has on the marbles as they reach the end of the run. **Do they move faster or slower than the marbles that started lower down? Why?**

AFTER YOUR VISIT

Test your pupils' understanding of what they have learnt about forces and motion with a quick quiz. You could complete this quiz on the journey back to school. *(Answers on the left.)*

1. Which force always acts in the **opposite direction to the motion of an object**?
2. Gravity is a non-contact force – **true or false**?
3. Are the forces on a stationary object **balanced** or **unbalanced**?
4. Which type of friction acts on parachutes to slow them down?
5. Can you think of three ways to reduce friction?
6. A force is a push or a ____?
7. Force don't just change the speed of an object, they can also change its form – **true or false**?
8. Forces are measured in...?
9. Does air resistance on an object **increase** or **decrease** as its speed increases?
10. When two or more forces are acting on an object, it is known as **r_____force**.

QUICK QUIZ ANSWERS:

1. Friction
2. True
3. Balanced
4. Air resistance
5. By using lubricant or a smoother surface, such as ice, or by streamlining the object in motion
6. Pull. It can also be a twist or turn
7. True
8. Newtons
9. Increase
10. Resultant force

A roller coaster ride experiences the same energy and forces as a rolling ball machine. Ask your pupils to complete our **Engineer a Roller Coaster** challenge, completing all the questions on the sheet as part of the task. As part of the project, they will need to draw the roller coaster, describe it and understand the forces at play. As a further option, they can also design a poster to advertise it.

Introduce the project with a BBC KS3 video on designing a safe roller coaster: https://www.bbc.co.uk/education/clips/zfh8q6f