

# LIGHT RACER KIT

**BUILD YOUR OWN BIKE  
LIGHTS & HARNESS  
WIRELESS POWER**

**TECH  
WILL  
SAVE  
US**

## WORKSHOP GUIDE

The Light Racer uses an electromagnet field to light a bike light. Through this series of progressive 50 minute sessions using the Tech Will Save Us online MAKE platform, you will first explore magnets, then make the electromagnet that wirelessly powers the Light Racer!

**01 : INVISIBLE FORCES**

**02 : MAGNETIC FIELDS**

**03 : MAKE IT**

**04 : IMPROVE IT**

**05 : MAKE SOME NOISE!**

**06 : MATERIALS EXPLORER**

**07 : MAGIC EXPLORER**

**08 : PHOTOGRAPH IT**

Includes part of the  
[Uk Statutory Curriculum](#) :

YEAR 3 Magnets

**8+**



# SESSION OVERVIEW



## 01: INVISIBLE FORCES

Explore magnets. Observe how magnets attract or repel each other and attract some materials and not others. Identify everyday materials that are magnetic.

## 02: INVISIBLE FORCES

Explore magnetic poles. Understand that magnets have 2 poles, north and south. Use a magnet and iron filings to reveal the pattern made by magnetic fields.

## 03: MAKE IT!

Explore the components of the Light Racer. Understand that the light racer uses an electromagnetic field to light the LED. Make the Light Racer..

## 04: IMPROVE IT!

Explore how to change the brightness of the LED. Understand that coiling more wire on an electromagnet makes it more powerful. Add more coils to the Light Racer to make the LED glow brighter.

## 05: MAKE SOME NOISE!

Explore how Electromagnetic fields can affect other electrical devices. Understand how to change a component in the Light Racer. Make a Theremin style instrument.

## 06: MATERIAL EXPLORER

Explore which materials wireless power can travel through. Understand how wireless power can travel through some, but not all materials. Conduct an experiment and record the results.

## 07: MAGIC EXPLORER

Explore wireless power's ability to travel through wood. Understand how this can be used to create an illusion. Create a magic show and perform to your friends.

## 08: PHOTOGRAPH IT!

Discover what an electromagnetic field looks like. Understand how far it can reach. Photograph or draw an electromagnetic field.



The Light Racer is a wireless light that teaches children about electro magnets and wireless energy. Through Makes, which are online step by step tutorials on the Tech Will Save Us Make platform, children will experiment with building the Light Racer and changing how the Electromagnet works. Once confident, they can even use it to perform a magic trick! We have included a few introduction to magnets sessions which cover some aspects of the UK STATUTORY CURRICULUM : YEAR 3 MAGNETS. If you choose to use them, these can act as useful way to start talking about magnetism and the Electromagnetic field.

Click on the images in the lesson plan to access the Makes directly

[make.techwillsaveus.com](https://make.techwillsaveus.com)

## Make Account

All Makers can set up their own free Make account to help them track their making progress.

## Design, Make, Evaluate

These STEAM sessions (Science, Technology, Electronics, Art, & Maths) look at the way electro magnets are constructed. Through a cycle of scientific exploration, making, and evaluation, participants will go through the steps of using the Light Racer in different ways. We provide all the activity sheets for your group to use.

## 21st Century skills

Creativity, collaboration, resilience and problem solving are all set to be highly valued and we have tried to include these in the sessions wherever possible. We celebrate risk taking and failure as much as success. Through tasks that can be carried out on pairs and give enough scope for creativity and collaboration, participants will get the opportunity to flex these skills. We have even included group questions to stimulate inquisitive minds.

## Resources

Every session requires that Makers have access to:

- Clear workspace
- Light Racer Kit
- access to a communal screen or a shared tablet to follow the Makes.

Additional resources needed are listed at the bottom of each session.

KEEP THE LIGHT RACER BOXES, they can be used to store students work between session!

## When things go wrong...

We embrace the fact that Making and coding can be as frustrating as it is rewarding, and we hope this is something you can communicate to your Makers too. Mistakes are a critical part of the learning process, and often allow that 'Ureka' moment to happen. Allow the physical and emotional space for these mistakes to happen happily!

## Sharing

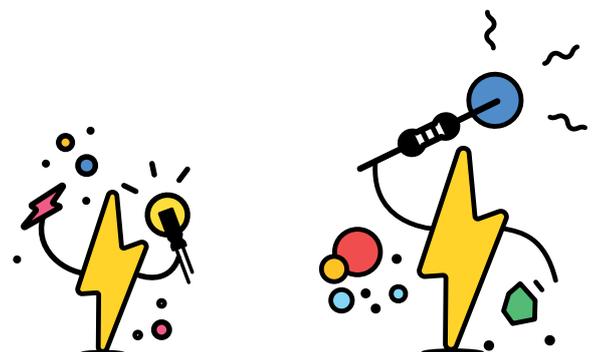
Celebrate your Makers work by sharing with your community.

We always love seeing what people Make, so why not send us a photo of your finished projects for us to share online with our own global maker community at:

[make@techwillsaveus.com](mailto:make@techwillsaveus.com)

## Enjoy

Making is fun!



## Science

### Forces & Magnets (Lower KS2)

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

### Electricity (Lower KS2)

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.

### Electricity (Upper KS2)

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram.

\*These areas are not covered within this scheme of work





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