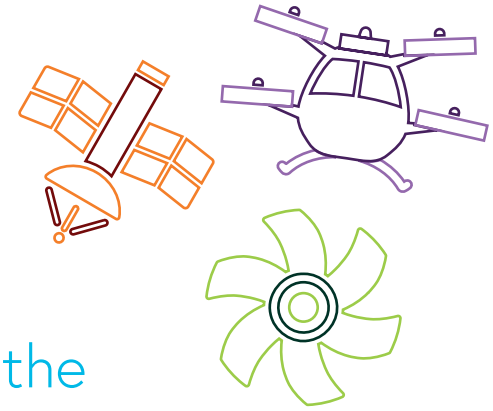
IET Faraday® DIY Challenge Day

FUTURE FLIGHT CHALLENGE

Teacher Extras

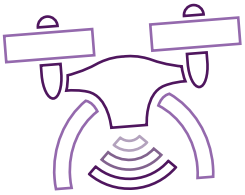
UK Research and Innovation

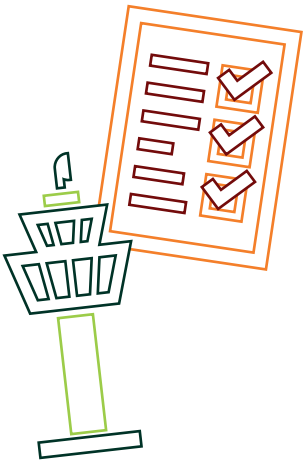
The Institution of Engineering and Technology

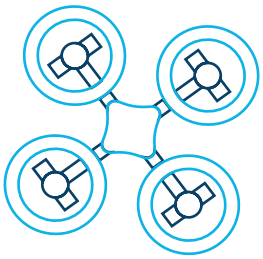


For taking part in the

IET Faraday® Challenge Day







Awarded to

David Lakin
IET Head of Education,
Safeguarding & Education Policy

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To find out about Future Flight:

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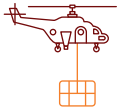
F1

IET Faraday® Reserve Note

One Faraday



Michael Faraday

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F5

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Five Faradays

Michael Faraday

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F10

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Ten Faradays

Michael Faraday

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F20

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= Twenty Faradays

Michael Faraday

Crocodile leads

F4.0

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Servo motor control unit

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Piezo buzzer
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LED – various colours
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Motor

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Solar motor

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Servo motor –
continuous
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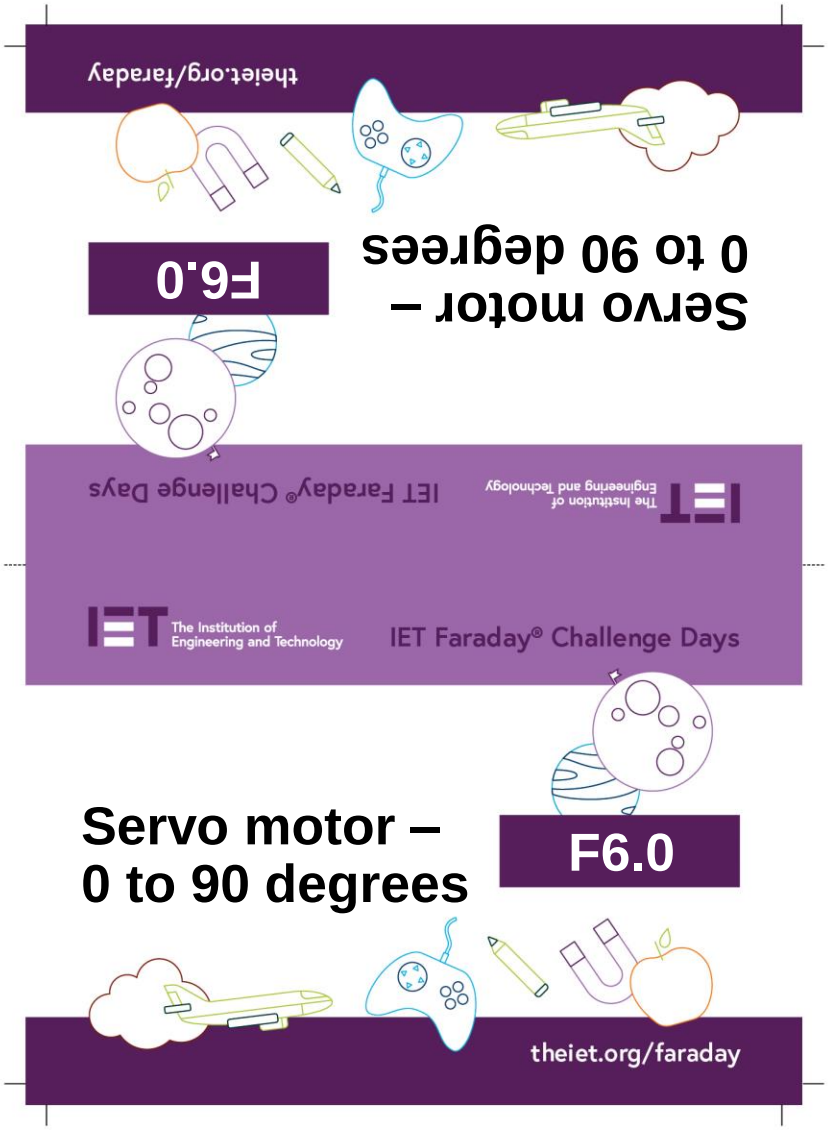
Servo motor –
0 to 90 degrees
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Light Dependent Resistor
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Light Dependent Resistor

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Push to make switch
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Push to make switch

F6.0

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Pulley attachment for motor

F2.0

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Solar panel

F6.0

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2 AA cells in battery holder

F4.0

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4 AA cells in battery holder

F6.0

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F6.0

Correx

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F6.0

Plastic syringes with tube

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F6.0
Correx
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F6.0
Plastic syringes with tube
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Small cog

F2.0

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Medium cog

F2.0

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Large cog

F4.0

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Dowel

F4.0

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Large cog

F4.0

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Dowel

F4.0

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Pulley wheel

F6.0

Wooden wheel

F4.0

Plastic reel

F4.0

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Wooden lolly stick

F4.0

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Coloured card

F4.0

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Aluminium foil

F6.0

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Masking tape

F6.0

Sponge

F6.0

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F1.0
Paperclip
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Paperclip
F1.0
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theiet.org/faraday
F1.0
Paper fastener
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Paper fastener
F1.0
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Elastic band

F1.0

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Cable tie

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Polyfoam
F4.0
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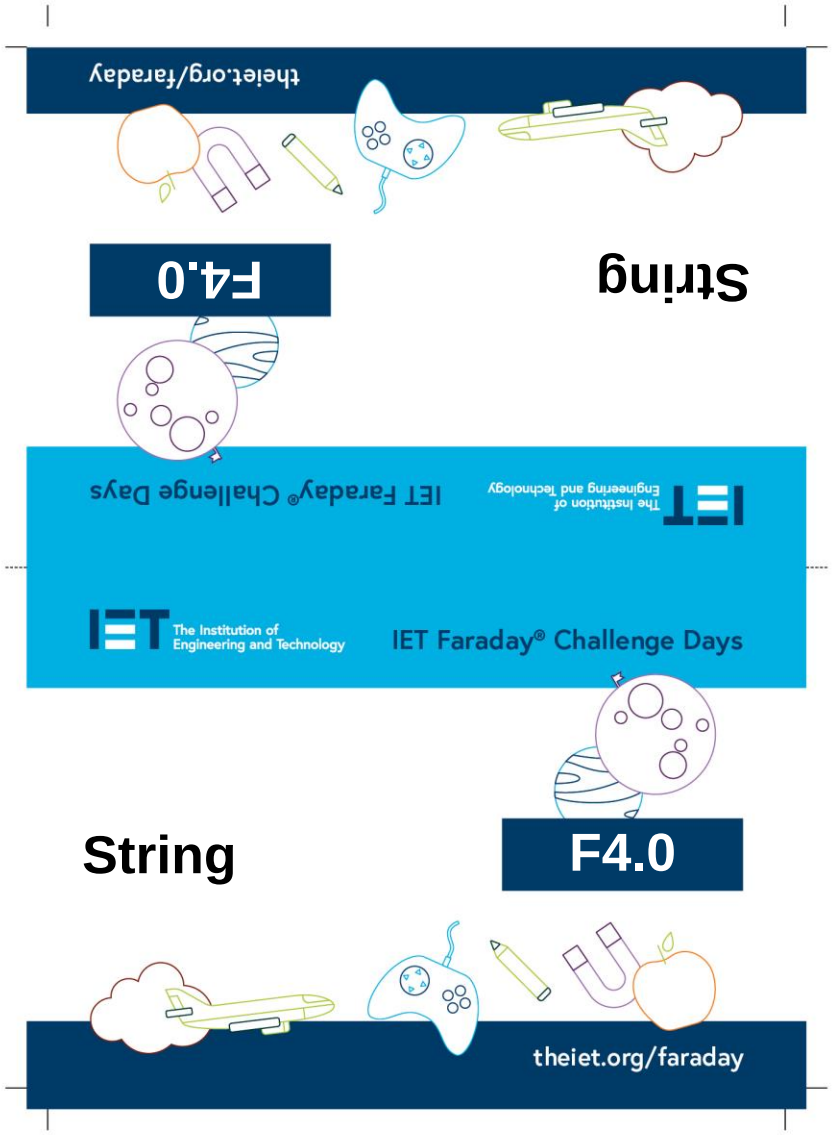
String
F4.0
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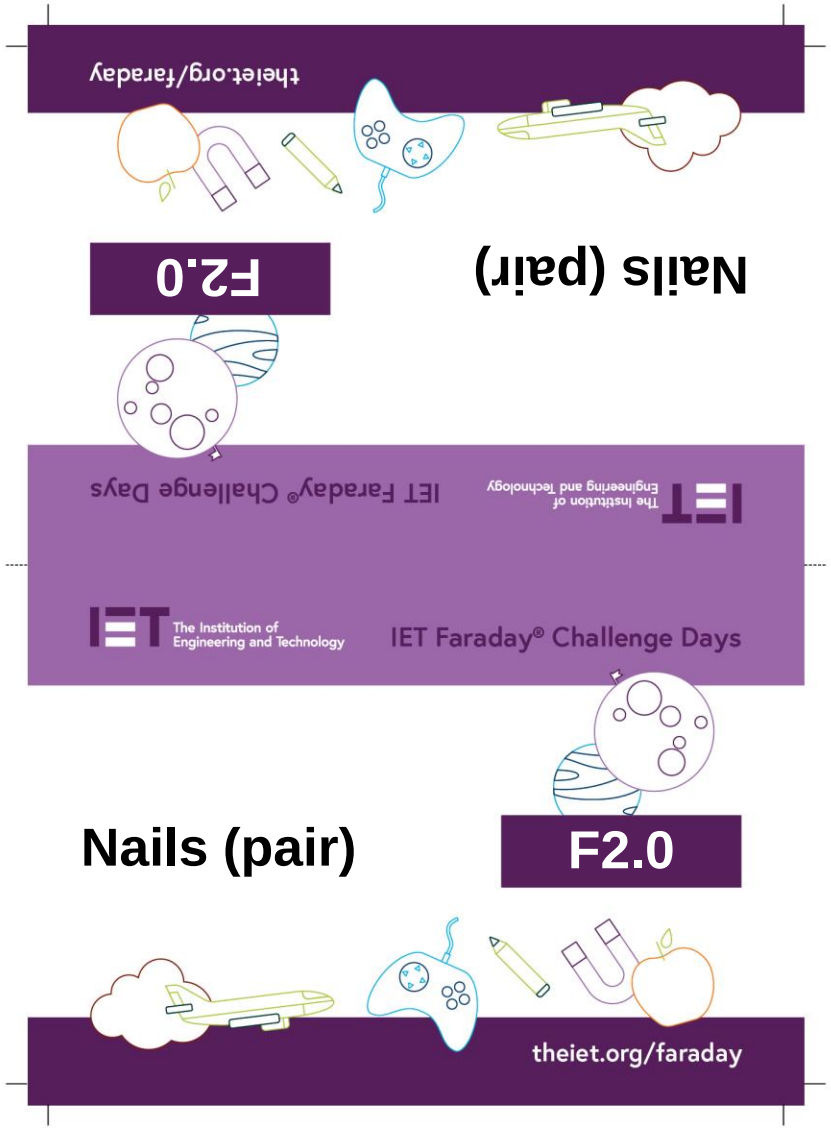
Nails (pair)
F2.0
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Magnets (pair)
F8.0
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Motor holder

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Gear attachment for motor

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Motor holder

F4.0

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Gear attachment for motor

F2.0

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HIRE CENTRE

1 item only at a time

Need card

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HIRE CENTRE TRADE CARD

Team 2

F6.0

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HIRE CENTRE

1 item only at a time

Need card

HIRE CENTRE TRADE CARD

Team 1

F6.0

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HIRE CENTRE TRADE CARD

Team 4

F6.0

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HIRE CENTRE TRADE CARD

Team 3

F6.0

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HIRE CENTRE TRADE CARD

Team 6

F6.0

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HIRE CENTRE TRADE CARD

Team 5

F6.0

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HIRE CENTRE
TRADE CARD

Team 7

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HIRE CENTRE TRADE CARD

Team 1

F6.0

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Shop manager resource sheet

Items to buy

Electrical components				
Item	**Description**		**Unit**	**Cost**
Crocodile leads		Lead with crocodile clips at each end	Each	4 Faradays
Piezo buzzer		Connect in a circuit to give a sound output	Each	6 Faradays
LED – various colours		Light Emitting Diode which lights up when connected in a circuit. Choose from red, orange, green or blue.	Each	6 Faradays
Motor		Connect in a circuit to create clockwise or anti-clockwise movement. Will **not work** with a solar panel or an LDR.	Each	6 Faradays
Solar motor		Connect to a solar panel to create clockwise or anti-clockwise movement.	Each	6 Faradays
Servo motor (0 to 90 degrees)		Use with a servo motor control unit to control movement from 0º to 90º	Each	6 Faradays
Servo motor (continuous)		Use with a servo motor control unit to control continuous movement through 360º	Each	6 Faradays
Light Dependent Resistor (LDR)		Component that detects the light level and changes resistance in a circuit.	Each	8 Faradays
Push to make switch		Connects a circuit when pushed down and breaks the circuit when released.	Each	6 Faradays

Servo motor control unit		Use this to control a servo motor. **You MUST** read the 'How to …' sheet before connecting this component.	Each	8 Faradays
Motor holder		Used to fix a motor or a syringe in position. NOTE: you will need the insert to connect a syringe.	Each	4 Faradays
Gear attachment for motor		Used to connect a motor to a cog.	Each	2 Faradays
Pulley attachment for motor		Used to connect a motor to a pulley wheel – will need connector (e.g. elastic band)	Each	2 Faradays
Solar panel		Used to power components using the power of the sun. **You MUST** read the 'How to …' sheet before using.	Each	6 Faradays
2AA cells in battery holder with battery snap		Used to provide power for your circuit	Each	4 Faradays
4 AA cells in battery holder with jumper leads		**ONLY to be used** with servo motor control unit.	Each	6 Faradays

Construction materials			
Item	**Description**	**Unit**	**Cost**
Correx	Used to create structures	Piece	6 Faradays
Plastic syringes with tube	Used to develop pneumatic system	Pair of syringes with plastic tube	6 Faradays
Small cog	Used in gear systems with motors	Each	2 Faradays
Medium cog	Used in gear systems with motors	Each	2 Faradays

Large cog	Used in gear systems with motors	Each	4 Faradays
Nail	Used for making moisture sensor	Pair	2 Faradays
Dowel	Piece of solid cylindrical wooden rod used to create structures	Each	4 Faradays
Pulley wheel	Used to connect to pulley attachments on motor	Each	6 Faradays
Wooden wheel	Used with motors to drive something	Each	4 Faradays
Plastic reel	Used in construction	Each	4 Faradays
Coloured card	A4 sheet of card – assorted colours	Each	4 Faradays
Aluminium foil	A conductive material which can be used to make pressure pads or switches (**MUST NOT** be used in place of connecting wires)	10cm strip	6 Faradays
Masking tape	Can be used to secure light parts in your design. **NOTE:** excessive use of tape will result in an additional charge	Roll	6 Faradays
Sponge	Can be used to make pressure switches or enhance your design.	Each	6 Faradays
Paperclip	Used to create switches or in construction	Each	1 Faraday
Paper fastener	Used to create switches or in construction	Each	1 Faraday
Elastic bands	Used to hold or create working parts, including driving pulley wheels	Each	1 Faraday
Cable ties	Can be used to hold your structures in place	Each	2 Faradays
String	Can be used as part of your product design	30cm piece	4 Faradays
Baking parchment	Can be used as part of your product design	10cm strip	6 Faradays
Wooden lolly sticks	Can be used as part of your product design	Each	4 Faradays
Hire Centre Trade Card	Use this to hire various items from the hire section of the shop – see next page for details	One per team	6 Faradays

Available with your Hire Centre Trade Card

These items can be hired from the shop if you buy a Hire Centre Trade Card. You will need to take it to the shop and show the shopkeeper each time you want to use of one of these items. You may only get one item at a time.

Stapler	Used to staple soft materials only
Hole punch	Used to make small holes in soft materials
Ruler	Used to measure any part of your product or additional items
Scissors	Used for soft materials only

Free to use

- Junior hacksaw with bench hook
- Craft knives x 2
- Cutting mats or suitable cover to protect table

The cutting station may be used at any point **BUT** only 3 people will be allowed at this station at any one time. Please put cutting station rules sign up to remind students.

Account sheet

Team………………………………………..

You will need to keep an accurate record of all the purchases your team makes.

Materials/resources purchased	Quantity	Cost		Faradays remaining
		Spent	Received (if sold back)	
Total Faradays remaining:				

Student Team Registration Form

Team number ……

IET Faraday® Challenge Date: ……

Your School Name: ……

Your Teacher's Name: ……..

Team Member Names (please print clearly):

	First name	Surname
1		
2		
3		
4		
5		
6		

SHOP MANAGER GUIDANCE

- Please record the number of Faradays spent each time a team comes to the shop. You do not need to record what the team buys, only the amount spent. If teams come up more than the available spaces on the sheet then continue on the reverse side. There is no restriction on the number of times they may visit the shop **but they have a spend limit of 120 Faradays** with no loans or overdrafts!

- Most unused items can be sold back to the shop for half price. No refunds given for partially used items (e.g. card, dowel, etc.) or for Hire Centre Trade Cards or rolls of masking tape.

- All prices are on the individual price tags and you also have a list on the clipboard. Please keep to these amounts and do not give them whole rolls of string or tin foil. No negotiation on shop items and no selling/bargaining between teams.

- Teams may come and replace a used roll of masking tape for free once they have bought a roll. The Challenge Leader will monitor how much they are using. They **cannot** sell masking tape back to the shop.

- **DO NOT** sell teams a 4 x AA battery pack unless they are using it with a servo motor and control unit as they will blow the LEDs. They **MUST** have read the help sheet, 'How to use a servo motor', if they are to buy this battery pack, the servo motors or the servo motor control units.

- If teams are unsure what components to buy, particularly which motor, please direct them to the 'How to ….' Sheets, the Student Booklet or the Challenge Leader for assistance. Do not guide them or help them.

- Only 2 members from each team at the shop at any time.

- Please monitor (or arrange for another person to monitor) the cutting station to ensure safe use of the craft knives and hacksaw and ensure the cutting station rules are adhered to.

- Hire Centre trade cards need to be purchased first before using the Hire Centre items. Each team to get the card with their team number on. They can only get one item at a time.

- If you think students are buying tin foil to connect their circuits, please inform the Challenge Leader urgently.

IET Faraday® Challenge Day - Shop Manager Balance Sheet

School ..... Date .....

Each visit	Team 1		Team 2		Team 3		Team 4		Team 5		Team 6		Team 7	
	Spent	Return	Spent	Return	Spent	Return	Spent	Return	Spent	Return	Spent	Return	Spent	Return
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
TOTAL SPEND														