

year 6

BIA Science Term
by Term Scheme
of Work



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BRITISH ISLAMIC
ACADEMY

Term by Term Objectives

year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Spring	Light Crime Lab Investigation			Light Crime Lab Investigation			Electricity Electric Celebrations			Electricity Electric Celebrations		

(1) Subject to change. Please visit the website or call-in for regular updates.

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Term by Term Objectives

week	1	Term	Spring 1
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Science Year 6 Light : Crime Lab Investigation

Light specialists required

Objectives

Take part in a Crime Lab light expert selection challenge. Do you have what it takes to join the investigation? Take a look at the initial crime report and cast your eye over the key suspects.

Science Objectives

- i) Recognise that light appears to travel in straight lines.
- ii) Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- iii) Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- iv) Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, tables, bar and line graphs.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.



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year 6

You Will Need

Provided Resources

- Crime Lab case files
- Light challenges

Additional Resources

- BBC quiz recording sheet

GO TO THIS SITE

<https://www.bbc.com/bitesize/articles/z2s4xfr>

<http://sciencewithkids.com/science-games/electronic-buzzer-game.html>

Term by Term Objectives



year 6

week	1	Term	Spring 1
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science year 6 Light : Crime Lab Investigation

Light specialists required

Teaching and Activities

Teaching

- Plan and complete a series of light investigations, identifying variables and ensuring fair testing. Suggest patterns and connections based on observations and measurements.
- Draw conclusions and provide answers based on scientific enquiry.

Activities

- Plan and carry out 5 light investigations in response to given enquiry questions.
- Identify variables that need to be controlled in order to achieve a fair test.
- Record and present findings, identifying patterns and drawing conclusions.

Investigation - planning, fair testing, exploring

- Investigate a range of simple light challenges.

Vocabulary

Light, light source, names of light sources, dark, reflect, reflective, mirror, shadow, block, absorb, direct/ direction, transparent, opaque, translucent, straight, rainbow, colours

Term by Term Objectives



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year 6

week

2

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

Light travels in straight lines

Objectives

The thief was spotted on CCTV 'casing' the school, using a torch. Can you demonstrate that light travels in straight lines and calculate plausible heights of the suspect based on their torch beam?

Science Objectives

- i) Recognise that light appears to travel in straight lines.
- ii) Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- iii) Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

You Will Need

Provided Resources

- CCTV based diagram including measurements
- maths needed to solve the problem

Term by Term Objectives



year 6

week

2

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

Light travels in straight lines

Teaching and Activities

Teaching

- Demonstrate that light travels in straight lines
- Understand why a light source is needed to see
- Suggest viable angles based on sight
- Convert feet and inches to cm

Activities

- Demonstrate and conclude that light travels in a straight line
- Know that a light source is needed in order to see
- Convert feet and inches to cm
- Make viable suggestions for given angles

Key Investigation

- Investigate and demonstrate that light travels in straight lines (exploring)

Vocabulary

Classification, kingdom, phylum, class, order, family, genus, species, Linnaeus, opinion, similarities, differences

Term by Term Objectives



year 6

week

3

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

Up periscope

Objectives

We know that the thief could see round corners, and likely used a periscope.

All suspects have one, but are they using materials that reflect well enough to see? Can you investigate and eliminate another suspect?

Science Objectives

- i) Recognise that light appears to travel in straight lines.
- ii) Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- iii) Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

You Will Need

Additional Resources

- Shiny metal
- Mirrors
- Shiny coloured Perspex
- Retro reflectors (all flat)
- Torches
- Sticky-notes
- Rulers
- Light meter

Term by Term Objectives



year 6

week

3

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

Up periscope

Teaching and Activities

Key Teaching

- Describe the movement of light beams off of reflective surfaces.
- Plan and carry out an investigation into the reflectiveness of given materials.
- Record results in the form of a graph and note patterns.
- Suggest how to investigate further their findings.

KeyActivities

- Demonstrate and describe the movement of light off mirrors.
- Plan and carry out an investigation into the reflectiveness of given materials.
- Record results in graphic form and identify patterns.
- Suggest further investigations for their findings.

Key Investigation - exploring, problemsolving

- Investigate how light reflects (make a periscope).

Key Vocabulary

Light, light source, names of light sources, e.g. torch, dark/darkness, reflect, reflective, mirror, shadow, block, absorb, direct/ direction, transparent, opaque, translucent, straight, rainbow

Term by Term Objectives

week

4

Term

Spring 2



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Science year 6 Light : Crime Lab Investigation

Shadow giants

Objectives

Many witnesses saw the thief in shadow form, but none of the sightings add up to the same person - each shadow was a different size! Explore how shadows can be deceptive and recreate each sighting to help identify the possible height of our thief.

Science Objectives

i) Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

You Will Need

Provided Resources

- Data for investigation
- Shadow outlines
- Sample line graphs

Additional Resources

- Lolly sticks
- Torches
- Mirrors
- Sticks and tape



week	4	Term	Spring 2
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Science year Light : Crime Lab Investigation

Shadow giants

Teaching and Activities

Key Teaching

- Note and explain that a shadow has the same shape as the thing or person casting it.
- Plan and carry out an investigation into shadow size and position of a light source.
- Use data from their investigation to draw a line graph.

Key Activities

- Be able to explain that a human shadow has the same shape as the person casting it.
- Independently plan and carry out an investigation into shadow size and position of a light source.
- Draw a line graph from investigation data and note any patterns.

Key Investigation - exploring, sorting and classifying

Investigate shadows and how they change as a result of light sources.

Key Vocabulary

Light, light source, reflect, reflective, mirror, shadow, block, direction, transparent, opaque, translucent, straight

Term by Term Objectives



year 6

week

5

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

It's a rainbow world

Objectives

How did our criminal read the encrypted laptop password that is too high up on the wall to see with the naked eye? And how did they decode it? Have a go at splitting white light into rainbow colours to help you crash through the password code.

Science Objectives

- i) Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- ii) Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

You Will Need

Provided Resources

- Encrypted code and password reminder
- Investigations and homework resource

Additional Resources

- Magnifying glasses of different strengths (ensure one of them is x2 and the others greater than x4)
- Prisms
- Mirrors
- Bubbles
- Clear plastic tops

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Term by Term Objectives



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year 6

week

5

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

It's a rainbow world

Teaching and Activities

Teaching

- Plan and carry out an investigation into the strength of various magnifying lenses.
- Understand that light can be bent when it is slowed down.
- Recognise that white light can be split into 7 rainbow colours.

Activities

- Investigate magnifying lenses, suggesting which cannot magnify enough in given circumstances.
- Explain and demonstrate that light can be bent when it is slowed down.
- Split white light into rainbow colours.

Investigation - exploring

Explore split light (finding 'rainbows')

Vocabulary

Light, light source, refraction, mirror, magnifying glass, absorb, direct/ direction, transparent, opaque, translucent, straight, bend, rainbow

Term by Term Objectives

week

6

Term

Spring 2



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Science year 6 Light : Crime Lab Investigation

A trick of the colourful light filters

Objectives

Our thief was spotted wearing not only a blue outfit, but also a red one and a yellow one. How is this possible and does it have something to do with the coloured transparencies found in the bin? Can you gather all of your evidence together to identify our key suspect?

Science Objectives

- i) Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- ii) Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

You Will Need

Additional Resources

- Green, blue and red transparent film
- Torches
- White A2 paper
- Colour mixing sample chart
- Blue and beige card



week

6

Term

Spring 2

Science year 6 Light : Crime Lab Investigation

A trick of the colourful light filters

Teaching and Activities

Teaching

- Plan and carry out an investigation into light colour mixing.
- Note the effects of mixing light colours.
- Record and report findings in chart form.
- Suggest and carry out further investigations on the effects of coloured light on coloured materials.

Activities

1. Plan and carry out a light colour mixing investigation.
2. Mix light colours.
3. Present findings in a chart.
4. Plan a further investigation into the effect of coloured light on coloured materials.

Investigation - exploring, problem solving

Investigate coloured light mixing.

Vocabulary

Light, light source, reflect, reflective, absorb, direct/ direction, transparent, opaque, translucent, straight

week

7

Term

Spring 2

Science year 6 Electric Celebrations

Electrical festive challenge

Objectives

Take part in a Dragons' Den briefing session and learn about the challenges that lie ahead as designers of festive lights and decorations with an electric buzz.

Science Objectives

- i) 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.
- ii) Use recognised symbols when representing a simple circuit in a diagram.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

You Will Need

Provided Resources

- Dragons' brief
- Challenge cards
- Sticky-note investigation resource

Additional Resources

- Dragons (parent volunteers)
- Electrical kits (bulbs, batteries, buzzers, motors, switches, wires)

week

7

Term

Spring 2

Science year 6 Electric Celebrations

Electrical festive challenge

Teaching and Activities

Teaching

- Plan electric circuit investigations to consolidate current electrical knowledge
- Establish current understanding of electricity and approaches to working scientifically
- Develop success criteria based on design brief

Activities

- Plan and carry out a series of simple electrical circuit investigations
- Identify current electrical knowledge and areas to explore further
- Create success criteria for their Dragons' Den electrical challenge

Investigation

- Investigate a range of simple electric circuit challenges (planning/fair testing/exploring)

Vocabulary

Electricity, electrical circuit, complete circuit, circuit symbol, components, cell, battery, positive/negative, connect/connection, loose connection, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), voltage, current, conductor, insulator, metal/non metal, enquiry question, investigation, findings

Term by Term Objectives

week	8	Term	Spring 1
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Science year 6 Electric Celebrations

Playing with electricity

Objectives

Using your planning meeting outcomes from Session 1 to set up some exploratory circuits to identify how they work and how to achieve a range of effects.

Science Objectives

i) Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.



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You Will Need

Provided Resources

- Enquiry questions - 'What if' cards
- Sample circuit diagrams

Additional Resources

- Electrical circuit sets
- Range of festive lights
- Images of decorations

Term by Term Objectives

week	8	Term	Spring 1
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Science year 6 Electric Celebrations

Playing with electricity

Teaching and Activities

Teaching

- Set up a series of enquiries that explore electrical circuits and various effects.
- Record findings in tables and graphs.
- Investigate examples of festive lights, identifying key features.
- Develop ideas and circuits that reflect the design success criteria.

Activities

- Carry out a series of enquiries that explore the effects of voltage on electrical circuit components.
- Record and present results graphically.
- Look at examples of festive lights and list key features.
- Create annotated drawings to represent their design ideas.

Investigation - exploring, fair testing, pattern seeking

Investigate the effects of voltage and number of components on a working circuit.

Vocabulary

Electricity, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, terminal, connect/connection, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), voltage, current, resistance, scatter diagram, investigation, causal relationship



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Term by Term Objectives



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year 6

week

9

Term

Spring 1

Science year 6 Electric Celebrations

Designs, ideas and circuit diagrams

Objectives

Your team needs to show that it has a technical flair for designing electrical circuits. Can you draw accurate circuit diagrams as a 'blueprint' for your design?

Science Objectives

- i) 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.
- ii) Use recognised symbols when representing a simple circuit in a diagram.

Working Scientifically

Record data and results of increasing complexity using scientific diagrams and labels.

Identify scientific evidence that has been used to support or refute ideas or arguments.

You Will Need

Provided Resources

- Circuit challenge
- Circuit symbols
- Feedback form



week	9	Term	Spring 1
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Science year 6 Electric Celebrations

Designs, ideas and circuit diagrams

Teaching and Activities

Teaching

- Identify from circuit diagrams those circuits that will or won't work.

Draw an accurate circuit diagram.

Research and explain why electrical components behave as they do in terms of resistance.

Feed back on others' designs.

Use feedback to improve their own design.

Understand how electrical components in their design work to the desired effect.

Activities

Draw a circuit diagram with a summary of the brightness, volume and speed of components within it.

Annotate their circuit diagram with explanations of the role of resistance in making components work.

Feed back on other's designs.

Use feedback to improve their design.

Investigation - exploring, analysing secondary sources -

Explore resistance through the use of various components.

Draw circuit diagrams.

Vocabulary

Electricity, electrical circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, terminal, connect/connection, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), conductor, insulator, metal/non metal, voltage, current, resistance

Term by Term Objectives

week	10	Term	Spring 1
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Science year 6 Electric Celebrations

Create a dimmer switch

Objectives

The dragons have added in a last minute design tweak - can you develop and include a dimmer switch into your design?

Science Objectives

i) 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.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using tables, scatter graphs, bar and line graphs.



You Will Need

Provided Resources

- Diagram for dimmer switch
- Materials request form

Additional Resources

- Dimmer switch equipment

Term by Term Objectives

week	10	Term	Spring 1
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Science year 6 Electric Celebrations

Create a dimmer switch

Teaching and Activities

Teaching

- Investigate, design and make a dimmer switch.
- Describe how a dimmer switch affects resistance.
- Incorporate a dimmer switch into their design.
- Identify materials and tools required to make a prototype.

Activities

- Investigate and develop a dimmer switch.
- Identify materials and tools for their design.

Investigation - problem solving, exploring

- Design and make a dimmer switch.

Vocabulary

Electricity, appliances/device, electrical circuit, complete circuit, components, cell, battery, positive/negative, terminal, connect/connection, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), conductor, insulator, metal/non metal, voltage, current, resistance



year 6

Term by Term Objectives



year 6

week

11

Term

Spring 1

Science year 6 Electric Celebrations

Create festive lights prototype

Objectives

Start putting your ideas and research into action as you create your festive lights and decorations.

Science Objectives

- i) Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- ii) 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.
- iii) Use recognised symbols when representing a simple circuit in a diagram.

Working Scientifically

- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identify scientific evidence that has been used to support or refute ideas or arguments.

You Will Need

Provided Resources

- General cost details
- Presentation prompts

Additional Resources

- Electrical equipment
- Range of materials and tools for design features (see materials request forms from Session 4)

Term by Term Objectives



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year 6

week

11

Term

Spring 1

Science year 6 Electric Celebrations

A healthy body: diet, exercise and lifestyle

Teaching and Activities

Teaching

- Build a working circuit.
- Explain how components work.
- Select appropriate batteries.
- Create a prototype of their design.
- Use working electrical systems within their prototype.
- Use tools and materials effectively in their prototype, adapting as they work.

Activities

- Create a working electrical prototype and identify possible improvements.
- Effectively use appropriate materials, tools and equipment.
- Explain clearly how components work.
- Explain clearly the effect that different voltages have on components in a circuit.

Investigation - exploring, problem solving

- Design and create a light decoration circuit.

Vocabulary

Electricity, appliances/device, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, terminal, connect/connection, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), conductor, insulator, metal/non metal, voltage, current, resistance.



week

12

Term

Spring 1

Science year 6 Electric Celebrations

Entering the dragons' den

Objectives

It's time for some final tweaks before entering the Dragons' Den. You will need to impress the dragons with your scientific know-how and the rigorous testing processes you have adopted. Good luck!

Science Objectives

- i) Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- ii) 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.
- iii) Use recognised symbols when representing a simple circuit in a diagram.

Working Scientifically

- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

You Will Need

Provided Resources

- Presentation prompts,
Sample copy for festive lights and photo examples
- Dragon questions

week	12	Term	Spring 1
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Science year 6 Electric Celebrations

Entering the dragons' den

Teaching and Activities

Teaching

- Present findings from prior investigations through presentation.
- Evaluate and make improvements on prototype.
- Present a working prototype, explaining how it works and how it meets the design criteria.

Activities

- Demonstrate how their decoration works and to link their circuits to their diagrams.
- Link findings from previous electrical investigations to their circuits.
- Outline how their design meets all success criteria.
- Demonstrate electrical knowledge and skills through presentation.

Vocabulary

Electricity, appliances/device, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, terminal, connect/connection, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), conductor, insulator, metal/non metal, voltage, current, resistance