Knowledge-Based Curriculum in Primary
From Theory to Practice
Background
Cultural Literacy

E.D. Hirsch

Illustration by Oliver Caviglioli (https://www.olicav.com/)
Background

Powerful Knowledge

“Renders the contours of knowledge and learning invisible to the very learners the pedagogy was designed to favour….those from low income homes..”

Young and Muller, 2010
Principles of a Knowledge-Rich Curriculum in Practice

**PRINCIPLE 1**
A Knowledge-Rich Curriculum utilises High Leverage Tasks and avoids elaborate activities that distract from the core knowledge.

**PRINCIPLE 2**
A Knowledge-Rich Curriculum thoroughly Monitors and Assesses the growing domain of knowledge.

**PRINCIPLE 3**
A Knowledge-Rich Curriculum Stretches the Most Able

**PRINCIPLE 4**
A Knowledge-Rich Curriculum makes Links with Prior Learning (across subjects and year groups).

**PRINCIPLE 5**
‘The Curriculum as the Progression Model’ should be visible in Pupils’ Books.

**PRINCIPLE 6**
Literacy is intrinsically embedded in a Subject-Specific Knowledge Rich Curriculum.
Background

Prototypes

Eleanor Rosch

Schema

Anderson and Pearson

Illustrations by Oliver Caviglioli (https://www.olicav.com/)
Background

Cognitive Load Theory

“I've come to the conclusion Sweller's Cognitive Load Theory is the single most important thing for teachers to know.”

Dylan William, Emeritus Professor of Educational Assessment, UCL

Illustration by Oliver Caviglioli (https://www.olicav.com/#/icons/)
Background

Memory and Learning
Long Term Planning

PRINCIPLE 4
A Knowledge-Rich Curriculum makes Links with Prior Learning (across subjects and year groups)

PRINCIPLE 5
‘The Curriculum as the Progression Model’ should be visible in Pupils’ Books
Medium Term Planning

Year 4 Physics
Summer Term 1

Example Sequence of Lessons

1. Energy and Energy Transfers

2. Electrical Circuits 1

3. Electrical Conductors and Electrical Insulators

4. Bulbs, Switches and Buzzers

5. Energy Transfers and Electrical Components: Big Memory Quiz
Medium and Short Term Planning

**Electrical Circuits 1**

1. The word **component** means ‘part of’. An **electrical circuit** has lots of components such as **wire**, **cells** and **bulbs**.

2. A circuit is a roughly circular loop. You may have run a circuit of the school field.

3. An electrical circuit is a complete loop of wires that has a **cell** or **battery** in it and other components such as light bulbs.

<table>
<thead>
<tr>
<th>Core Vocabulary for this Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. battery</td>
</tr>
<tr>
<td>2. buzzer</td>
</tr>
<tr>
<td>3. cell</td>
</tr>
<tr>
<td>4. circuit</td>
</tr>
<tr>
<td>5. closed switch</td>
</tr>
<tr>
<td>6. component</td>
</tr>
<tr>
<td>7. electrical conductor</td>
</tr>
<tr>
<td>8. electrical insulator</td>
</tr>
<tr>
<td>9. energy</td>
</tr>
<tr>
<td>10. energy transfer</td>
</tr>
<tr>
<td>11. light bulb</td>
</tr>
<tr>
<td>12. open switch</td>
</tr>
<tr>
<td>13. switch</td>
</tr>
</tbody>
</table>
Lessons

PRINCIPLE 1
A Knowledge-Rich Curriculum utilises High Leverage Tasks and avoids elaborate activities that distract from the core knowledge.
**Example of a lesson**

**Lesson 5 – Bulbs, Switches and Buzzers**

Read through the page ‘Bulbs, Switches and Buzzers’ with the pupils. Do not put the page on the screen and ensure the pupils are all looking at their own books. You may wish to ask the pupils to hold a ruler on their books to follow the line which is currently being read.

Read through the page first in its entirety. Read through again and stop on each of the core vocabulary terms e.g. ‘electrical energy’. Make sure the pupils can all pronounce the term: ‘I say: electrical energy. You say...’

Do this as a whole class and then focus on groups or individuals as needed. Then ask a pupil to tell you what energy is. If he/she answers ‘the ability to do work’ then reply ‘well done, it is the ability to do work’. If the pupil gets it wrong ask him/her to repeat the correct answer and come back to the pupil later. Ask the same question to at least five other pupils. Repeat this procedure for switches, closed switches, open switches and buzzers.

To reinforce the first lesson’s work, ask the pupils to write the energy transfer for light bulbs and buzzers.

Proceed to the experiment...

**Lessons**

Explanations / Extrapolations
Control the pace and expectation. Pupils may want to connect too quickly as many components are possible. They will in fact enjoy their learning a lot more by taking care to observe the detail.

Explanations / Extrapolations
We are moving from what a light bulb does to how a light bulb works. This will lay down a memorable observation that will be used when we later study thermal energy.

Rationale
Don’t presume how a switch works is obvious. Our pupils live in a world of amazing technology however the workings are often hidden.

Explanations / Extrapolations
This experiment is optional, so only complete if there is time. The key objective is to learn fully the core vocabulary.

Rationale
The core knowledge is reinforced by being connected to an historical context.

Rationale
Marking together gives instant feedback and helps the pupil think carefully about the core vocabulary.

This whole section is about slowing down to observe the detail. The pupils may well have used the electrical apparatus before, however, today they are going to do what scientists do, looking carefully at the detail and finding out how things work.

Pupils carefully examine a light bulb that is off under a hand lens and draw what they see. They then connect the bulb to a circuit and again draw what they see. They will observe a fine piece of coiled metal at first which will be glowing white hot in the second observation.

Pupils then observe and draw the switch, explain how it works (guide them to use the words ‘conductor’ and ‘insulator’) and then test a switch in their circuits.

If time is available pupils would benefit from building a switch using card, split pins and a paper clip.

Study the information on the background knowledge slides on ‘The Invention of the Light Bulb’ and ‘Morse Code’. Draw out the references to how bulbs and switches work.

Complete the ‘Quizzing for Memory’ and mark as a class.
Lessons

PRINCIPLE 2
A Knowledge-Rich Curriculum thoroughly Monitors and Assesses the growing domain of knowledge
## Teacher's Notes

<table>
<thead>
<tr>
<th>Example Sequence of Lessons</th>
<th>Quizzing for Memory of Core Knowledge</th>
<th>Suggested Activities to Build and Reinforce Knowledge</th>
</tr>
</thead>
</table>

### Lessons

**True or False?**

1. Europe had plenty of coal to provide energy for its factories and railways.
2. The European Coal and Steel Community was set up in 1952.
3. A common market meant it was easier for the countries in the group to trade together.
4. The European Union was formed before the European Coal and Steel Community.
Lessons

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PRINCIPLE 3
A Knowledge-Rich Curriculum Stretches the Most Able
<table>
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<tr>
<td>Where would the energy for the bike come from?</td>
</tr>
<tr>
<td>How could you change the circuit to turn the bulb on and off?</td>
</tr>
<tr>
<td>How could you test that your circuit is working.</td>
</tr>
<tr>
<td>Explain how buzzers and bulbs could be used in your house.</td>
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</tbody>
</table>
Lessons

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Lessons

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**Electrical Circuits 1**

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4. Short Paragraph for Extended Writing

   Q3: An electric bike has lights, an electrical horn and electrical heated handle bar grips. Write down all of the energy transfers for the different devices on the bike.

   Q3: Describe how you can make an electrical circuit to light a bulb.

   Q3: Explain how to test if a material is a conductor or an insulator. Describe the circuit you would make, the tests you would do and what the results would mean.

   Q3: What does a bulb do and what does a buzzer do? Include energy transfers in your answer.