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20 May 2013

CAPS content for Grade 5, 6 and 7 science and technology teachers: Circuits and electrical systems

Basic course [redacted] **June**

OR

Advanced course [redacted] **July**

These 3-day courses are designed for teachers who are new to science teaching, or now have to teach technology, or want more science background. They are based on the content in the CAPS Grade 5-7 and go beyond that.

We do practical problem-solving with real equipment. You will take home circuit components to use with your classes. You will also have a RADMASTE microscience electricity kit to work with.

The courses deal with knowledge in science and technology, as well as the knowledge of how to teach that content. These two aspects of the curriculum are known as Subject-Matter Knowledge (SMK) and Pedagogical Content Knowledge (PCK).

The Subject-Matter Knowledge covers

- Basic circuits, cells and batteries, how and where energy gets transferred in a circuit, conductors, insulators and resistors, what's inside different bulbs, LEDs and how they differ from bulbs.
- Parallel and series circuits; short-circuits; how parallel connections change the current at different parts of a circuit. Circuits as systems with inputs, process and outputs; input and output devices, and conceptual understanding of what's going on in a system.
- How ESKOM power stations work, the national grid, overload and load-shedding. Paying for kilowatt-hours, watt ratings and portable generators. House wiring and safety with mains electricity. Illegal connections.
- Fossil fuels and alternative sources of energy; the environmental implications of using electricity.

Trustees: Prof. JD Bradley, S Dlamini, EA Papenfus

*"Setlhare" means a tree. In Africa, people meet under trees to talk about important matters and children play in trees.
Curriculum must make places for teachers to meet and children's minds to play.*

The Pedagogical Content Knowledge (knowing how to teach the content) covers

- Children's typical misconceptions, from South Africa and other countries, about electricity in circuits. Assessment and misconceptions. A physical model to help children understand what's going on in a circuit.
- How the process skills in the CAPS help in asking good questions. Language issues. Concept mapping.
- Fixing children's circuits that won't work; knowing what goes wrong. How to manage the Grade 6 technology electrical systems project; how to make switches and sensors.
- Budgeting and managing equipment. How to recognise a short-circuit that will destroy an expensive battery!

Assessment on the course is self-referenced assessment; in other words, your ending performance is compared to your starting performance.

The basic course is for teachers who have not taught either electricity or a technology project before. It will enable you to do the CAPS topics practically with series and parallel circuits, manage the technology project, and help children when their circuits won't work. It will deal with mains electricity and safety.

The advanced course is aimed at teachers who have taught electricity before. It will cover the basic course quickly but also deal with making cells and batteries, understanding the energy link between static and current electricity and relationships between voltage, current and resistance in series and parallel circuits. (This is done practically, by qualitative differences, but bring a calculator.)

The course venue: The RADMASTE Centre, Wits University Education Campus, Parktown (old JCE)

Dates: [redacted] June for the basic course and [redacted] July for the advanced course.

A course day is 6½ hours of contact time, from 8:30 to 1:00 and 1:30 to 3:30.

Cost: [redacted] per day making [redacted] for the course. We need at least 13 people to make the course viable and we take up to 24.

Closing date for registration and fee payment is [redacted] for the basic course and [redacted] for the advanced course.

For registration forms, please fax your

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|---------------------------------------|-------------------------------------------|
| <input type="checkbox"/> name, | <input type="checkbox"/> email, |
| <input type="checkbox"/> school name, | <input type="checkbox"/> fax and |
| <input type="checkbox"/> cell number, | <input type="checkbox"/> telephone number |

to Setlhare Science Curriculum Trust Fax 011 717 3470

or email Setlhare at peter.moodie@wits.ac.za