Coaching week: Electricity

Session attendance codes:
4 pm MAN9D
7 pm MAN46
Coaching electricity session plan

1. Welcome, introduction & updates!
2. Sharing & caring
3. How can we help?

What are you hoping to gain from this session?

Have you used an idea that someone shared in a previous coaching meeting?
Welcome & introductions

Rachel Hartley (she / her)
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@rachelphysics

Carole Kenrick (she / her)
Professional Practice Group Coach
carole.kenrick@iop.org
@helpfulscience

Please introduce yourself verbally or in the chat – what's your name, where do you work, what are you hoping to get out of this session?
Hopes for today and reflection on previous coaching sessions

https://padlet.com/rachelhartley/h6hd5wnsw8hqxam6
5 week cycle for each physics DOMAIN

- IOP Coaches
- Early Career Teachers
- Everyone teaching physics to age 16
- Everyone teaching physics 16-19
- Everyone coaching physics

Schedule

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<tr>
<th>CPD Dates</th>
<th>Domain of Physics</th>
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<td>21 September to</td>
<td>Forces</td>
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<td>23 October 2020</td>
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<tr>
<td>2 November to</td>
<td>Energy and Thermal Physics</td>
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<td>5 December 2020</td>
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<td>11 January to</td>
<td>Electricity</td>
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<td>11 February 2021</td>
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<td>6 March to</td>
<td>Light, Sound and Waves</td>
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<td>21 March 2021</td>
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<td>1 May to</td>
<td>Matter and Nuclear Physics</td>
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<td>16 May 2021</td>
<td>Earth in Space</td>
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<td>13 June to</td>
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<td>28 June 2021</td>
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The DOMAINS Programme is one part of our Professional Support for Teachers. To view all our CPD session listings and bookings, please visit events on TalkPhysics

https://www.talkphysics.org/articles/domains-cpd-programme/
A few updates to our schedule

- Professional practice group review video production process.
- Content and scripts checked first before filming.
- 3 videos per Domain Spring 2021 more added over the year.
- Blurb available early on for coaches to use in planning.
- Powerpoint slides on talkphysics.org.
- Transcript resources and summary sheet.
Domains update - Electricity

- Charge and static (11-14)
- Using models to explain simple circuits (11-14)
- Exploring circuits practically (11-14)
- What is voltage? (11-16)
- Storytelling: the people behind the physics (11-19)
- Factors that affect resistance (14-16)
- Circuit equipment and I-V graphs (14-16)
- Electricity Equations (14-16)
- Potential dividers (16-19)
- Internal resistance and EMF (16-19)
Storytelling

Carole shares fascinating stories about the people behind the physics we teach, demonstrating some historical experiments, and she highlights the importance of considering representation when we choose which physicists we teach students about.
Your feedback on the videos

- Please share your thoughts verbally / in the padlet
- Have you watched any of the electricity DOMAINS videos?
- What did you think?
- How might you use them?
Sharing & caring
'A framework for coaching knowledge' from Rowson, J. (2020) From teacher to teacher educator: Supporting the development of schools based physics coaches
Knowledge of teacher learners

Share & care time:

- How have you managed to coach inclusively online?
- How do you coach non-physicists inclusively?
Knowledge for teaching electricity

Share & care time:
• Which ideas matter most when teaching electricity?
• What are some key challenges when teaching electricity?
Knowledge of coaching pedagogy

Share & care time:

- How is coaching teachers about electricity different from teaching students about electricity?
- What works well for coaching electricity?
Linking EEF guidance to coaching electricity

In zoom rooms, discuss:

• What are your top ideas for coaching electricity?
• How do you coach teachers to consider these aspects of good science teaching?
• Please share your thoughts verbally / in the chat / padlet

1. Preconceptions: Build on the ideas that pupils bring to lessons
2. Memory: Support pupils to retain and retrieve knowledge
3. Modelling: Use models to support understanding
4. Practical Work: Use practical work purposefully and as part of a learning sequence
5. Language of Science: Develop scientific vocabulary and support pupils to read and write about science
Some students have differing ideas about what is happening in the wires of an electric circuit when it is working (check wording on spark)

Many students think that electric current or electric charge (or 'electricity'), rather than energy, is stored in a battery.

Many students see circuit behaviour as a sequence of causes and effects, rather than seeing the whole circuit as an interacting system.
Start with scaffolded observations and then develop understanding of what is going on. Finally, introduce equations.

Cognitive load e.g. teaching series and parallel circuits in one lesson

Dual coding – circuit diagrams
Think about what the charges are doing in the wires and what is making them do it, so that we can explain observations and mathematical relationships between variables.
More practical work in this domain.
With careful walk throughs and additional data for GCSE required practicals.

You may want to spend time in live sessions wiring things up slowly, demonstrating the multimeter, for example.
'Electricity' is the name of the topic, and nothing else – instead of saying 'electricity', explanations will be clearer if you say 'current', 'potential difference', 'resistance' etc.

Language that helps to contextualise named objects is helpful: "potential difference across X", "current in Y", "power dissipated by X", "energy shifted by Y".

When describing a circuit, refer to V, I and R together, e.g. "when the resistance goes up the current goes down if the potential difference stays the same"
What can we do to help?

Please remember to complete the session evaluation. It only takes about 2 minutes to complete and is very important to measure and evaluate impact of the IOP DOMAINS CPD programme.

This 5 digit code is unique to the session you are attending and is needed if you want to request confirmation of attendance.

4 pm MAN9D 7 pm MAN46

Link to padlet board with all your great ideas and suggestions
https://padlet.com/rachelhartley/h6hd5wnsw8hqxam6