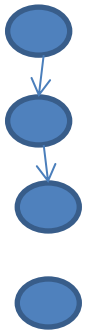
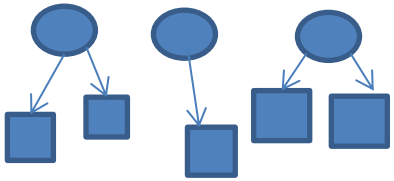
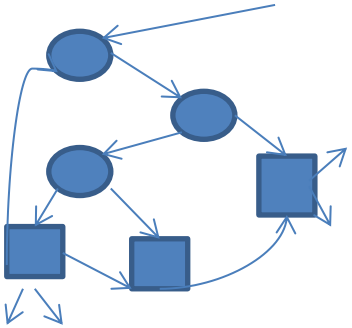
		Limited	Basic	Developing	Exemplary
Category A: Learners prior knowledge and misconceptions	**A1 – I is the same throughout the circuit A2 – R and I in a parallel circuit**	• No identification/ No acknowledgement/No consideration of student prior knowledge or misconceptions • No explanation of concepts • Incorrect explanation given	• Teacher acknowledges misconception • Provide standardized knowledge as definition • Repeats standard definition with no expansion *E.g. Bulbs are series therefore current is constant throughout* • No indication of action that the teacher would take	• Teacher acknowledges misconception or prior knowledge and provides correct explanation to confront misconception • Provide standardized knowledge as definition and/or expands and re-phrase explanation with a single level explanation *E.g. I would explain that …….*	• Teacher acknowledges misconception and provides a correct explanation to confront misconception • Provide standardized knowledge as definition and/or Expands and re-phrases explanation with a multi-level approach. *Eg. Makes use of conservation of particles or fields in explanation. Not just a single approach* • Explanation demonstrates conceptual understanding
Category B: Planning and Sequencing	**B1/B2- Big Ideas and Sequencing**	• Only subordinate ideas or 1 Big Idea Identified • Sequencing no value due to mixed concepts or no sequence provided at all ***Big Ideas (any 3 from list below)*** *1. To obtain an electric current there needs to be a continuous loop from one battery terminal to the other terminal* *2. An electric current is the net flow of charge.* *5. A battery provides the energy for an electric current* *8. When there is a current, energy flows from the battery to the external circuit.* *10. A battery creates an electric field within the materials that make up the circuit. The electric field is the cause of current flow.* *12. An electric circuit is a system in which changes in one part can affect other parts*	• Identifies 2 Big Idea Sequencing can be followed but has at least one illogical placing of key concepts (Big Ideas). • Reasons given for sequence unclear or lacks logic. *E.g. Need to know what resistance is before the rest can be taught*	• Identifies at least 2 or 3 Big Ideas • Provides a logical sequence for the concepts. • Reasons given for sequence are logical in terms of content or learner's level • Sequencing is linear: it follows only one concept through and makes no links to other concepts *E.g. For current to flow a 'closed' path is need from + battery to the – end of the battery*	• Identifies at least 3 Big Ideas • Provides logical sequence for all three Big Ideas with correct and logical reasons • Sequencing links the Big Ideas to multiple concepts. *E.g. Once learners see a circuit as a system you can then explain how charge 'flows' in the system and introduce concepts of rate of flow of charge and potential difference*

	B3 (a) –concept map	• Identified subordinate ideas mixed with those Big Ideas of other topics • Not all Big ideas have subordinate ideas • Identified subordinate ideas mainly incorrect or repetitions of Big Ideas • Response lacks logic No linking words	• Not all Big ideas have subordinate concepts identified. However those identified are correct • Some Subordinate concepts used as starting point • Some subordinate ideas relate to Big Ideas • Subordinate ideas are limited to algorithms or standard definitions • There are few connections between concepts and connections not always correct 	• Identifies subordinate ideas and shows links to Big ideas with no additional information • Uses 2 or 3 Big Ideas as a starting point • Subordinate ideas relate to Big ideas on map • Identified subordinate ideas include applications of equations and concepts • Evidence of linking of at least two concepts • Concept map has several connections to subordinate ideas, which are correct. 	• Identifies subordinate ideas and explains/shows Links • Uses only Big ideas as a starting points • Subordinate ideas relate to Big ideas on map includes pre-concepts • Identified subordinate ideas focus on understanding concepts underlying equations and concepts • Cross links shown where applicable • Differentiates clearly and correctly be main, subordinate ideas and minor concepts. Has a logical sequences and visually illustrates the 'circuit' nature of electrical concepts. 
	B3(b) – Why is it important?	• Reasons limited to a general statement One reasons given or gives a general statement such as " has important applications in …"	• Identifies the importance as a topic related to aspects, application and motivation/interest and gives a reason for one aspect *E.g. Electricity is a vital part of everyday life. It is important for students know how circuits works so that they can use electricity safely*	• Identifies the importance as a topic related to aspects, application and motivation/interest and gives reasons for both aspects *E.g. These are systems used in their everyday lives, so it is important to have a basic understanding of how they work and the effects of circuits and it is a key part of the final matric exam*	• Reasons given include three considerations, application, motivation and interest and conceptual considerations such as scaffolding/sequential development of understanding for other subsequent topics

Category C: What makes it difficult to teach?	**C1 – Three concepts C2 - Terminology**	• Identifies broad topics or terms without specifying the actual sub-concepts that are problematic Reasons not given to identified concepts E.g. *Learners struggle with this concept – how it is transferred and the conservation of energy*	• Identifies specific terms concepts but provides broad /generic reasons such as 'abstract'	• Identifies specific terms or concepts with reasons related to prior knowledge of students or common misconceptions *E.g. Learners tend to see the components of a circuit as independent. So because they do not see it as a system they cannot explain what a change in one part has on the whole circuit*	• Identifies specific concepts with reasons related to prior knowledge of students or common misconceptions • Provides reasons linking to specific gate keeping concepts that when not fully understood adds to the difficulty of a concept regarded as difficult. • There is evidence of further self-reflection. *E.g. Students confuse 'charged particles' and current – maybe because we often speak about current flowing*
Category D: Representations and analogies	**D1 – What I like and dislike about the**	• Reasons given are incomplete, vague and difficult to follow E.g. *I like the first one* *(*Note - *criteria to be considered across all three representations)*	• Reasons for selection limited to single consideration	• Reasons for selection include two levels of consideration e.g. ease of use, effectiveness to confront misconception , learners context	• Reasons for selection include multiple considerations • Reason for selection also includes possible points for new misconceptions or indicates awareness where analogy fails. • Reasons includes appropriate use to explain the interrelatedness of electricity terminology
	D2 – How would I use….?	• No discussion on how the representation is going to be used or suggested use inappropriate or unworkable	• Discussion lacks logic or clarity. List of concepts given with no explanation on how representation is going to be used Suggested procedure impractical	• Discussion on how the model shows logic and part of explanation shows conceptual orientation • Gives clear or satisfactory explanation on how the chosen representation is going to be used Suggested procedure is workable	• Explanation clear, logical and shows conceptual orientation • Clearly, explained the procedure how the chosen representation can be used • Suggested procedure is workable and takes into consideration learners' context

Category E: Conceptual teaching strategies	**E1 – 'Sparky'**	• Incorrectly identifies of student prior knowledge and misconceptions • Strategy to confront misconceptions not included or limited E.g. *Differentiate between charge, energy and current*	• Identifies student prior knowledge and Misconceptions. • Strategy to confront misconceptions limited	• Considers confirmation/confrontation of student prior knowledge and/or common misconceptions • Strategy includes a clear plan for the explanation, which is correct yet basic *E.g. I would label all the parts and then talk through Sparky's journey with the student, from when sparky leaves the cell to when he returns to the cell. Use the correct terminology*	• Considers prior knowledge and/or common misconceptions • Strategy is multifaceted it includes more than one possible strategy e.g. an analogy, demonstration *E.g. Use of the traffic analogy (petrol as source of energy) cars as particles that move to show that the number of cars going from point A to B does not change. Then set up a simple circuit with an ammeter to measure current at different points in the circuit* • There is evidence of self-reflection in their description of their strategy