# Using the ‘Problem of the Week’ Blended Learning Resource

These slides are intended to support teachers and pupils with a blended approach to learning, either in-class or online. The tasks are intended to form part of a learning journey and could be the basis of either one lesson or a short sequence of connected lessons.

The 4-step Polya model for problem solving has been used to provide a structure to support reasoning. Teachers may need to use more or fewer steps to support the range of learners in their class.

Teachers should delete, change and add slides to suit the needs of their pupils. Extra slides with personalised prompts and appropriate examples based on previous teaching may be suitable. When changing the slide-deck, teachers should consider:

- Their expectations for the use of representations such as bar models, number lines, arrays and diagrams.
- Which strategies and methods pupils should use and record when solving problems or identifying solutions. This could include a range of informal jottings and diagrams, the use of tables to record solutions systematically and formal or informal calculation methods.

Teachers may also wish to record a ‘voice over’ to talk pupils through the slides. As a ‘voice over’ version this could provide pupils with a means of hearing the explanation again to support their independent working.

The following chart provides further ideas about how to adapt and use the slides in the resource to meet the needs of a range of learners.

| Slides | Suggested | Teacher could adapt by |
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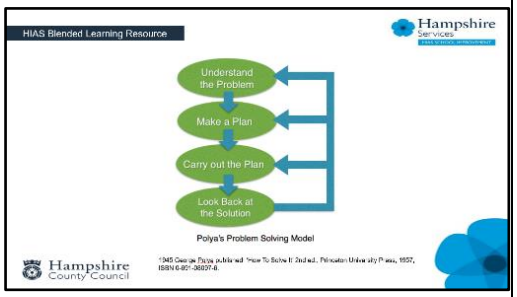
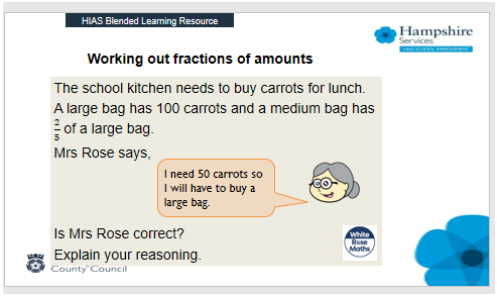
|  | This slide shows the process used in the Polya model for solving problems. | |
|  | Slide 4: This has the whole task for the resource.<br><br>This task should be part of a sequence of learning.<br><br>Pupils may benefit from prior work revisiting key concepts and skills needed to solve the problem. Alternatively, the problem can be used to identify key concepts and skills to revisit in subsequent lessons. | Changing the starting problem to be a little easier or harder for the whole class or for groups and individuals.<br><br>Chunking the task will support pupils with SEND - this may be through provision of checklists, instructions on a whiteboard or providing one step or question at a time. This helps reduce distractions to avoid overloading working memory.<br><br>Changes could include:<br>• Removing the numbers initially<br>• Using 'easy' numbers to reduce the cognitive load on the calculation enabling pupils to focus more on the problem and the steps needed<br>• Slow reveal of the task to focus on one 'step' at a time |

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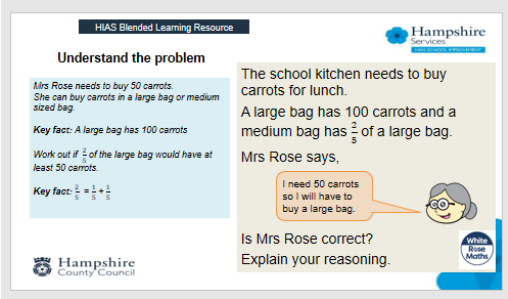
<td> 
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<td>Understand the problem<br><br>Prompts have been suggested to help pupils understand the whole problem before thinking about how they might plan/ what they might do to solve the problem.<br><br>This is suggested ‘scaffolding’ for temporary support that can be removed when no longer required. Teachers should provide enough support so that pupils can successfully complete tasks that they could not do independently. It is important to gain a precise understanding of the pupil’s current capabilities.<br>E.g.<br><br>• Support could be visual, verbal, or written.<br>• Reminders of what equipment is needed and classroom routines can be useful.<br>• Scaffolding discussion of problem- solving texts: promoting prediction, questioning, clarification and summarising</td>
<td>Support pupil’s understanding using words, phrases and key facts prompts as appropriate to group and individual need based on autumn term teaching and blended learning in spring term.<br><br>Other questions could include:<br><br>• What maths do you think we need?<br>• Have you worked on a problem like this one before? What steps and strategies did you use?</td>
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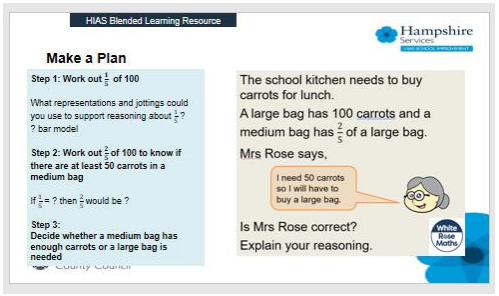
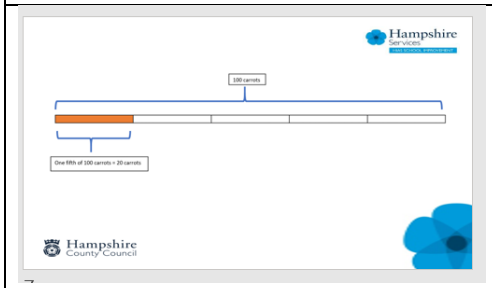
|  | **Make a Plan**<br><br>Prompts have been suggested that might help pupils identify the steps they could take to solve the problem.<br><br>There may be other ways to solve the problem. This can be explored with groups and individual pupils as appropriate.<br><br>This involves explicit instruction using a range of teacher-led approaches, focused on teacher demonstration followed by guided practice and independent practice. Explicit instruction is not just "teaching by telling" or "transmission teaching".<br><br>This relates to the use of Rosenshine's 'Principles of Instruction'<br>**Examples:**<br><br>• Worked examples with the teacher modelling self-regulation and thought processes by 'thinking aloud' is helpful.<br>• Using visual aids and concrete examples promotes discussion and links in learning | Create the steps needed through discussion with class/ group/ individuals and record using their language phrases as appropriate to support the use of key vocabulary.<br><br>Could ask pupils who fluently and confidently solve the particular problem example to come up with alternative plans/ steps to solve that problem. Often more than one way to solve a problem. |
|  | A suggested representation of the problem. | This slide could be replaced by a more familiar worked example of teacher modelling of recording from the autumn term or from a 'live lesson' using the same resource. E.g<br>• Working walls<br>• Flip chart modelling<br>• Examples of pupil work taken from the 'live' lesson |

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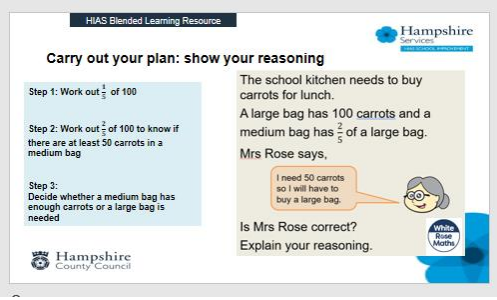
<td> 
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<td>Carry out your plan: show your reasoning.<br><br>This slide aims to support pupils being able to show each step towards the solution This often includes the actual calculations needed at each step for that particular example as number sentences.</td>
<td>Steps could be added or removed depending on the needs of different learners.<br><br>The aim is to support the pupil as needed to understand and solve that type of problem so that with sufficient practise, they can solve similar problems independently without constant reference to use of the scaffolded steps – achieving mastery of the task</td>
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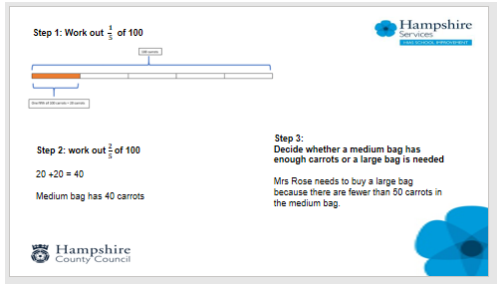
<td> 
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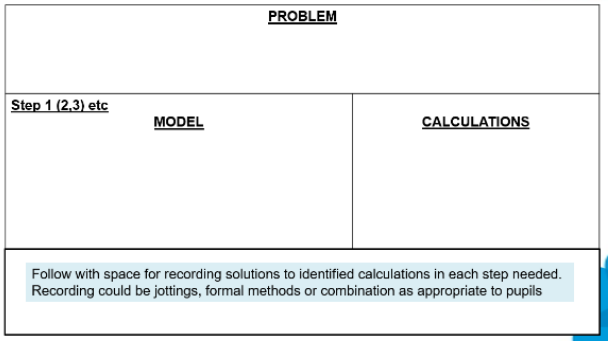
<td>Slide showing how the steps in the solution could be recorded.<br>Opportunities to talk about:<br>• choice of calculation strategy; mental, jottings and formal methods, depending on the numbers involved<br>• Appropriate representations using CPA approach<br>• Recording the answer(S) to the problem</td>
<td>This slide could be replaced by a more familiar school – based example of teacher modelling of recording from the autumn term and from ‘live lesson’ modelling.<br><br>E.g this template below could be used which has been shared and discussed at Core Provision with subject leaders<br><br> 
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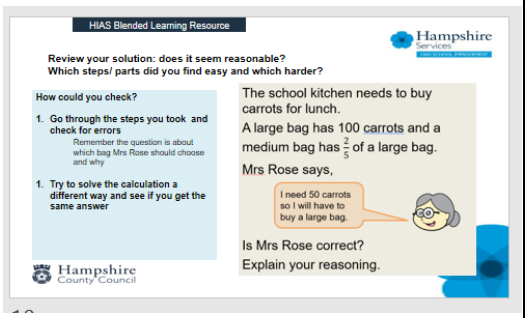
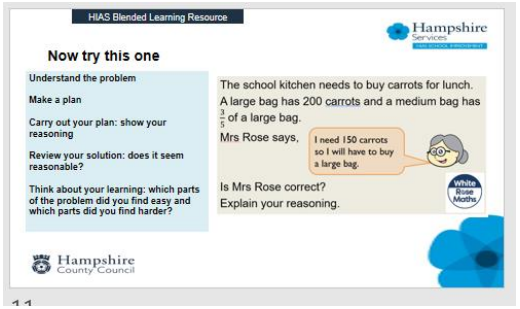
|  | **Review solution: does it seem reasonable?**<br>A prompt has been provided linked to the problem and or the maths where appropriate.<br>Opportunities to discuss the use of rounding, use of key facts and approximation.<br><br>**Which steps/ parts did you find easy and which harder?**<br>This slide aims to support the development of pupils' meta-cognitive awareness and feedback to the teacher.<br>Responses to this inform the next steps in learning<br>E.g. Might need a focus on:<br>addressing mis-conceptions and errors;<br>practising and improving fluency in a key skill etc | This slide could be replaced by a more familiar school – based example for reviewing learning or one being used to support blended learning.<br><br>It could form the basis of a review conversation about the pupil's learning for the week to judge progress made in learning and agree next steps needed for future work.<br><br>This assessment information should inform planning, teaching and task design. |
|  | **Now try this one**<br><br>An example of a possible next task for the teacher to consider.<br><br>Based on assessment for learning the 'next task' could be one or two lessons addressing errors, misconceptions or developing fluency with an aspect of the maths involved before looking at another problem. | To meet the range of needs there could be different 'Now try this one' tasks for groups and individuals supporting the next few lessons. Some pupils may need to have several more very similar examples of the task to develop independence. Eg, perhaps just the numbers changed.<br><br>Some pupils may need to have a slightly more challenging task – through changes to the calculation and or the complexity of the language involved.<br><br>Task variation can be used to provide appropriate access and challenge to all.<br><br>The set of slides can be used by pupils as a WAGGOLL to remind themselves of the reasoning process and or to check the steps needed for variations of the first task. |