

Does a spaced, interleaved, quiz-based curriculum improve outcomes in primary science in an international British school in Qatar?

Introduction

This project is based in an international British school in Qatar, working with two Year 4 classes following the National Curriculum of England with respect to Islamic beliefs and culture. The cohort is entirely EAL with a range of nationalities.

Aim

To improve upon the science teaching in Primary to support children progress with further studies.

Principally, my aim was to ensure a solid grasp of scientific knowledge which children could more easily recall for future use and application to support the school’s growth as the leading provider of STEM education in Qatar.

Methodology

Using the current research base of a spaced, interleaved teaching approach (see *References 1-4*) with respect to the ‘forgetting curve’ (*Refs. 5-7*), utilising the ‘testing effect’ (*Ref. 7-8*) and metacognition strategies (*Refs. 9-10*), I implemented a maximum 20 minute starter task for the beginning of each weekly science lesson.

These starters were low-stakes quizzes which all children completed independently and self-marked with the teacher. Children were informed that these are just practice quizzes intended to help them remember what they have learned. The quizzes were comprised of 4-5 questions which tested children on prior-taught topics (for examples see **Figure 1**, bottom left).

As my preliminary trial, I have only focused on a Year 4 cohort and I have only implemented this approach for 1 term (Summer term). This has meant that, for now, my approach only included questions taught in Year 4 from Year 4 topics in the National Curriculum of England.

Following the success of this preliminary experiment, I intend to apply this whole-school and include testing questions from prior year groups, example plans for which are shown in **Figures 2 and 3**, on the right.

Results

Thanks to the emphasis of these quizzes being low-stakes quizzes intended to help the children learn and remember scientific knowledge, they were received very well by the children. Pupil voice enquiries revealed children: felt the quizzes were helpful; enjoyed finding out where they were succeeding and where they needed more practice. Children stated a desire to continue using the quizzes.

To ensure the quizzes were perceived as low-stakes, no formal data was collected on the results. However, teacher judgements from both classes indicated that children were able to recall prior-taught material more easily and that separate summative assessments had positive results.

In conclusion, I now intend to follow through with my plan for a whole-school implementation next academic year.

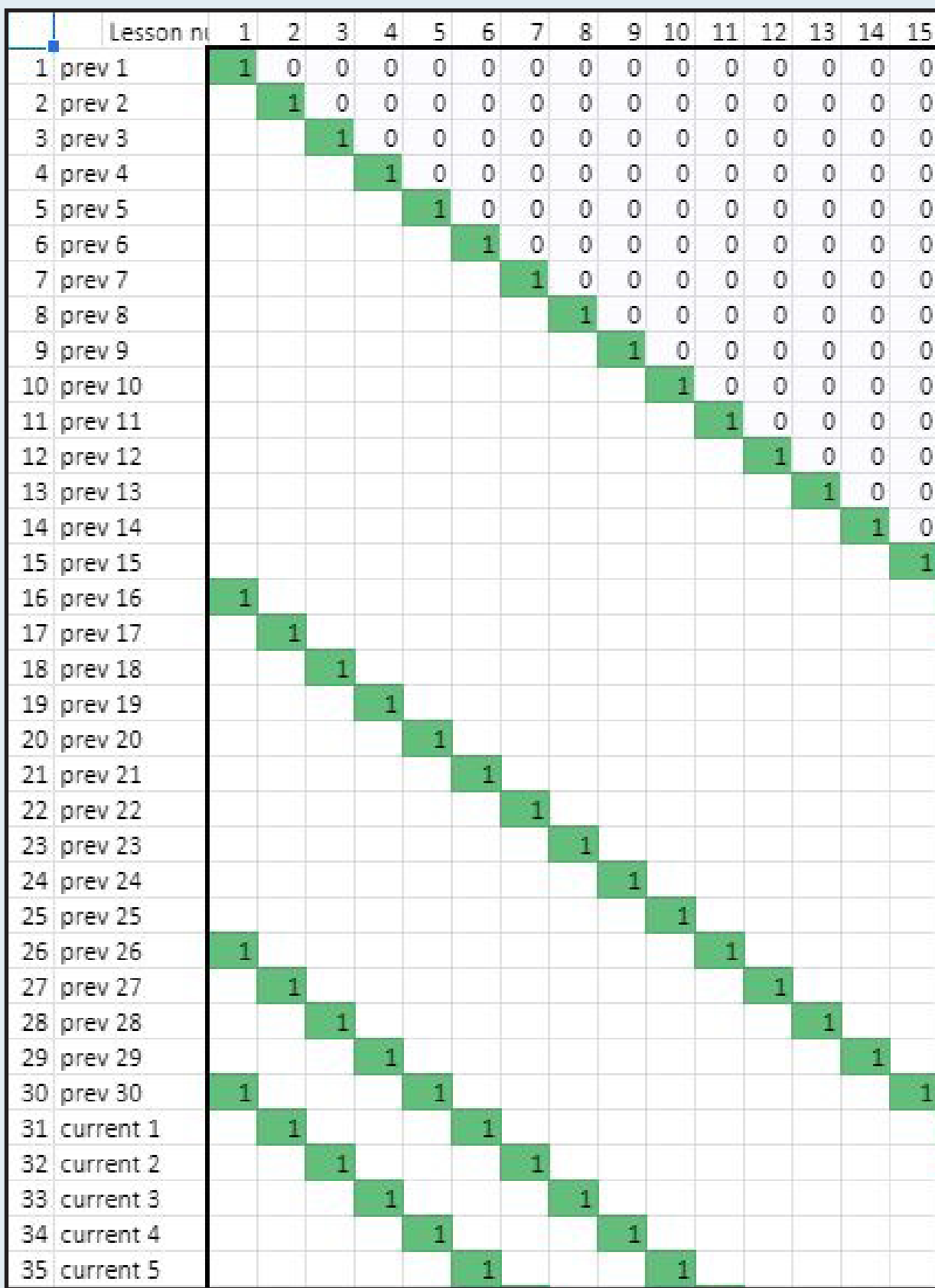
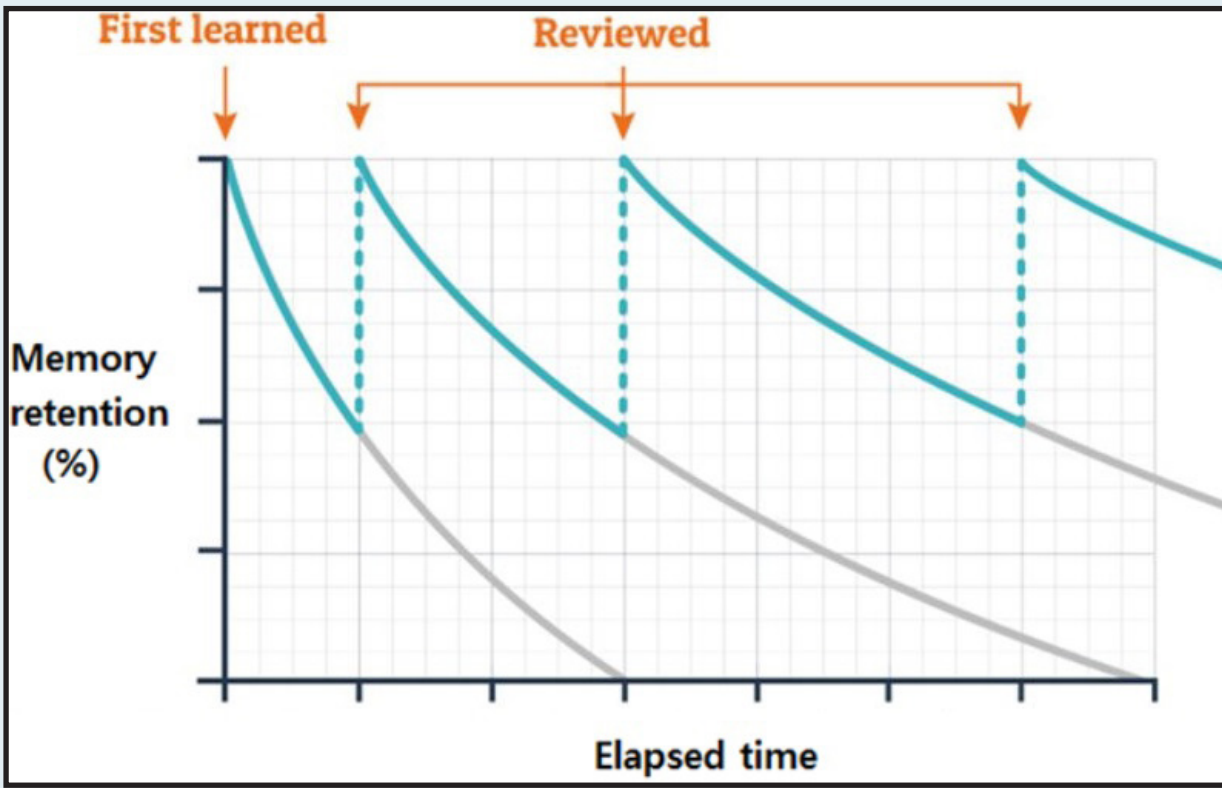


Fig. 2: Concept reference sequencing

Year 4	Topic	Lesson (first half)	Lesson (Second half)	Concept reference	
1	Organs	human digestive system		1	401
2	Types of teeth	Teeth structure		2	402
3	Animals	Looking after teeth	EXPERIMENT	3	403
4		Food chains	Experiment write up	4	404
5		Food webs	Assessment	5	405
6	Electricity	Electrical machines	Electricity and safety		
7			Half term		
1	Electrical components	Practical demonstrations		6	406
2	Electrical circuits	EXPERIMENT		7	407
3		Experiment write up			
4	Electricity	Conductors and insulators	EXPERIMENT	8	408
5		Experiment write up			
6	Electrical switches	Practical demonstrations		9	409
7	Working circuits	Assessment		10	410
8	Sound	How we hear things	Making a string instrument	11	411
			Winter break		

Fig. 3: Science Curriculum Scheme of Work including concept references / lesson



Ref. 6 image: Graph showing the ‘forgetting curve’ (Bjork 2011) and the impact of reviewing prior-taught content on the efficient recall and retention of concepts.

References

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- 10 Education Endowment Fund (EEF) (2021) Reading and research on Feedback for learning and progress <https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/feedback/>