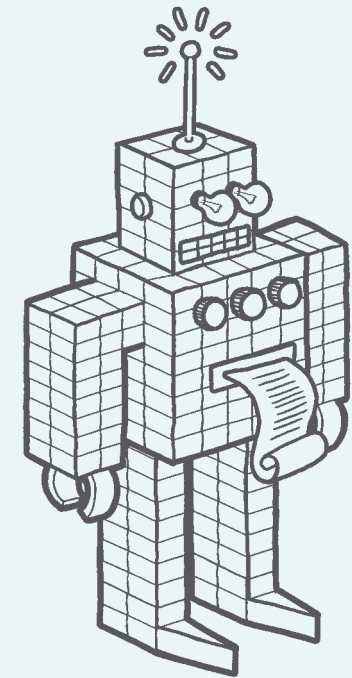


Visualising Plans and Elevations

Representing objects
in multiple formats and
taking maths lessons to
another dimension with
online 3D modelling.



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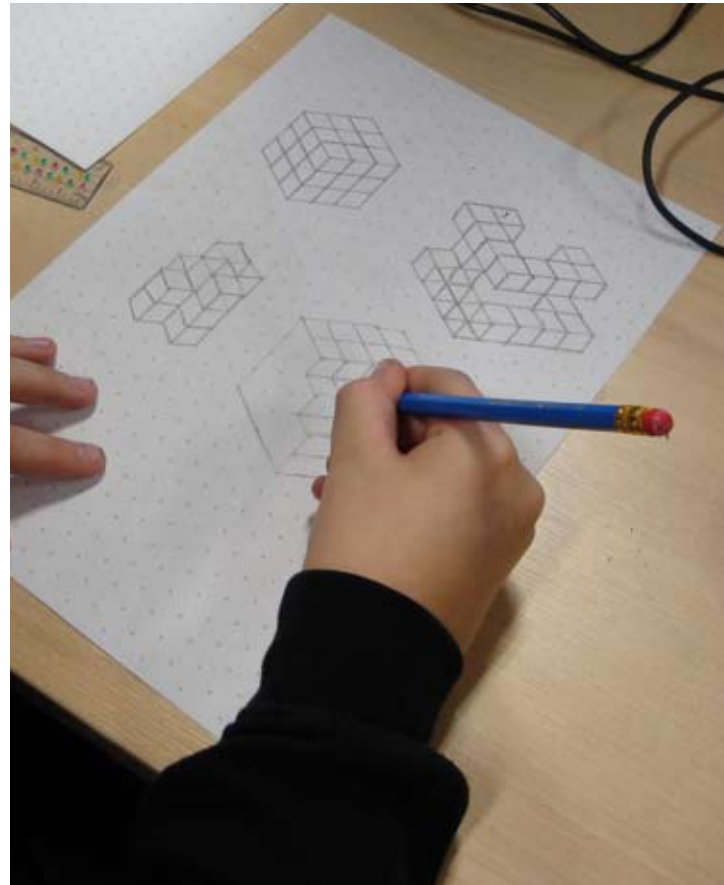
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Bridget Chickonobaya, a maths teacher at Brislington Enterprise College, wanted to support her Year 7 students to visualise plans and elevations whilst also developing their digital literacy.



She planned to help students understand this topic by relating it to their own context of being located in a new-build school and asking them to consider why both printed plans or elevations and 3D computer models would have been useful when the school was being designed.

At the beginning of the scheme of work students were asked to carry out independent **research** for homework in order to find out what 'plans' and 'elevations' were, and to locate some examples. The teacher did not specify where students should look for this information as she wanted students to think about what the best sources of information might be for this particular purpose. Most students chose to use the internet and the teacher initiated some discussion about how they had found the information and how they knew it was reliable and relevant.

The teacher introduced the topic by demonstrating a model of a house on the interactive whiteboard and asking students to complete a related task on www.mymaths.co.uk. Students then used a specific website which allowed them to use blocks to **create** any 3D object they wanted. (www.fi.uu.nl/wisweb/isdeee/applets/Blookkendos.htm). The students were given time to play around with the website and become familiar with it before being asked to use their 3D onscreen creations to help them visualise what the object would look like in both plan and elevation form on isometric paper.

"You can build anything you want and then just draw it... I did a Mickey Mouse."

Year 7 boy

"It's really good for them to visualise and for them to explore building their own things, not the things I want them to make."

Year 7 teacher

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Students were encouraged to work together to help each other when they encountered problems, but they also undertook a personal online assessment to evaluate how much they had learnt at the end of the lesson.

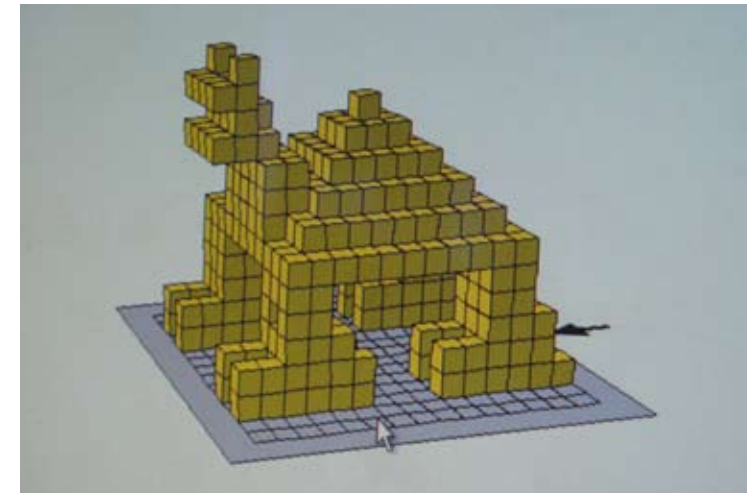
“Can we draw it like this?
Shall we draw it together?”

Year 7 boy

The teacher moved around the class reminding students of the purpose of what they were creating. The students were supported to realise that the technology afforded them the ability to create complex objects and whilst this could be very useful, they may need to simplify these objects when drawing 2D representations; technology could help them with their task but it also presented some challenges.

The teacher planned to move on to relate this work to the printed plans of the school which had been used when the school was being built, and to ask students to use Google SketchUp to re-create parts of the school. This would allow her to further discuss the contribution that both technology and mathematical understanding can make in enabling people to visualise objects in different modes, see objects from different perspectives and relate this to real-life experiences and professions.

Finally, she planned to ask students to **collaborate** to create a presentation to **communicate** what 3D solids look like in plan and elevation form and how this is used in real-life for building houses and schools. Presentations will be aimed at an audience of people who know nothing about the subject, and there will be some classroom discussion about what good communication looks like in the context of this particular audience.



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Successes and next steps

The internet was used to stimulate learning about maths. The website helped students to create, manipulate and visualise 3D objects and solids. The teacher felt that it was “the best tool we’re using... it’s really exciting.” As the children’s digital literacy develops, they could be supported to find other web-based tools which could support these processes and to compare and contrast the benefits of different tools.

Students used technology to explore and communicate the application of subject knowledge to real life. This was linked to the children’s own context in terms of the re-design of their school and provided an opportunity to think about communication and representation in different modes. Students needed to step back from their immediate assumption that a 3D model would always be the most useful and think critically about different forms of representation and how technology could support this.

Students reported enjoying the work and felt that using computers and the internet helped them to learn.

“In here it helps you learn because it’s just better on the computers than having to, like, write it all down and copy it from the board, you can do it for yourself... you learn more because you’re enjoying it.”

Year 7 student

The students encountered some problems whilst using the technology and were supported to overcome these problems, as well as being allowed to help each other with them (eg not being able to find the website, the computer freezing, learning how to use the website and how to manipulate the objects on the screen).

As the teacher further develops these types of activities, she could support students to use and analyse a wider range of technologies and to think about communicating their work in different formats. The way the room was arranged (computers on individual tables) made it difficult for effective group working and if the teacher repeated the activity she would plan to put more emphasis on the skills of collaboration, including discussion of how plans and elevations themselves support team work, for example, in the building profession.