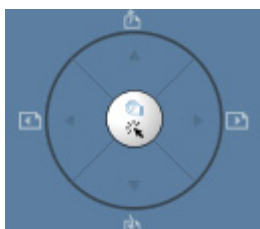


Moving into geometry – Grab and Drag!

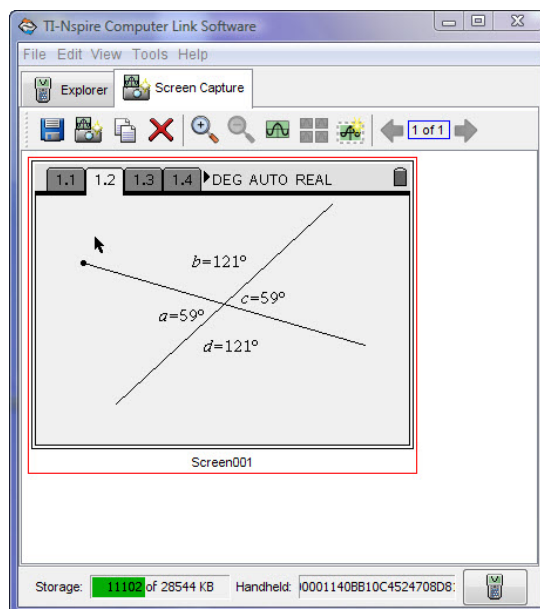
Following the positive experience of her first lesson, Annie decided to be slightly more adventurous and develop a lesson that used the dynamic geometry environment within the Graphs and Geometry application with her Year 8 group. This would require the students to learn how to work in this new application within TI-Nspire, to move between TI-Nspire pages (by pressing ctrl and right \rightarrow or left \leftarrow) and also how to use the NavPad to drag objects.



The NavPad, which acts like a mouse, enables the students to grab and drag on-screen objects such as points and lines. As this is similar to most computer game handsets, the students have no difficulties using it!

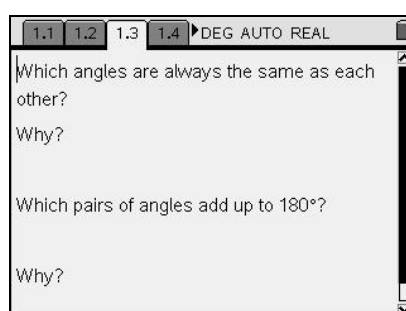
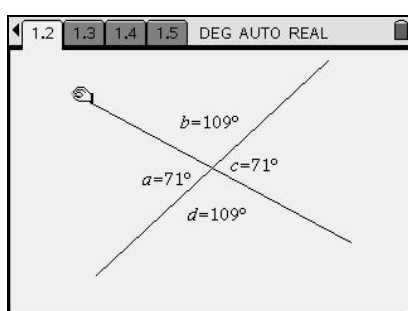
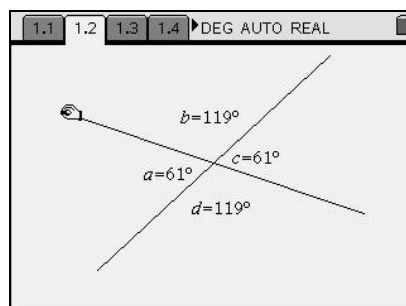
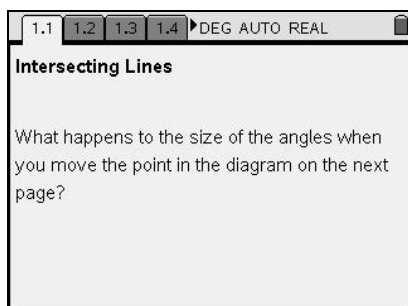
Annie decided to adapt an activity that Adrian Oldknow had devised for just this purpose. It also included the use of Notes pages both to outline the task and for the students to add their own text comments. The students would also save their TI-Nspire files onto the handhelds so that Annie could review their work at the end of the lesson.




As this lesson used a pre-designed TI-Nspire file, Annie learned how to transfer this file from her computer to each of the students' TI-Nspire handhelds using the TI-Nspire Computer Link software. As Adrian had emailed her the file, she needed to find where she had saved it on her computer and drag and drop it into the Year 8 folder she had made on the handhelds¹. Annie also discovered at this stage that she could use the Screen Capture facility to save a copy of the TI-Nspire handheld screen to use in her Smart Notebook file at the beginning of the lesson.



¹ Although at the time this needed to be done individually for each handheld, later in the project she was able to send to multiple handhelds using the TI-Connect-To-Class software.

Having organised the students' access to the TI-Nspire file, Annie was able to think carefully about her aims for the lesson. Apart from developing the student's repertoire of skills with TI-Nspire described previously, she wanted them to explore the relationships between the angles in the diagram and in particular, notice that vertically opposite angles were equal and that the sum of the angles on a straight line is always 180° .



In order to drag a point the students needed to move the pointer near to it and, when the pointer changed to an open hand , press the **ctrl** and  keys to close the hand . The NavPad could then be used to move the point and observe the angles change. Annie used the TI-Nspire software on her interactive whiteboard to show the students how to grab and drag the point and also where they should write their responses. A few of the students' initial questions related to the exact manipulation needed to grab and drag the point to vary the angles. However, once they had sorted this out, there were no further problems and Annie concluded that this lesson had given her students a very rich opportunity to analyse the mathematics of the situation by *exploring the effects of varying values and look for invariance*². She also said that "all students were able to see the connections without having to draw and measure" and that she was surprised how, with practice, the students were able to overcome their manipulative difficulties.

² One of the process skills in the National Curriculum Key Stage 3 programme of study (2007).