Teacher Notes and Instructions for Chain Surveying Activity

This activity requires a minimum of four children in the active roles but works with groups of eight to ten. Depending on the time and teaching assistance available, larger numbers should be split into smaller groups with each group undertaking the activity in turn. Small groups can do the survey and record the information at the same time. With two or more groups, one group can do the surveying while the others observe and record the information. The activity is suitable for children of most levels and aptitudes. The only mathematical skill required is the ability to count the number of links on a chain. Basic geometry (i.e. familiarity with right-angle triangles and angles) is useful to understand the technique but it is not essential.

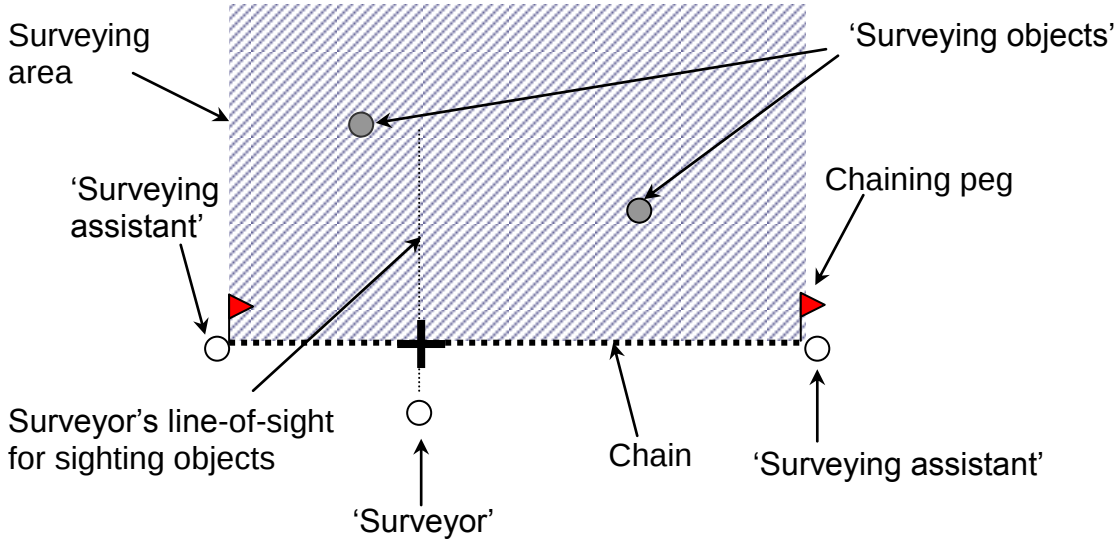
Method

1. Divide the children into groups as required.

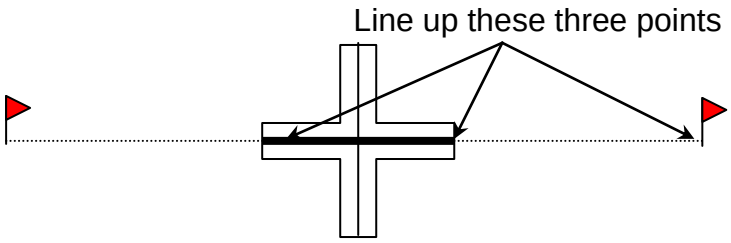
2. In each group appoint the following:
    a. Surveyor (who can wear the hat for the exercise).
    b. Two (or more, up to five) surveying assistants.
    c. A recorder (alternatively another group can do this).

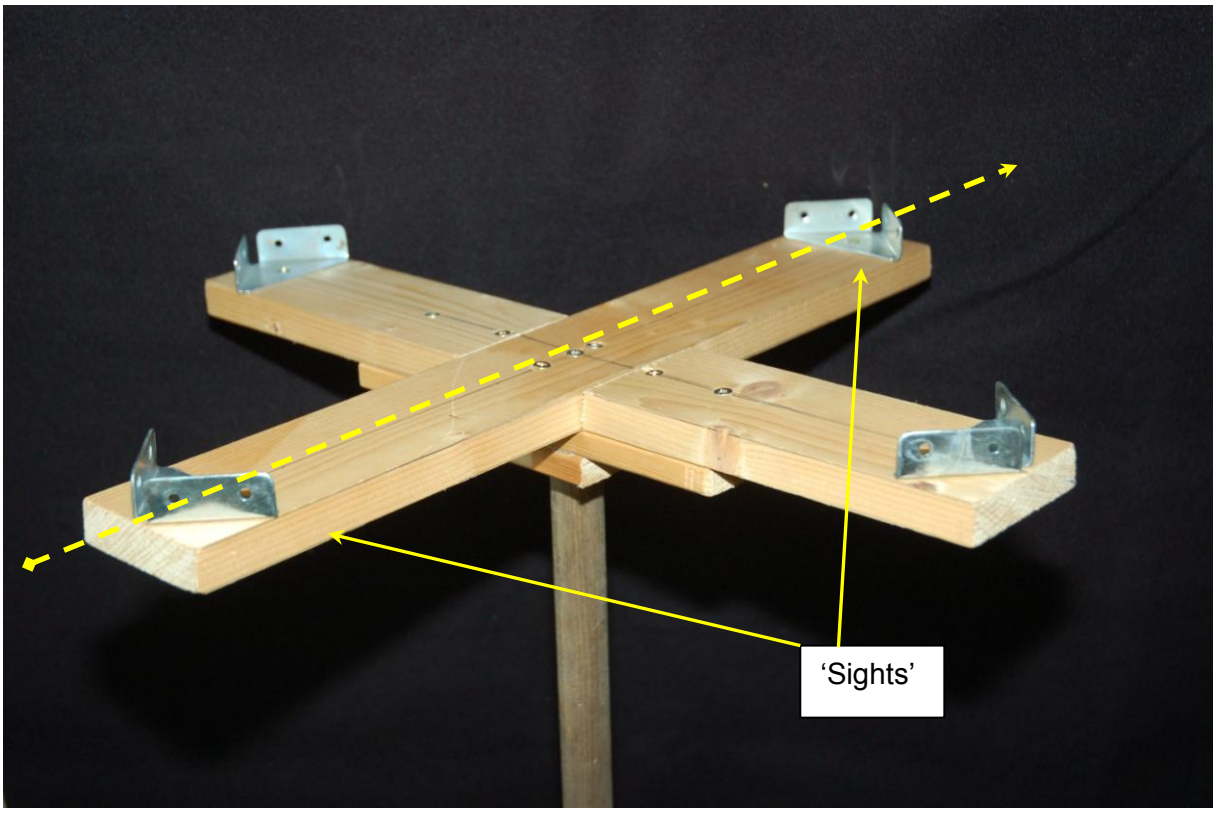
Other children can be used as objects to be surveyed. The various tasks can be rotated through the group so that all the children can experience the different roles.

3. On the exercise area, two of the surveyor's assistants can lay out the first chain, which is pulled taut and then the ends kept in position and marked by chaining pegs. This is the baseline chain and can be left in-situ for the exercise. If children are being used as objects to be surveyed, send them out into suitable positions (see rough plan below). They need to stand still in their positions until surveyed. For the purpose of the exercise it is easier to take measurements only on one side of the chain not both.



4. Holding the surveyor's cross vertically, the surveyor walks along the baseline chain until he is roughly in line with the first object to be surveyed. At this point he must do two things. First he looks through the sights on one of the cross arms to line up the chaining peg at the far end of the chain as shown in the first diagram below.



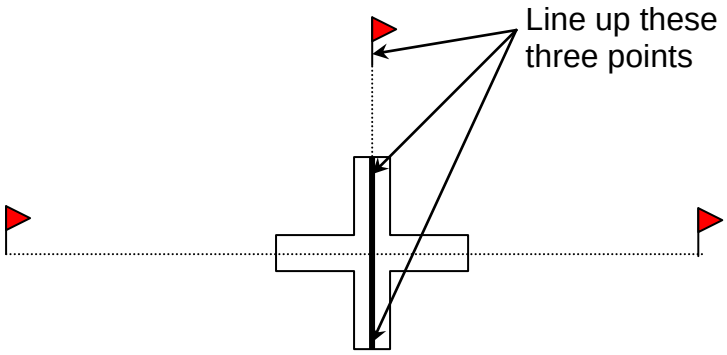


The reproduction Surveyor's Cross. The sights are the silver objects at the end of the cross arms. The dashed line represents the line-of-sight of a surveyor looking from the left through the sights to an object in the distance.

The reproduction surveyor's cross in use.

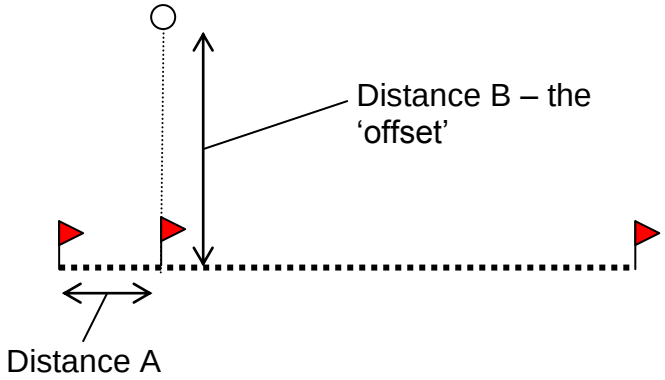
Note how the tree is lined up through the two sights. This is shown in diagram form below

5. Whilst keeping this alignment, he then looks through the sights of the other cross-arm in the same way to line up the object. If the object is not in line, the whole cross must be moved left or right until it does come into line. By keeping these two alignments it ensures that the cross is at 90º to the chain and the object to be surveyed.

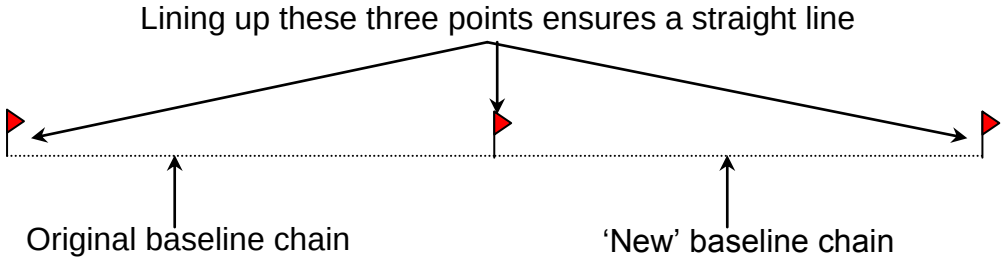


Sometimes it helps to have one of the assistants maintain one alignment while the surveyor does the other. Once the point on the baseline chain is found it should be marked with a chain peg.

6. The surveying assistants then measure from the end of the baseline chain to the point (this is distance A in the diagram below). This is done by counting the number of quarter chain markers and then counting the number of individual links. A typical measurement might be: *'¼ chain, 10 links*'. This is recorded on the surveyor's field book sheet.



7. The surveying assistants then measure distance B (the offset), i.e. the distance from the chain out to the object. To do this, the second chain is used. One end is held at the chaining peg on the first chain and the other end taken out to the object to be surveyed. When this is done, the surveying assistants can then measure the offset in the same way.
8. When this is done, it marks the end of one completed survey measurement. More objects can then be surveyed along the chain as required.
9. When a number of objects have been surveyed, the baseline itself can be extended. The easiest way to do this and to maintain a straight line is to lay out the second chain from the end of the baseline chain peg and then extend the second chain, lining up the far end, middle and other end (as shown below). The original baseline chain can now be moved and become the offset measuring chain.



10. Back in the classroom, the results obtained can be plotted on sheets of paper or drawn on computer/whiteboard if required.

Extension activity

The process of surveying does not have to be large scale. The above could be repeated as a tabletop or indoor exercise using rules, tape measures or string. Pupils could also survey a landscape (such as a play ground with equipment, a garden or a gym/hall) arranged by the teacher and draw up a suitable map – complete with map key, scale, etc.