



## Practice makes perfect?

The purpose of this activity is:

- to find out how quickly we can learn a skill that involves co-ordination of movement with information from our senses
- to see how experience helps us to improve our skill
- to consider whether or not this gives us general information about learning.

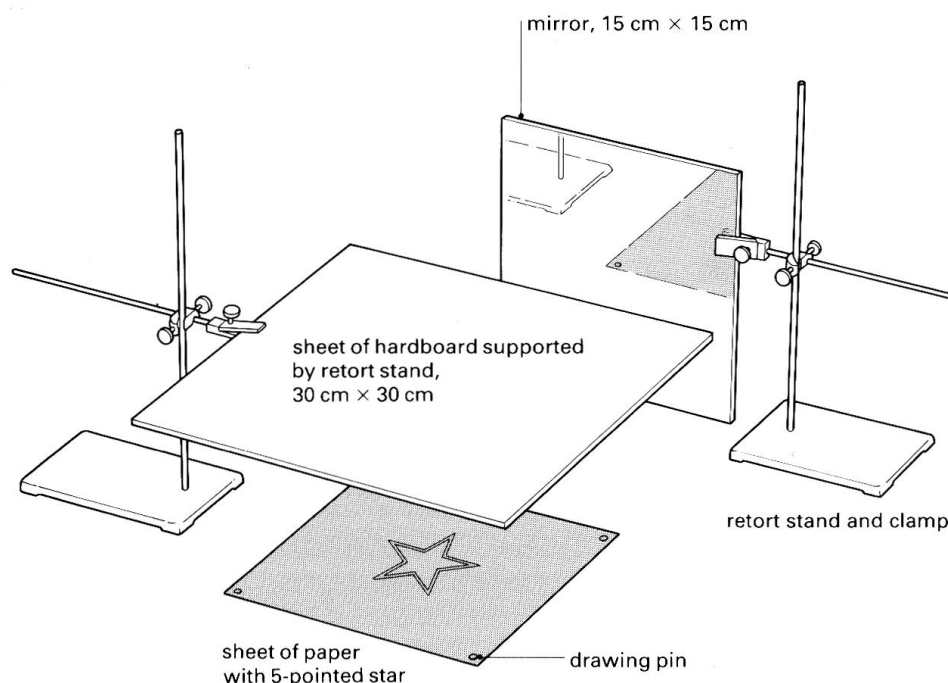
### Procedure

SAFETY: There are no safety precautions for this practical

### Investigations

#### Task 1:

- Set up the apparatus as shown in the diagram. The mirror should be about 50 cm away from the subject. The hardboard sheet must be high enough that the subject can comfortably write underneath it, blocking their view of the star figure, but not blocking the view of the mirror.
- Fix a figure of one five-pointed star with a double outline in a marked position underneath the hardboard (see page 3 for this figure).

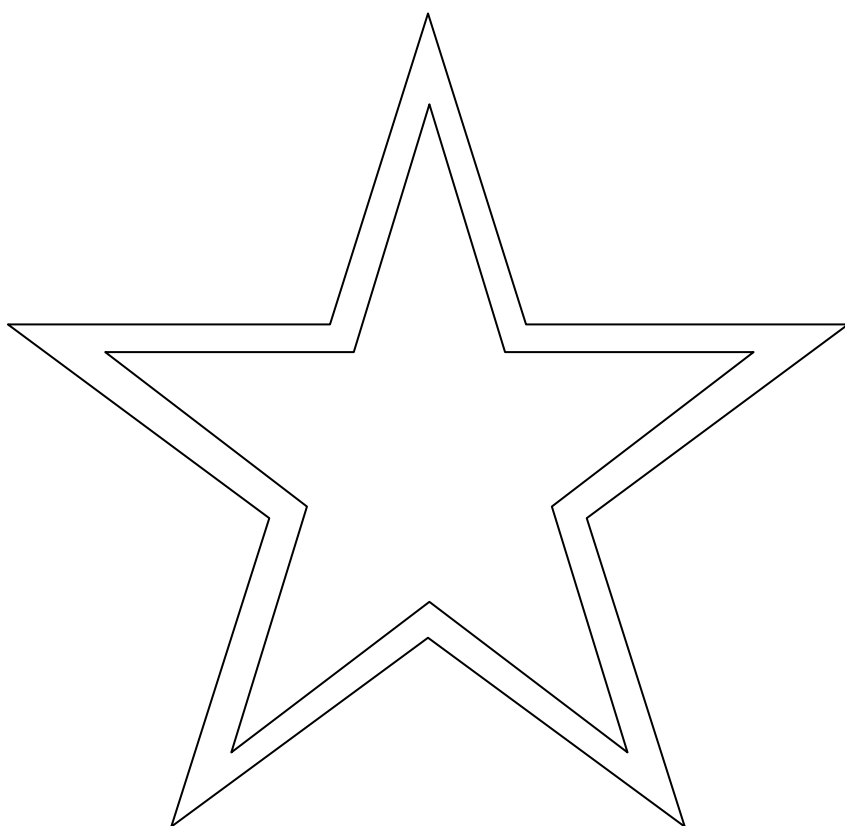
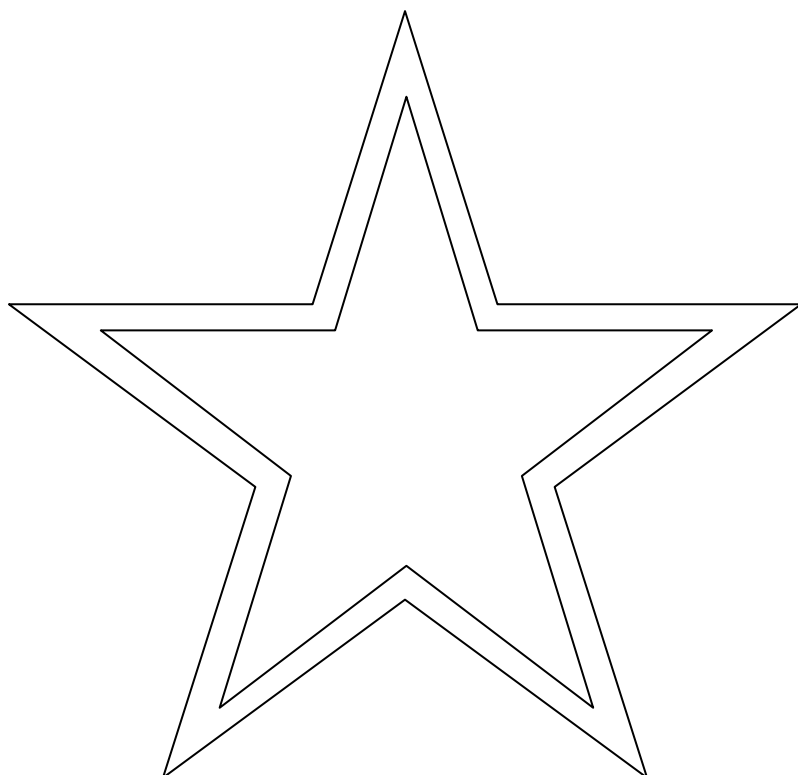


- Settle your subject in place: able to see in the mirror, both the star and the position of their pencil on the paper. No part of the subject's body should touch the bench.
- At a suitable signal, start a timer and ask the subject to draw a pencil line around the star shape, keeping it between the two lines as much as possible, and as quickly as possible.

## PRACTICAL BIOLOGY STUDENT SHEET



- e** Repeat this at least 15 times, using a fresh star figure each time. Each time, fix the figure in the same place and start tracing from the same point. Write the trial number on each tracing.
- f** For each trial, record the time taken and the number of errors. Crossing the printed lines of the star figure is considered to be an error.
- g** Plot graphs of the time taken and the number of errors against the number of the trial.





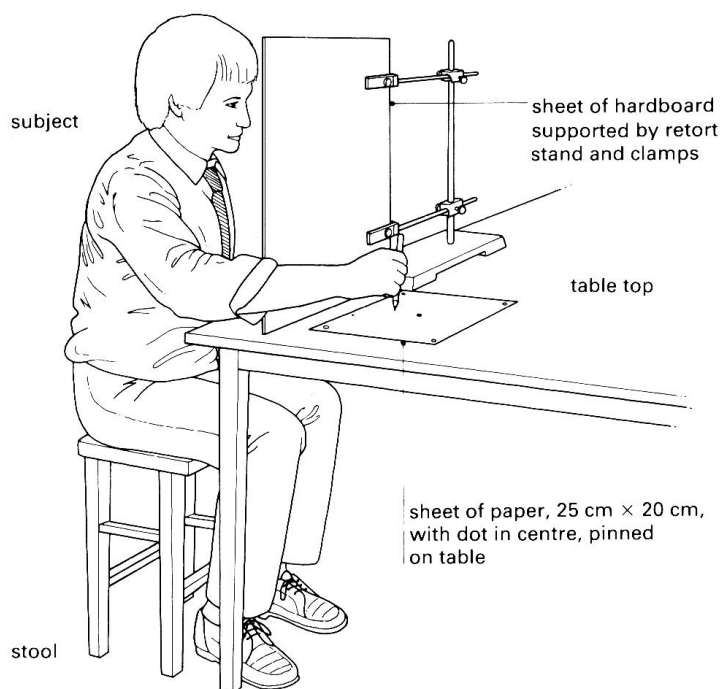
## Task 2:

- Number 41 sheets of paper – from 1 to 41.
- Ask the subject to try to draw freehand a straight line as close to 7.5 cm long as possible on a sheet of paper (A6), presenting the sheets in order.
- Turn the paper face down on the bench, and ask the subject to draw another line of the same length on a second sheet of paper. Continue this for 20 trials.
- Hand the 21st sheet of paper to the partner to measure the line to the nearest 0.5 cm. Tell the subject the result. Then ask the subject to perform another 20 trials.
- Measure the lengths of the lines in both series and graph the results against number of the trial. Include both series on the same graph.

## Task 3:

### Preparation

- Arrange the apparatus and the subject as shown in the diagram. The subject must be able to reach the sheet of paper around the dot, but not be able to see it.



- Ask the subject to mark the paper as near to the dot as possible, without touching the bench. After each attempt, the partner should measure the distance between the dot and the pencil mark and record it, without informing the subject. Continue for 20 trials. Each time, write the trial number next to the dot.
- Perform a second series of trials, but this time, inform the subject of the result of the previous trial – for example, 5 cm north-west of the dot.
- Plot the results of the two trials against the number of the trial on the same graph.



## QUESTIONS

- 1 What do your graphs indicate about the speed with which you can learn to draw the star shape in the first task?
- 2 How much variation in the rate of learning is there in your group?
- 3 How would you investigate whether developing your skill at this mirror drawing makes it easier for you to trace a different mirror drawing?
- 4 Looking at your results from task 2, does knowledge of the results improve subsequent performance? What is the effect of feedback on accuracy?
- 5 In all these tasks, what information must be available to the brain if you are to improve your performance?
- 6 How might performance be affected by running 50 trials or more without a break?



## ANSWERS

- 1 There might be some variation between people. Most will improve during the course of the trials, but some might improve more, and more quickly, than others.
- 2 There is likely to be variation in the rate of learning for this task in the group.
- 3 Try with another mirror drawing. Three sets of people – one set of people who have worked on this task, one set of people who have worked on another drawing task and one group of people who have not done any prior tests.
- 4 Knowledge of results should improve subsequent performance. Feedback should increase accuracy.
- 5 The brain needs to know how well you have performed in order to improve on the performance.
- 6 Running 50 trials or more without a break might result in a decrease in success or a drop in performance as the subject becomes tired.