

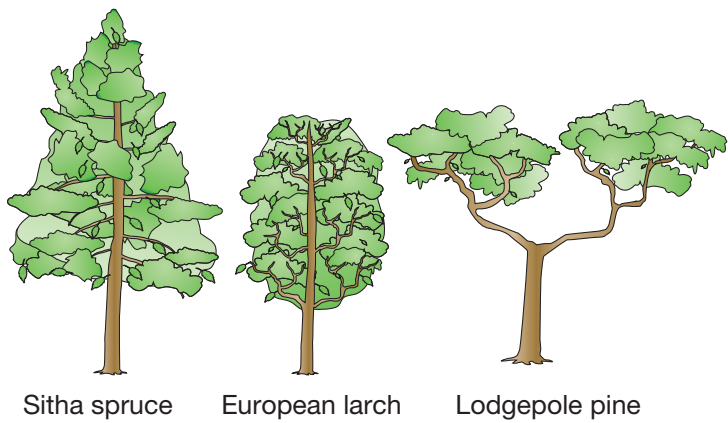
# Tree tops

## Problem sheet

A manager of a forestry company in Scotland has to decide which trees to plant. There are three main species to choose from: Sitka Spruce, European Larch or Lodgepole Pine.

Whatever trees are planted they have to be thinned after 10 and 20 years, and the wood from the thinning is sold for a profit.

Each kind of tree has a different planting cost per hectare, a different growth rate and a different value per hectare depending on the age the tree is felled. All this information is given in the table below.



	Sitka Spruce	European Larch	Lodgepole Pine
Planting cost per hectare (£)	120 000	115 000	130 000
Profit per hectare from 10 years thin (£)	10 000	15 000	20 000
Profit per hectare from 20 years thin (£)	40 000	40 000	30 000

Growing period (years)	Possible income per hectare		
	(£)	(£)	(£)
30	358 000	192 000	122 500
40	513 000	469 200	366 400
50	693 000	858 000	646 000
60	834 000	1 184 000	950 200
70	1 126 800	1 158 000	1 144 000
80	904 000	1 059 000	1 310 800
90	805 000	837 000	1 476 000
100	666 000	782 600	1 360 000

What strategy for planting and felling would you recommend to the manager in order to maximise the profit:

- after 70 years?
- after 90 years?
- more generally?