RANDOM BLOCKING FACTORS

Contrast the two examples:

A. Seedlings are being grown in a greenhouse. Since variables such as light, heat, humidity, and pests might vary according to location in the greenhouse, the greenhouse is divided into blocks by location, and treatments are randomly assigned within each block.

B. The candle experiment (Problem 6, p. 326): Color of candle is the treatment factor, burning time of the candle is the response, and the blocks are the experimenters.

Candle experiment:

1. Treating block as fixed

```
Factor      Type Levels Values
BLOCK      fixed      4    1    2    3    4
COLOR      fixed      4    1    2    3    4
```

Analysis of Variance for TIME

Source	DF	SS	MS	F	P
BLOCK	3	151659	50553	29.58	0.000
COLOR	3	60345	20115	11.77	0.000
BLOCK*COLOR	9	15821	1758	1.03	0.431
Error	48	82025	1709		
Total	63	309850			

2. Treating block as random (unrestricted model):


```
Factor      Type Levels Values
BLOCK     random      4    1    2    3    4
COLOR      fixed      4    1    2    3    4
```

Analysis of Variance for TIME

Source	DF	SS	MS	F	P
BLOCK	3	151659	50553	28.76	0.000
COLOR	3	60345	20115	11.44	0.002
BLOCK*COLOR	9	15821	1758	1.03	0.431
Error	48	82025	1709		
Total	63	309850			

3. Treating block as random (restricted model):

```
MTB > ANOVA 'TIME' = BLOCK|COLOR;
SUBC>   Random BLOCK;
SUBC>   Restrict.

Analysis of Variance (Balanced Designs)


Factor      Type Levels Values
BLOCK      random     4      1      2      3      4
COLOR       fixed     4      1      2      3      4


Analysis of Variance for TIME

Source          DF        SS        MS       F      P
BLOCK            3     151659     50553   29.58  0.000
COLOR            3      60345     20115   11.44  0.002
BLOCK*COLOR      9      15821      1758    1.03  0.431
Error           48      82025      1709
Total           63     309850
```