Plane Group Symmetry Exercises

These exercises are designed to:

a) help you identify plane group symmetry elements
b) associate the standard symbols with the symmetry elements
c) use the located symmetry elements to identify unit cells
d) use the symmetry to identify the asymmetric unit
e) introduce the standard symbols for the general coordinates used in the Internation Tables for Crystallography: Volume A

There are 17 plane groups. You are encouraged to do all of the exercises in the “Basic” and “Advanced” menus.

The animations presented in the “Basic Instruction” and “Advanced Instruction” menus show you how to get to the answer step-by-step.

Basic Instruction: p1 p2 pm cm p2gg p4gm

The animations presented in the “Advanced Instructions” menu also provide instruction to help you make the transition from simple plane groups using the “flask and cylinder pattern” to space group general position diagrams using the standard symbols as presented in the International Tables for Crystallography: Volume A.

Advanced Instruction: p6 c2mm

In “More Plane Groups,” texts provide short descriptions of the remaining plane groups.

More Plane Groups p3 pg p4 p3m1 p31m p2mg p2mm p4mm p6mm

Practice provides four patterns of difficulty similar to those above.

Practice h1 h2 h3 h4

The final pattern is a real challenge. Yes, it is "tricky."

Hard one h5