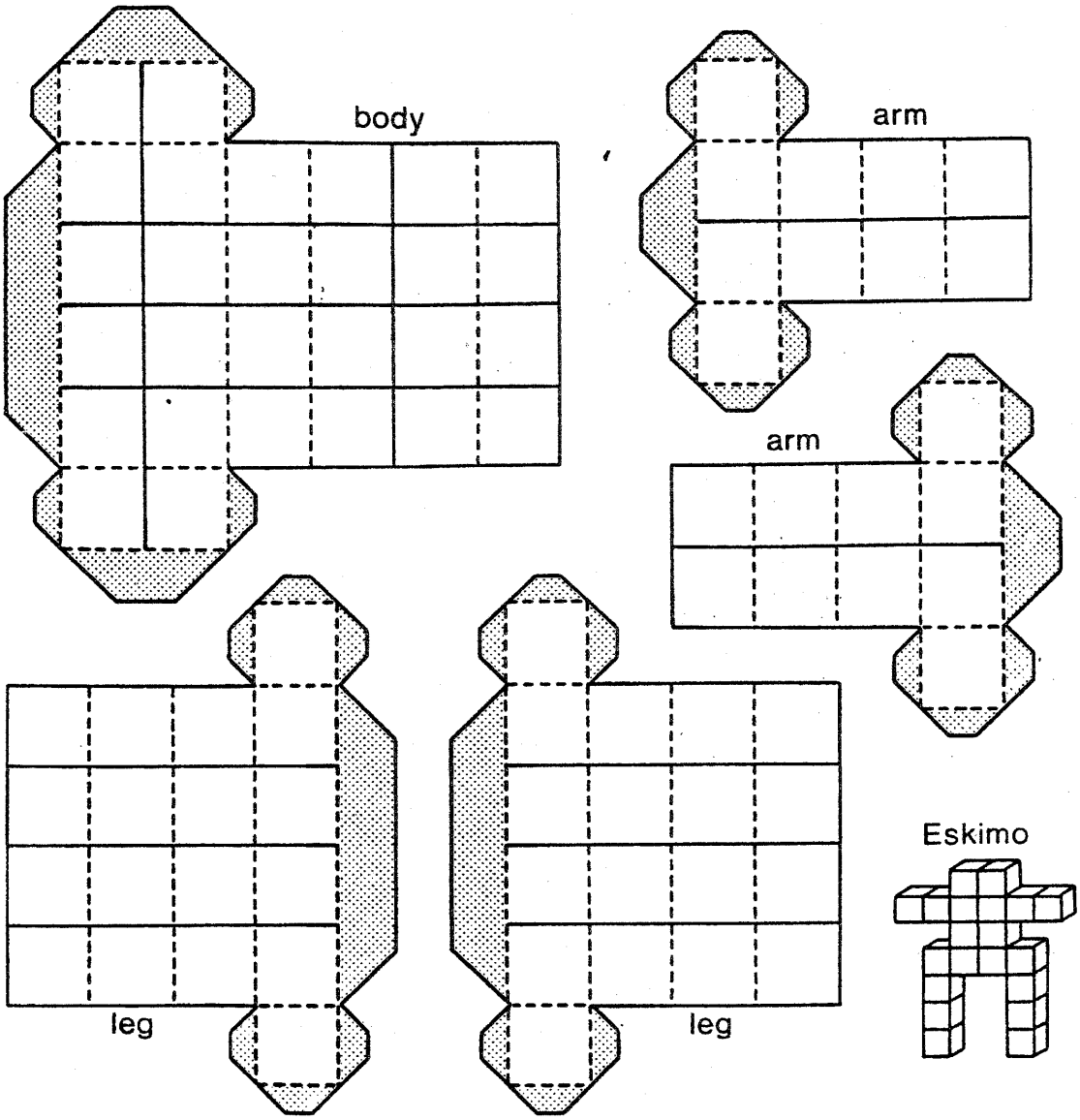
VOLUME OF PRISMS
INVESTIGATION
SURFACE AREA TO VOLUME RATIO

This investigation compares the surface areas to the volumes of different body shapes. Is there an advantage to being of a particular body shape in a particular climate ? Why are the body shapes of marathon runners different from shotput throwers?

- Assume that each square is 1cm by 1cm.
- The surface area is the total number of unshaded squares, each with an area of $1cm^2$. The surface area represents the skin through which a person can lose heat in hot climates or retain heat in cold climates.
- The volume is the total number of cubes, each with a volume of $1cm^3$. The volume represents the body size.
- Work in pairs.
- Before cutting out each body shape, calculate the surface area and write this in the table below.
- After cutting out and assembling each body shape, calculate the volume of each. Write this in the table.
- Write the ratio of surface area to volume. Simplify this by dividing the SA by the volume.
- Are certain body shapes better adapted to particular climates or sports?

BODY SHAPE	SURFACE AREA (Number of squares)	VOLUME (Number of cubes)	RATIO OF SA:VOLUME	RATIO OF SA:VOLUME (Simplified)	OPTIMUM (BEST) CLIMATE/SPORT FOR THIS BODY SHAPE
Example	50	40	50 : 40	1.25 : 1	-
ESKIMO (INNUIT)				: 1	
DESERT-DWELLER				: 1	

Shape and Relative Surface Area



1 Cut out the above four parts of the 'Eskimo' along the solid outer lines.
2 Fold them along the broken lines to form the tabs (shaded parts).
3 Using glue on the shaded sides of the tabs, assemble each part and then stick the five together to form the 'Eskimo'.
4 Repeat for the 'Desert dweller'.
5 Compare the two humans with respect to height, breadth, shape, total surface area and volume.

Shape and Relative Surface Area