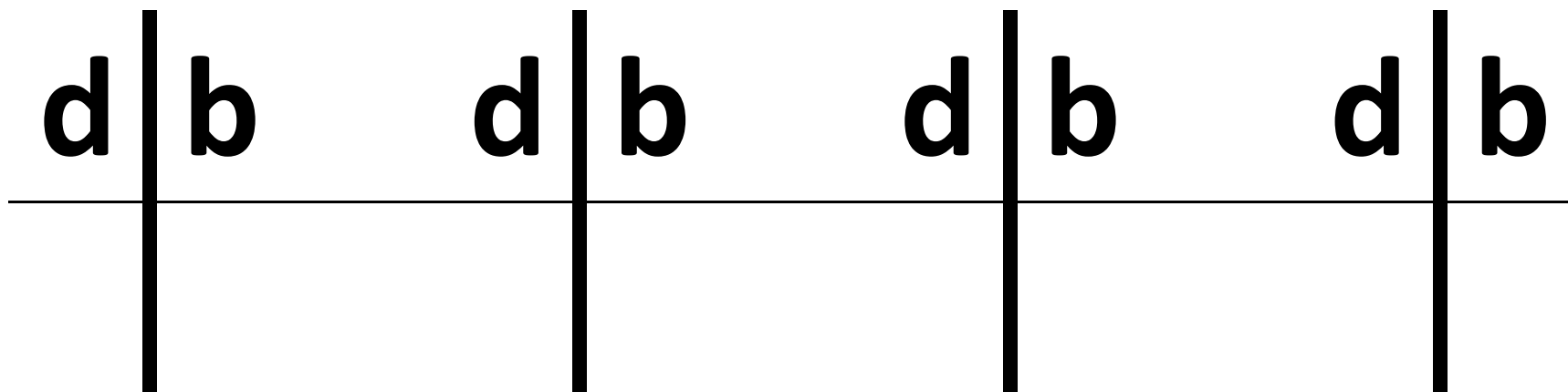


Two-element motif with vertical mirror

“side”

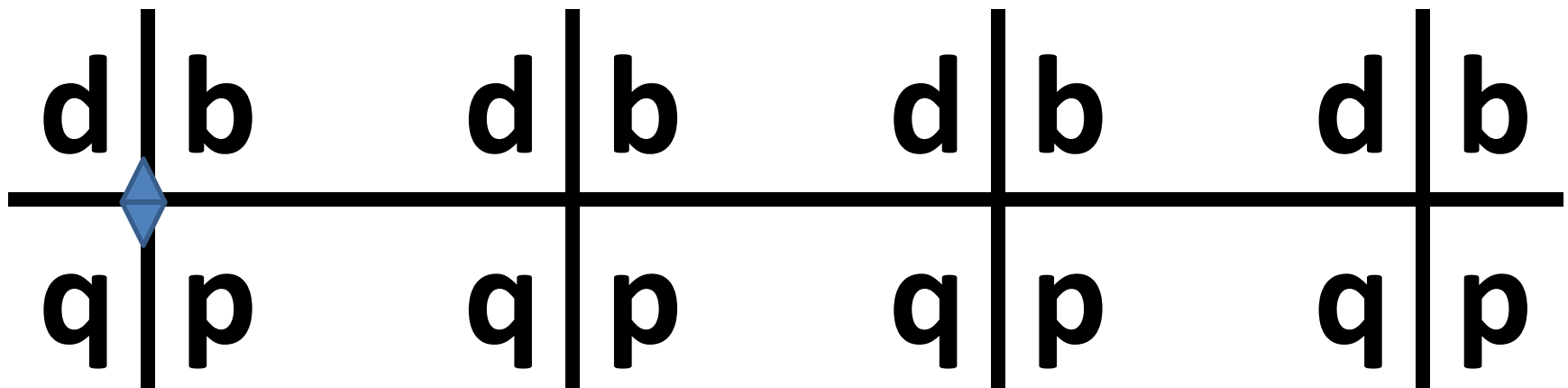
m1



Four-element motif with vertical and horizontal mirrors (rotational symmetry is automatic)

“dizzyjump”

mm



Ok, I lied ... a little

- The five previous frieze patterns were generated by just “stringing together” motifs that already displayed the symmetries of the rectangle.
- There exist two more frieze patterns that display symmetries not found either isolated rectangles or strings of rectangles.

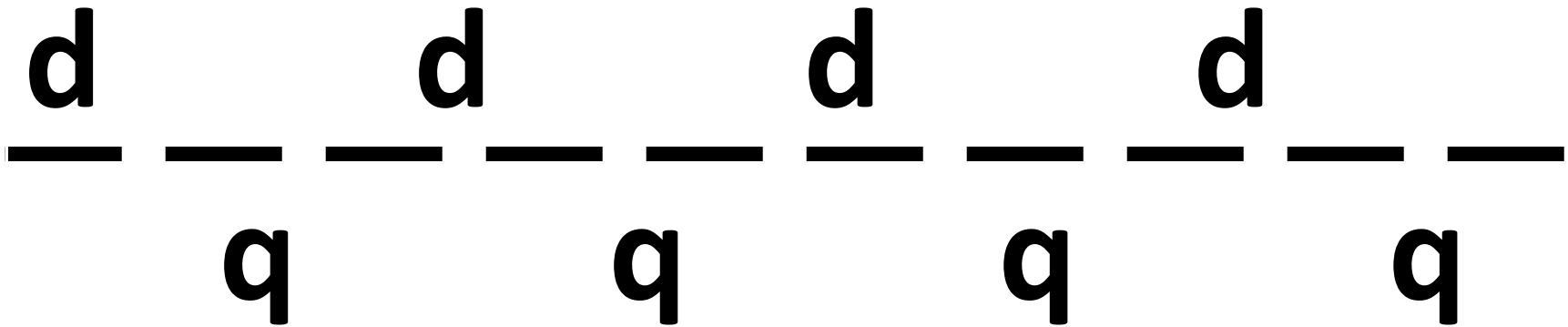
Glide

- These “new” symmetries arise from the way certain motifs combine with translations; or more precisely,
- These “new” symmetries arise only from the way certain motifs LACKING any of the rectangle symmetries combine reflections with HALF-translations. These are called “glide” translations.
- The fact that the motifs do not possess the symmetries of the rectangle and the translations do not possess the periodicity of the frieze patterns means that the glide operation is a distinct kind of symmetry.

Two-element motif with no rectangle symmetries (no mirrors or rotational symmetry), but which admits glide symmetry

“step”

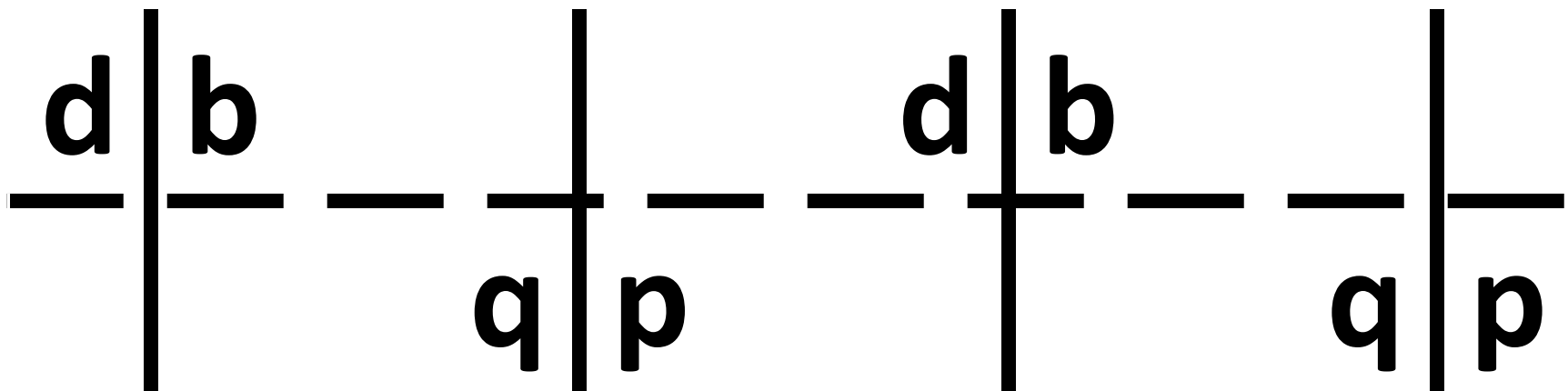
1g



Four-element motif with vertical mirrors and rotational centers, but not those of the rectangle; admits glide symmetry

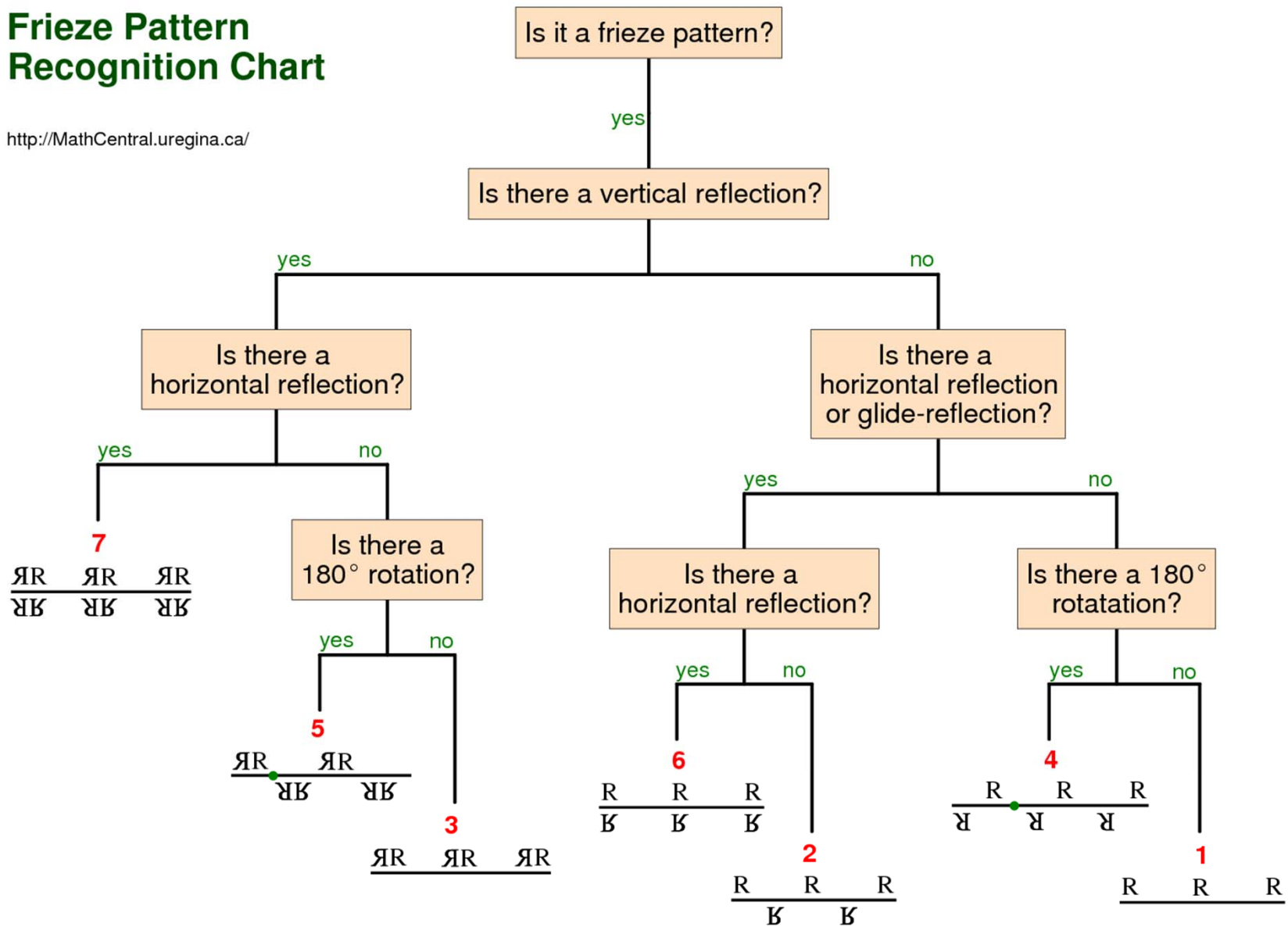
“dizzyside”

mg



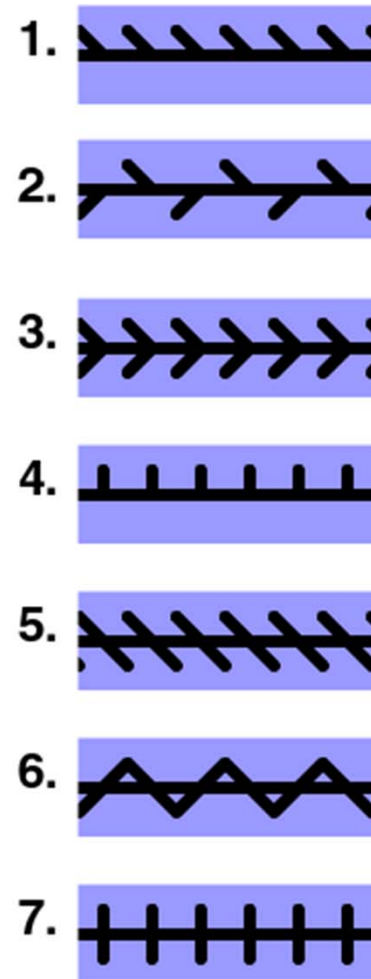
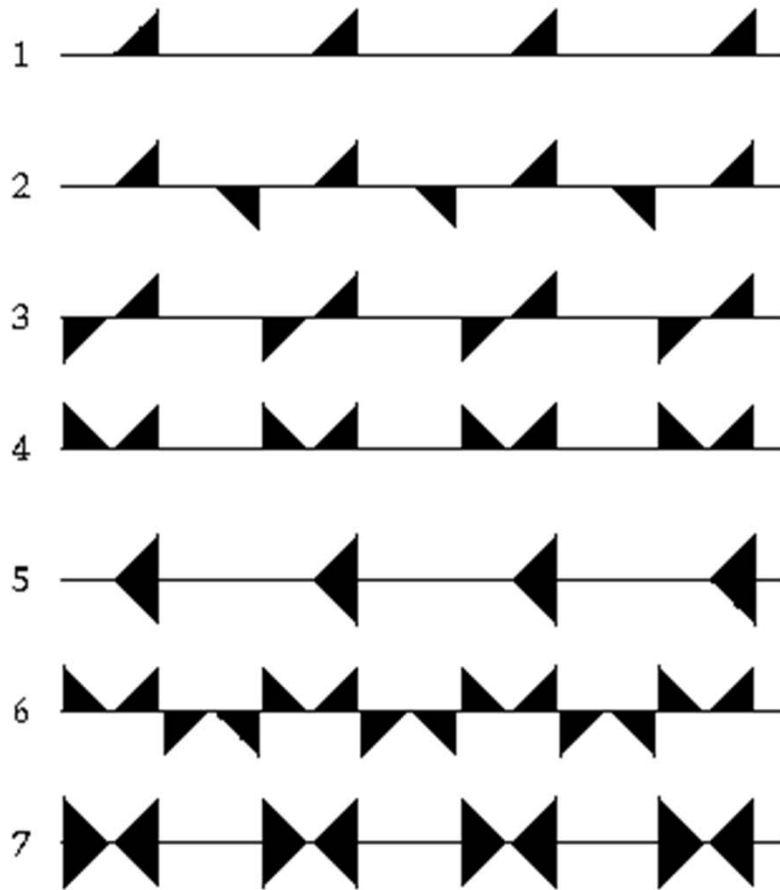
Frieze Pattern Recognition Chart

<http://MathCentral.uregina.ca/>



Frieze Groups

(watch out for numbers that don't match)



Two-symbol notation for friezes

- First symbol: a letter **m** indicates reflection in the vertical axis; otherwise, a **1**.
- Second symbol: **m** indicates reflection in the horizontal line; **g** indicates glide reflection but no horizontal reflection; **2** indicates a half-turn but no glide reflections; **1** indicates that none of these conditions is satisfied.

Alphabetic Examples

- (11) {T} ppppppppppppp
- (1m) {T,H} EEEEEEEEE C,D,K
- (1g) {T,G} pbpbpbpbpbpbp
- (12) {T,R} pdppdppdppdpp N,S,Z
- (m1) {T,V} pqpqpqpqpqpqp A,M,T,U,V,W,Y
- (mm) {T,H,V,R} HHHHHHHHH I,O,X
- (mg) {T,V,G,R} pqbdpqbdpqbd

Friezes in the round

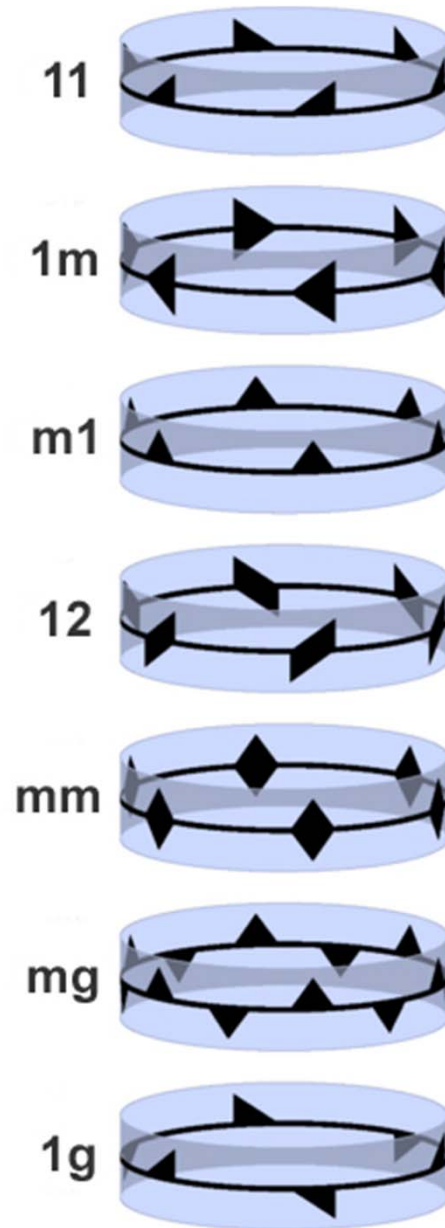
Frieze patterns can be found wrapped around cylindrical objects or formed into hoops.

Belts, bracelets, necklaces (esp. chokers), hat bands

Decorative bands around bottles and cans

Rolled products such as:
Ribbon, gift wrap, paper towels, fabric, lace

Automobile tire treads



No Vertical Mirror

Vertical Mirror

aaaaaaaaaa

11

m1

ababababab

aaaaaaaaaa
gggggggggg

1m

mm

ababababab
ggeggeggeg

a a a a
g g g g

1g

mg

ab ab
ge ge

aeaeaeae

12



11
“hop”

