Repeating Knot Cards

How to play

Justin Roughley, 2026

THE CARDS

Every card is a little patch of Celtic knotwork, and every one can be turned any way: wherever it goes, the ribbons still pass alternately over and under.

THE IDEA

Lay four cards in a square, repeat the square, and the knot takes on one of nine kinds of symmetry: nine of the seventeen wallpaper groups.

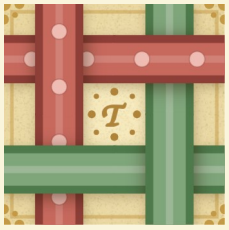
IN THE PACK

48 pattern cards: 16 T, 16 G, 8 R and 8 E.

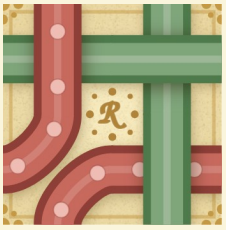
9 target cards: a recipe on the front.

3 reference cards.

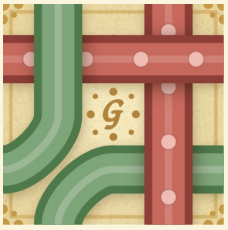
This leaflet, and the box.



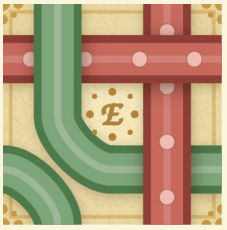
T × 16
four crossings: a trellis



R × 8
two red bends



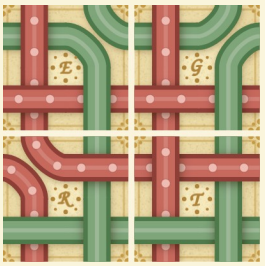
G × 16
two green bends



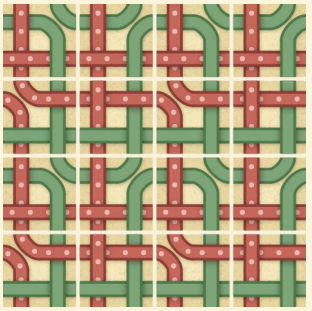
E × 8
an elbow and a corner

HOW TO PLAY

1. Lay four cards in a square, each turned any way you like.
2. Make three more squares the same and join them: sixteen cards.
3. Colours must match across every edge.
4. Look for mirrors, glides and turns, and name the pattern's wallpaper group. Over and under count; colours do not.



A square of four



The square repeated: sixteen cards

EASY

Study a group

Read a target card's back first: it names the group and marks its mirrors, glides and turns. Build the pattern from the front and find each mark.

MEDIUM

Name the group

Build a target from the four letters on its front, each turned as shown, and work out its group. Then turn the card over.

HARD

Find all nine

With the pattern cards alone, find a square of four for each group: **4*2**, **2222**, **2*22**, **22***, ******, **××**, **22×**, **442** and **o**.

THE ANSWERS

The target cards' backs are the answers. They are printed separately, as the solutions, so the cards can be played without them.

READING THE NAMES

2, 4 before *: a kind of turn centre on no mirror; 2 a half turn, 4 a quarter turn.

*****: mirrors: one kind, or kinds that meet.

2 after *: a kind of point where mirrors cross; the digit counts the mirrors.

×: a glide (reflect, then slide) that crosses no mirror.

o: nothing but repeats.

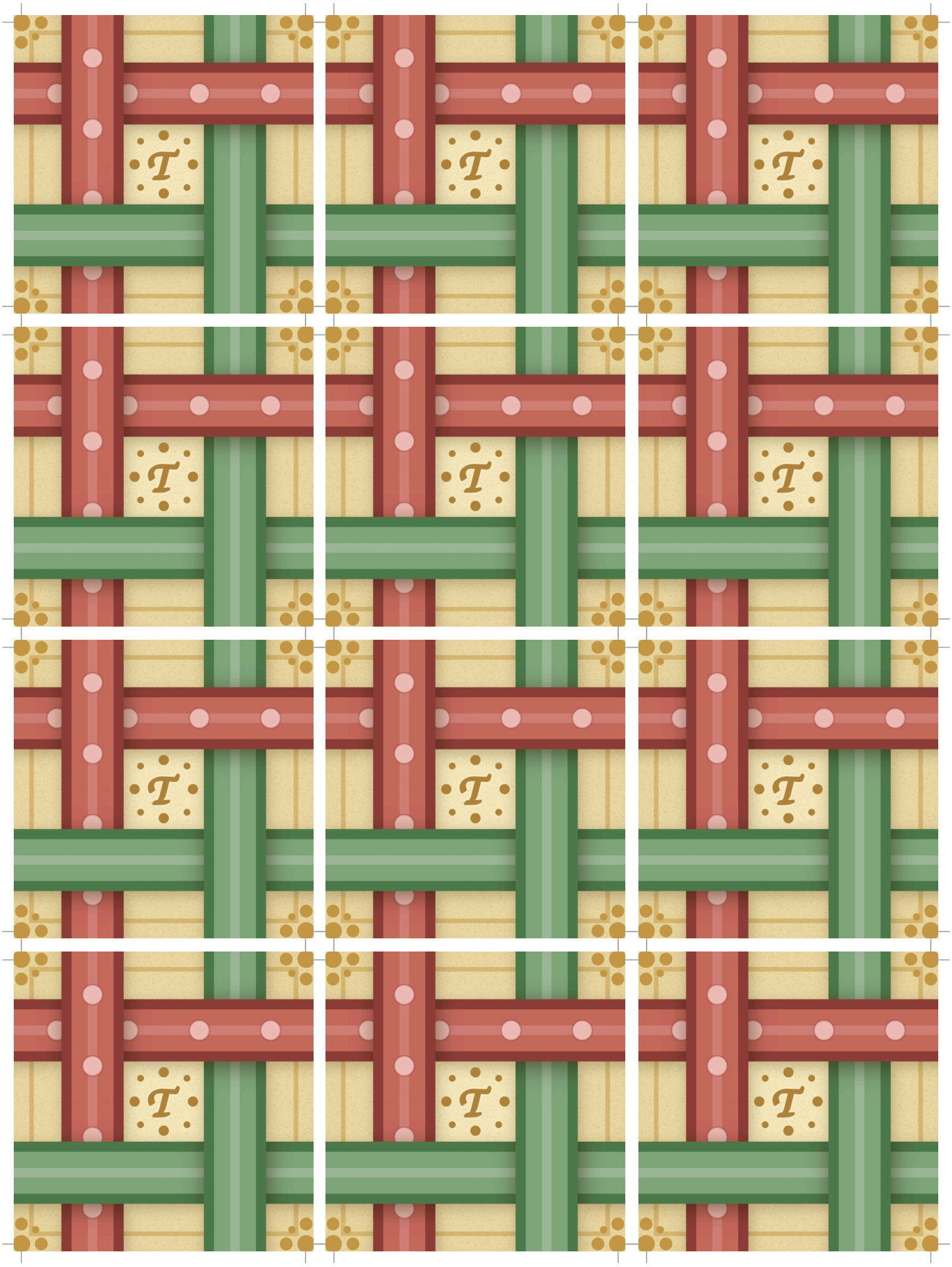
Count kinds, not copies. Two marks are one kind when a symmetry of the pattern carries one onto the other.

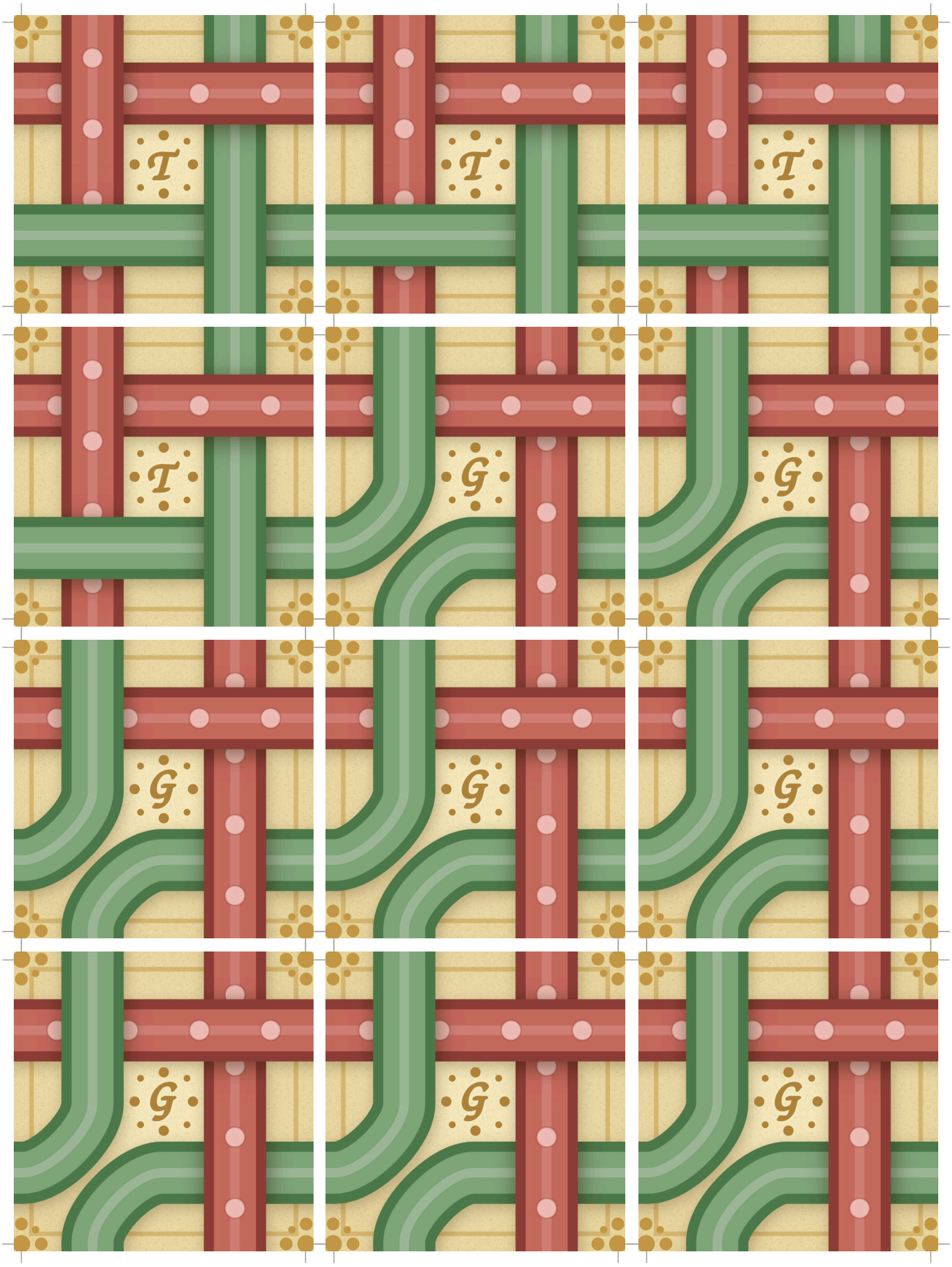
On screen, a card table and a guide to every target:
knotworthy.co.uk/K2026-06

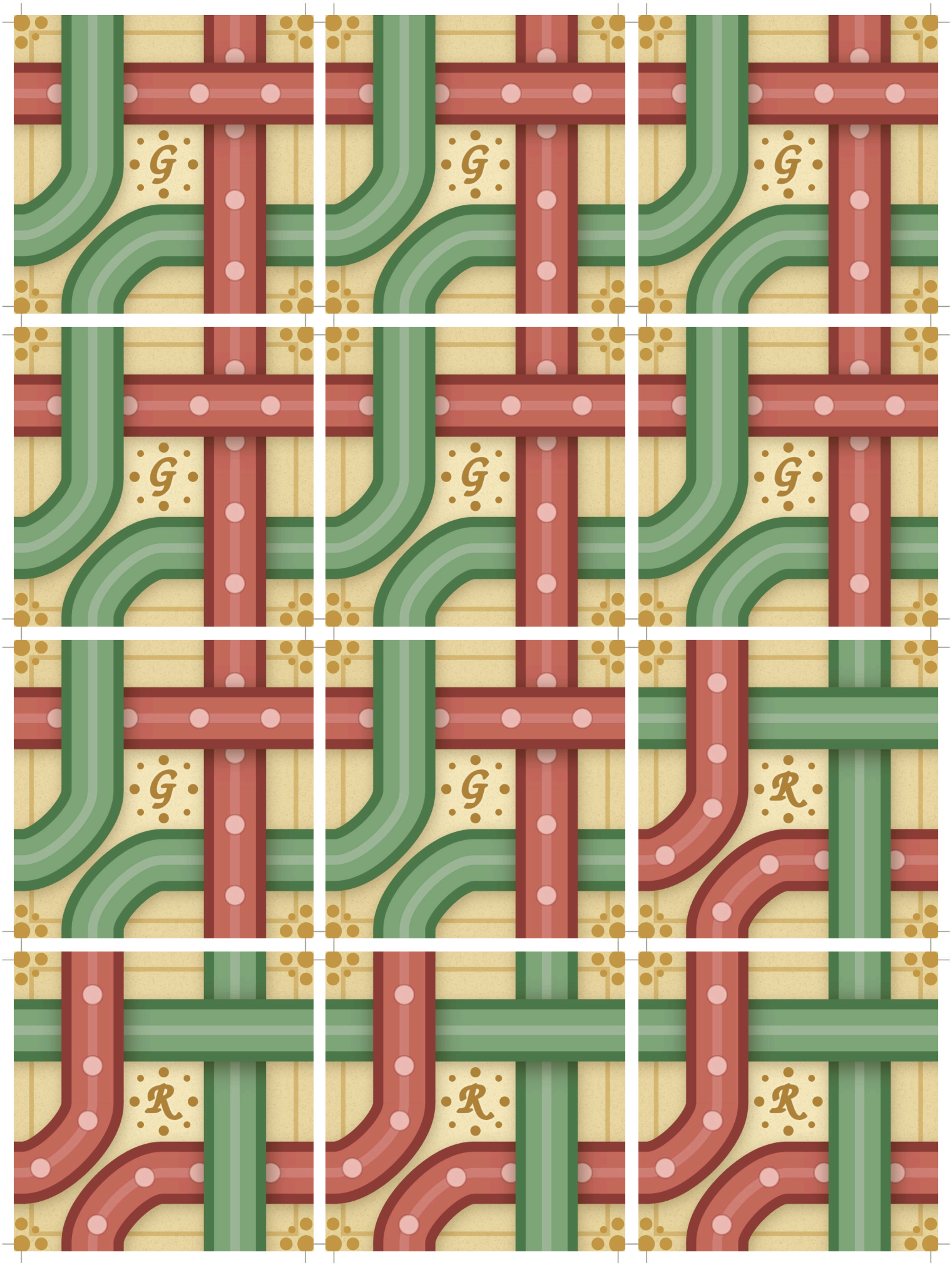
TO FOLD

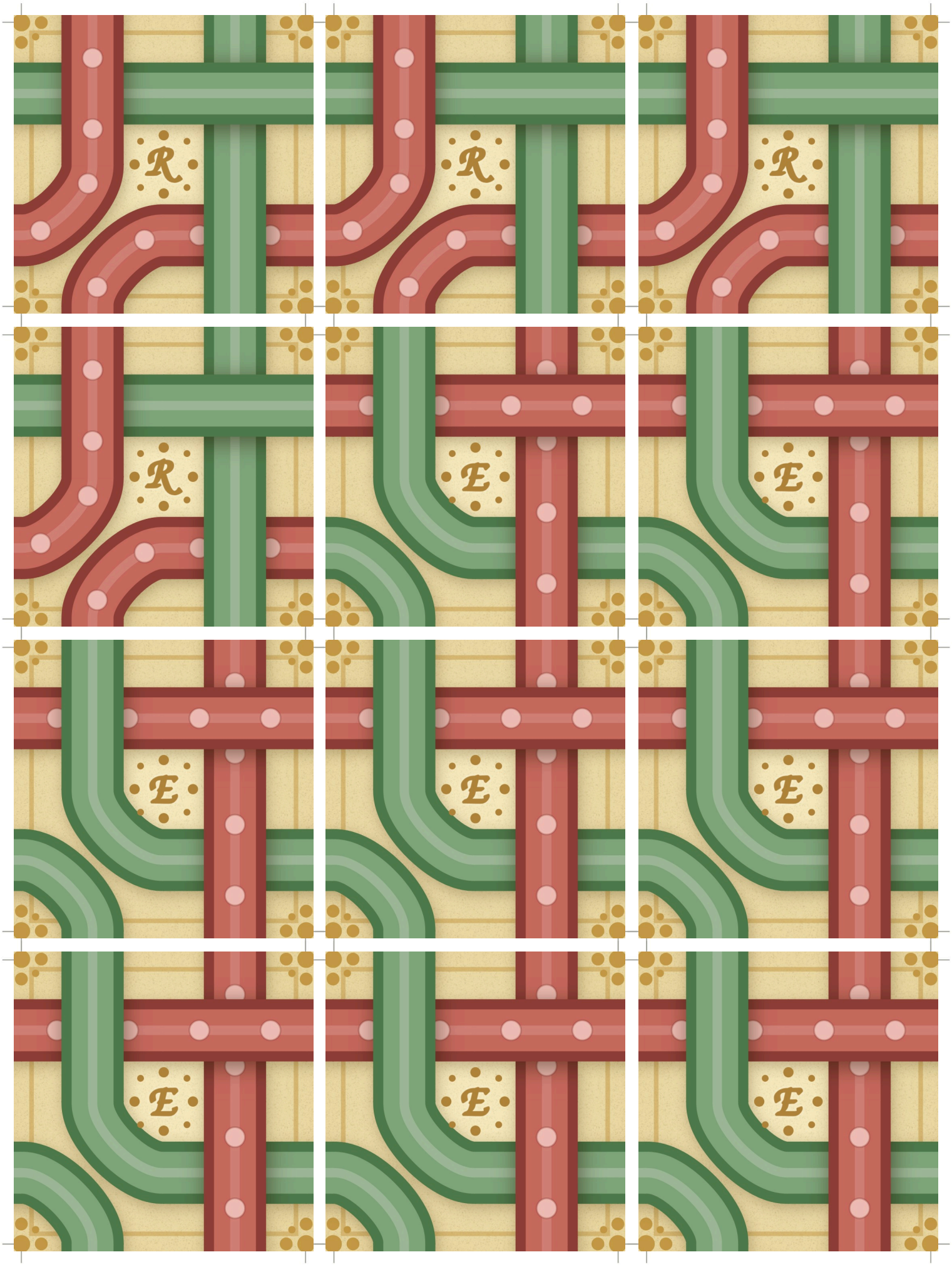
Print this page on ordinary paper. Zig-zag along the dotted lines, the four across first, then the three down, keeping the cover (top left) facing you. It ends on top, and the leaflet lies on the cards in the box.

Free to print · CC BY 4.0




T
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Repeating Knot Cards

four cards · nine wallpaper groups

1. Pick a target card, recipe side up.
2. Lay out its four cards in a square, each turned so its letter faces as shown.
3. Make four such squares and join them: sixteen cards. Match ribbon colours across every edge.
4. Find the mirrors, glides and turns. Which group is it?
5. Turn the target over to check.

READING THE BACKS

- mirror
- glide: reflect and slide
- half-turn centre
- quarter-turn centre

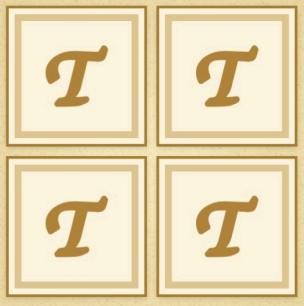
The name lists what a pattern has: a number for each kind of turn centre; ***** for mirrors, with a number after it for each kind of corner where mirrors meet; **×** for a glide that crosses no mirror; **o** for repeats only. In brackets: the crystallographers' name.

TO WONDER ABOUT

1. Why can't these cards make ***×**, the tenth group a square grid allows?
2. Change one card at a time. Can you visit all nine groups without repeating one?
3. How many strands of each colour does each pattern have?

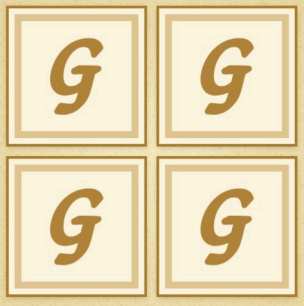


TARGET 1



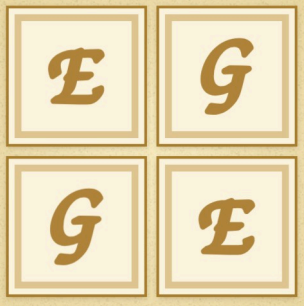
Make this square, then four of them. Which group is it? Turn over to check.

TARGET 2



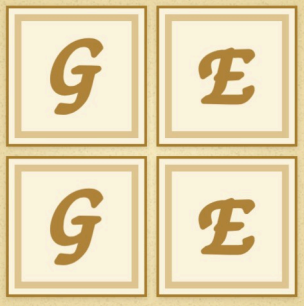
Make this square, then four of them. Which group is it? Turn over to check.

TARGET 3



Make this square, then four of them. Which group is it? Turn over to check.

TARGET 4



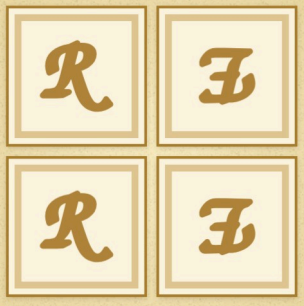
Make this square, then four of them. Which group is it? Turn over to check.

TARGET 5



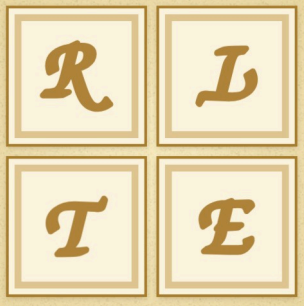
Make this square, then four of them. Which group is it? Turn over to check.

TARGET 6



Make this square, then four of them. Which group is it? Turn over to check.

TARGET 7



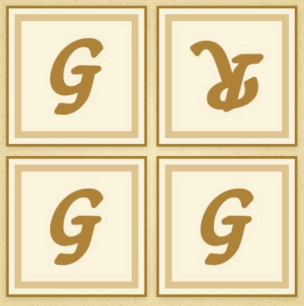
Make this square, then four of them. Which group is it? Turn over to check.

TARGET 8



Make this square, then four of them. Which group is it? Turn over to check.

TARGET 9



Make this square, then four of them. Which group is it? Turn over to check.

THE BOX

To make it: glue this page onto thin card, such as a cereal box. Cut round each net on the solid line. Score and fold every dashed line, the coloured side out. Glue each flap inside the wall it meets. The lid fits over the tray. Sized for the 60 cards printed on 300 gsm card, with the folded instructions on top.

LID



TRAY

