§16 Paper Cutting and Musical Frieze Patterns

The goal for this part is to create rosettes and frieze patterns in paper strips and recognize frieze patterns in music.

Supplies:

- Paper strips
- tape
- scissors
Paper snowflakes

- As a child, you may have made snowflake patterns by folding a piece of paper and cutting along the edges. Make snowflakes representing as many of these symmetry groups as you can: $D_2, D_3, D_4, D_5, D_6, D_7, D_8, D_9, D_{10}$.

- Devise a way to make a snowflake with $C_n$ symmetry for any values of $n$ that you choose. Hint: you will need to make an extra cut.

See Vi Hart’s Snowflakes video.
Paper frieze patterns

• Take a long strip of paper and roll it around several times into a cylinder. Do not flatten the cylinder, but cut through one side of it, cutting out an asymmetric motif. Unroll and classify the pattern.

• Fold a long strip of paper in a zigzag and cut out an asymmetric motif. Unfold and classify the pattern.

• Devise methods for producing the other five frieze patterns by paper cutting.
Musical Frieze Patterns

Vi Hart has several videos involving rosettes and frieze patterns, including:

- Fruit by the Foot
- Snowflakes,
- Folding Space Time
- Mobius Music Box
- Doodle Music
- Sound Braid