11.3a—Symmetry

- *Symmetry is found in*
  - *Art*
  - *Architecture*
  - *Crafts*
  - *Poetry*
  - *Music*
  - *Dance*
  - *Chemistry*
  - *Physics*
  - *Biology*
  - *Mathematics*

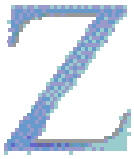
- *When a figure undergoes an isometry and the resulting image coincides with the original, then the figure is symmetrical*
- *Different isometries produce different types of symmetry*
- *Reflectional symmetry*
  - *Produced when a figure is reflected over a line so its image coincides with the original*
  - *Sometimes called bilateral symmetry or mirror symmetry*
  - *The letter "T" in the picture at the right has reflectional symmetry (for the most part, the entire design does as well).*
  - *In which direction does the line of symmetry run?*

- *Rotational Symmetry*

11.3b—Symmetry

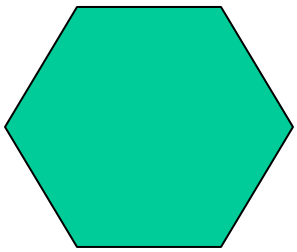
– *Produced when a figure can be rotated about a point so it rotated image coincides with the original figure after turning less than 360 degrees.*

– *The letter "z" has 2-fold rotational symmetry because it coincides with the original figure after a 180 degree and 360 degree rotation—this is also called point symmetry*



– *If a figure coincides with its original n times in one 360 degree rotation the figure has n-fold rotational symmetry*

– *What type of rotational symmetry does a regular hexagon have?*



– *Does it have reflectional symmetry? If so, how many reflection lines can you find?*

11.3c—Symmetry

- *There are two other types of symmetry*
  - *Translational (each vertical "strip" in the picture on top)*
  - *Glide-reflectional (picture on bottom)*

- *On the next page are some interesting designs.*

11.3d—Symmetry

- *Try to identify **all** of the different types of symmetry in them.*