Problem-Based Task: Stained Glass Pattern, Part I

Coaching Sample Responses

a. What are the properties of the sides and angles of a square?

All sides are congruent and all angles are congruent.

b. What are the properties of the sides and angles of a rhombus?

All sides are congruent and opposite angles are congruent.

c. Which sides in the pattern are congruent and why?

$\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{DA}$ because $\square ABCD$ is a square.

$\overline{BC} \cong \overline{BE} \cong \overline{EF} \cong \overline{FC}$ because $\square BEFC$ is a rhombus.

$\overline{FC} \cong \overline{FG} \cong \overline{GH} \cong \overline{HC}$ because $\square CFGH$ is a square.

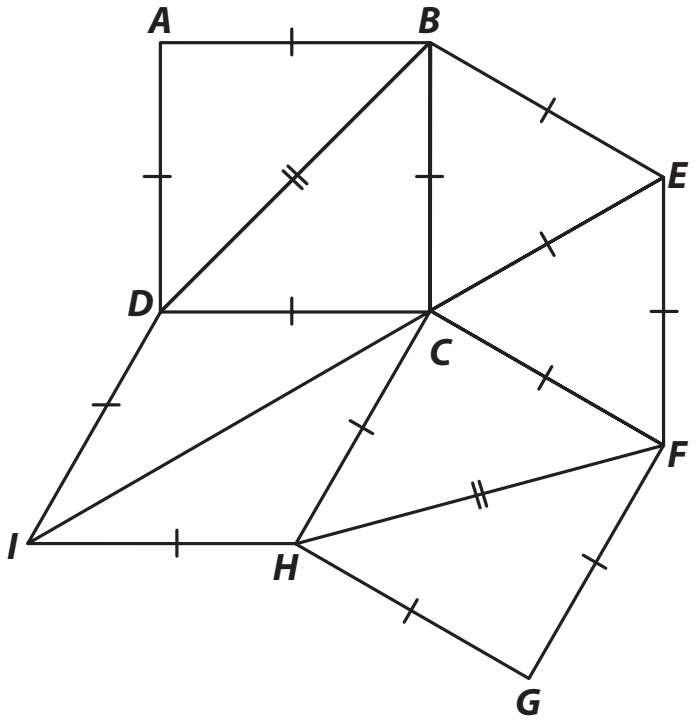
$\overline{HC} \cong \overline{HI} \cong \overline{ID} \cong \overline{DC}$ because $\square DCHI$ is a rhombus.

$\overline{EC} \cong \overline{BC}$ because this was given.

d. How do you indicate on a diagram that sides are congruent?

Use the same number of tick marks on the sides that are congruent.

e. Mark the congruent sides on the diagram.



f. Which angles are congruent and why?

$\angle DAB \cong \angle HGF \cong \angle DCB \cong \angle HCF$ because these are the vertices of the squares; the measure of the vertex of a square is always 90°.

$\angle ABD \cong \angle DBC \cong \angle ADB \cong \angle BDC$ because the diagonal of a square bisects the opposite pairs of angles.

$\angle CHF \cong \angle GHF \cong \angle CFH \cong \angle GFH$ because the diagonal of a square bisects the opposite pairs of angles.

$\angle CBE \cong \angle EFC$ because these are the opposite vertices of a rhombus; opposite vertices of a rhombus are congruent.

$\angle BCE \cong \angle ECF \cong \angle BEC \cong \angle FEC$ because the diagonal of a rhombus bisects the opposite pairs of angles.

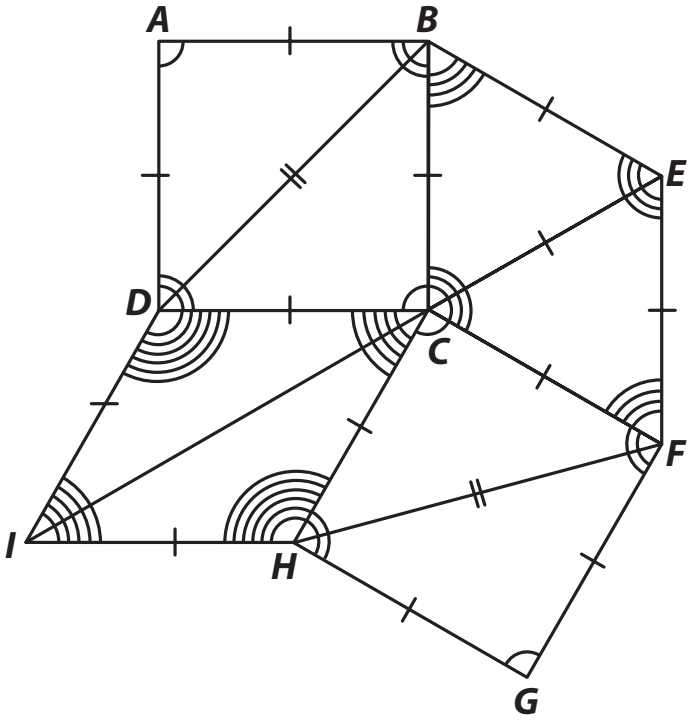
$\angle IDC \cong \angle IHC$ because these are the opposite vertices of a rhombus; opposite vertices of a rhombus are congruent.

$\angle DIC \cong \angle HIC \cong \angle DCI \cong \angle HCI$ because the diagonal of a rhombus bisects the opposite pairs of angles.

g. How do you indicate on a diagram that angles are congruent?

Use the same number of arcs on the angles that are congruent.

h. Mark congruent angles on the diagram.



i. Name one pair of congruent triangles. Justify your answer by indicating which corresponding parts are congruent.

$\triangle ABD \cong \triangle CBD$

$\angle DAB \cong \angle DCB$

$\angle ADB \cong \angle CDB$

$\angle ABD \cong \angle CBD$

$\overline{AB} \cong \overline{CB}$

$\overline{AD} \cong \overline{CD}$

$\overline{BD} \cong \overline{BD}$

j. Name a second pair of congruent triangles. Justify your answer by indicating which corresponding parts are congruent.

$\triangle HCF \cong \triangle HGF$

$\angle HCF \cong \angle HGF$

$\angle CHF \cong \angle GHF$

$\angle CFH \cong \angle GFH$

$\overline{HC} \cong \overline{HG}$

$\overline{CF} \cong \overline{GF}$

$\overline{HF} \cong \overline{HF}$

k. Name a third pair of congruent triangles. Justify your answer by indicating which corresponding parts are congruent.

$\triangle CBE \cong \triangle CFE$

$\angle CBE \cong \angle CFE$

$\angle BEC \cong \angle FEC$

$\angle ECB \cong \angle ECF$

$\overline{CB} \cong \overline{CF}$

$\overline{BE} \cong \overline{FE}$

$\overline{CE} \cong \overline{CE}$

l. Name a fourth pair of congruent triangles. Justify your answer by indicating which corresponding parts are congruent.

$\triangle IDC \cong \triangle IHC$

$\angle IDC \cong \angle IHC$

$\angle DIC \cong \angle HIC$

$\angle DCI \cong \angle HCI$

$\overline{ID} \cong \overline{IH}$

$\overline{DC} \cong \overline{HC}$

$\overline{IC} \cong \overline{IC}$

m. Are any pairs of triangles that you identified congruent? If so, name them.

Yes, $\triangle ABD \cong \triangle CBD \cong \triangle HCF \cong \triangle HGF$.

n. How can Mary use this information to plan her project?

Mary can use the congruent triangles to create a template for her needed cuts.

She can then verify that the triangles she has cut will fit her pattern if the cut pieces are congruent.

Recommended Closure Activity

Select one or more of the essential questions for a class discussion or as a journal entry prompt.