**TASK #1A**

***Pattern Block Patterns***

**Use tables and graphs to explore this pattern and answer the following questions.**

a) Build Design #4.

b) Make a table that shows the number of triangles needed for each design.

c) Describe (in words) what Design #5 will look like.

d) How many triangles are needed for the 10th design? The 20th? The 100th?

 Explain your reasoning.

e) If the design contains 27 triangles, which design number is it?

 Explain your reasoning.

f) Describe (in words) how you would determine the total number of triangles needed to

 build Design *n*.

**TASK #1B**

***Pattern Block Patterns***

**Use tables and graphs to explore this pattern and answer the following questions.**

a) Build Design #4.

b) Make a table that shows the number of triangles needed for each design.

c) Describe (in words) what Design #5 will look like.

d) How many triangles are needed for the 10th design? The 20th? The 100th?

 Explain your reasoning.

e) If the design contains 28 triangles, which design number is it?

 Explain your reasoning.

f) Describe (in words) how you would determine the total number of triangles needed to

 build Design *n*.

**TASK #2A**

***Color Tile Patterns***

**Use tables and graphs to explore this pattern and answer the following questions.**

a) Describe (in words) what Design #4 will look like.

b) Complete the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Design** | **1** | **2** | **3** | **4** | **5** |
| **Red** |  |  |  |  |  |
| **Blue** |  |  |  |  |  |
| **Total** |  |  |  |  |  |

c) How many squares are needed for the 10th design? The 20th? The 100th?

 Explain your reasoning.

d) Which design contains exactly 80 red squares? Explain your reasoning.

e) Which design contains exactly 80 blue squares? Explain your reasoning.

f) Which design contain 80 total squares? Explain your reasoning.

g) Write a rule that gives the total number of squares needed to build Design *n*.

**TASK #2B**

***Color Tile Patterns***

**Use tables and graphs to explore this pattern and answer the following questions.**

a) Describe (in words) what Design #4 will look like.

b) Make a table that shows the number of red, blue, and total squares for each design.

c) Draw a scatter plot that represents this data. Use three different colors – one for the number

 of red squares, one for the number of blue squares and a third for the total number of squares.

d) How many squares are needed for the 10th design? The 20th? The 100th?

 Explain your reasoning.

e) Which design contains exactly 50 red squares? Explain your reasoning.

f) Which design contains exactly 50 blue squares? Explain your reasoning.

g) Which design contain 50 total squares? Explain your reasoning.

h) Write a rule that gives the number of blue squares needed to build Design *n*.

i) Write a rule that gives the total number of squares needed to build Design *n*.

**TASK #3A**

***Multilink Cube Patterns***

**Use tables and graphs to explore this pattern and answer the following questions.**

a) Make a table that shows the number of cubes for each design.

b) Describe (in words) what design #5 will look like.

c) How many cubes are needed for the 10th design? The 20th? The 100th?

 Explain your reasoning.

d) Which design will use 48 cubes? 100 cubes? 62 cubes? Explain your strategy.

e) Will there be any design in this pattern that can be built using an odd number of cubes?

 Why or why not?

f) Write a rule that gives the total number of cubes needed to build Design *n*.

**TASK #3B**

***Multilink Cube Patterns***

**Use tables and graphs to explore this pattern and answer the following questions.**

a) Build Design #4 and #5.

b) What is changing each time a new design is built? What stays the same?

c) Make a table which shows the number of cubes for each design.

d) How many cubes are needed for the 10th design? The 20th? The 100th?

 Explain your reasoning.

e) Write a rule that gives the total number of cubes needed to build Design *n*.

f) Which design, if any, will use 37 cubes? Explain your reasoning.

g) How can you use the rule to help determine the answer to f?

**TASK #4A**

***Cuisenaire Rod Patterns***

a) Create a table to record the number shorts, longs and total pieces needed for each span.

b) Create a graph for this data. Use three colors – one color for the number of shorts, a second

 for the number of longs , and a third color for the total number of pieces.

c) Use the rods, table, or graph to determine a rule for each color and for total pieces needed to

 build Design *n*.

d) Will you ever use 32 longs? 32 shorts? 32 total pieces? Explain our answer.

e) When the total number of rods equals 80, how many will be shorts? How many longs?

 Explain your thinking.

f) The bridge with 100 spans will use how many longs? How many shorts? How many total

 rods? Explain your thinking.

**TASK #4B**

***Cuisenaire Rod Patterns***

a) Build the bridges that have 4 spans and 5 spans.

b) Create a table to record the number shorts, longs and total pieces needed for each span.

c) Create a graph for this data. Use three colors – one color for the number of shorts, a second

 for the number of longs , and a third color for the total number of pieces.

d) Use the rods, table, or graph to determine a rule for each color and for total pieces needed to

 build Design *n*.