

Product Design: Puzzle Cube

Design Brief: The **BHS 3-D Design Company** has been hired by the **Blockhead Toy Company** to design and model a **Puzzle Cube** toy. The Puzzle Cube toy will be marketed to teenagers as a way of learning spatial recognition. The toy will be part of a **kit** of **3 puzzle toys**. The objective of the toys will be to teach kids how to manipulate shapes into a geometric entity from shapes of similar, but different, design.

Each kit will contain a minimum of **three** puzzles. Each puzzle must represent a **3” cube** when assembled. The puzzle pieces should vary enough so that they can be used for only one puzzle. Three quarter (3/4) inch wood cubes are to be used to create the prototype puzzle pieces. The actual **production pieces** will be manufactured using material **removal** processes that will result in single, solid wood units for each puzzle piece.

1. Each **Puzzle** will have six pieces.
2. Each **Puzzle Piece** will be a different color.
3. Each **Puzzle Piece** must represent a **minimum** of three wood cubes, and a **maximum** of six wood cubes.
4. Each **Puzzle** must have **one black, one red** and **one natural wood** piece. The rest of the pieces can be **purple, green, yellow, blue, orange or brown**. The following colors cannot be used together in the same puzzle:
 - Purple and Blue
 - Orange and Yellow
 - Green and Brown
5. ALL colors should be present in a 3 puzzle kit
6. Questions and clarifications of the Design Brief must be submitted in electronic form and posted on Moodle. The Blockhead Toy Company will issue clarifications and specific answers to queries when necessary.

Stakeholders: The Blockhead Toy Company (profits), parents and teens who buy the puzzles, anyone who use the puzzles, U. S. Product Safety Commission are all stakeholders.

Name _____ Period Number _____

Research and Investigation: Investigate current puzzle cube designs on the Internet. Sketch 4 design ideas that you find (15 minutes ONLY).

1

2

3

4

Name _____ Period Number _____

Initial Design Procedures:

Working with the cubes supplied by The Blockhead Toy Company, each designer will create one design that addresses all of the requirements of the *Design Brief*.

- As you work through your design, use a glue stick to lightly, temporarily glue the blocks into puzzle shapes. Keep a wet sponge available so that you can clean pieces that need to be reglued.
- As you complete a design idea, sketch all of the pieces as an Isometric Exploded View, so that you can easily put them back together.
- Mark each Puzzle Piece with a colored marker. This will help you when you are permanently gluing the wood blocks into finished pieces. **Remember - *Leave one piece as natural wood.***

Notes:

Name _____ Period Number _____

*Use this space to sketch the **Isometric Exploded View**.*

Name _____ Period Number _____

Finish your Puzzle Cube: Gently separate the temporary pieces. Lightly sand the previously glued surfaces. Reglue using Wood Glue. Use your wet sponge to wipe away any excess glue.

Color the dried Puzzle Pieces completely with the colors that you marked them with. Let them dry.

Create 3-D models of your Puzzle Pieces using Inventor. Create an Assembly of your Puzzle Pieces. Be sure to color your pieces.

Present Your Design:

Staple your Drawings to this packet. Be sure to have ORTHOGRAPHIC and ISOMETRIC drawings of all the views that you will need. These include:

1. ***Isometric Assembly*** – Your final assembly in Isometric view on a Cover Page.
2. ***Exploded Assembly View***. Include a Parts List and two isometric views
3. ***Orthographic of each Piece***. Three orthographic views and an isometric view of each piece.
4. Each Drawing must have the appropriate ***title block***.

