# Performance Assessment Task

## Designing an Equilibrio Tower

You've been hired by FoxMind to design a new tower for the Equilibrio puzzle book!! The game is so popular that players are demanding more puzzles for different levels of difficulty in the book. FoxMind has two design criteria:

1) make a tower and matching puzzle tricky so that it's a challenge;
2) it has to have math/geometric features to convince more teachers to use Equilibrio in math class!

In this task you will:

- **Design an Equilibrio tower:** Use as many pieces as you want from the game, and arrange in a tower that you build.

- **Create a puzzle:** Draw a matching puzzle to be included in the Equilibrio book that can be used by players to build your tower.

- **Defend your puzzle:** Explain what makes your tower mathematical and tricky to solve.
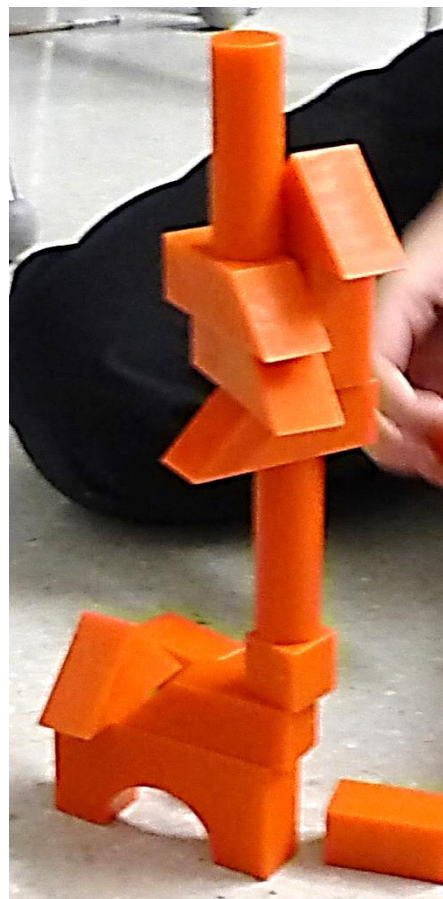
## Part I: Design an Equilibrio Tower

**Names** _____ **Date** _____

**Before** you start building, make a list of at least 4 features you want to include. Use drawings and words.

**Build your tower!!**

**Make sure you've thought about these questions:**
- ☐ Is our tower stable for someone else to build?
- ☐ Will we be able to draw the puzzle picture?
- ☐ What features worked and what did we have to change?
- ☐ What math ideas are in our tower?

**Take a photo with an iPad.**

## Part II: Create a Puzzle (Sketch)

Use this page to make a first sketch of your tower.

 Use the Peer Coaching Tool and interview another group. Use their suggestions on your drawing to make a share-quality drawing.

# Peer Coaching Tool
## Designing an Equilibrio Tower

**Names** _____ **Date**_____

**Coaches** _____

**Instructions for the Coaches:** Using the questions below, interview a group who is defending their tower design.

Here are some questions to ask the group:

| | |
|---|---|
| **?** | How did you decide on the number and types of 3D solids to use to make it tricky enough? |
| **?** | How did you design your tower so you can show your great geometry ideas? |
| **?** | Why do you think your sketch shows your tower well enough for someone else to build? |
| **!** | One suggestion I have for you is... |

**Instructions for the Student:**

Now that you have explained your tower and puzzle, listened to the feedback, and thought about your work, go back and improve your puzzle in at least one way.

## Part II: Create a Puzzle (Share-Quality)

Use this page to make a share-quality drawing of your tower.

## Part III: Finding Math Ideas with Your Partner

Use the photo on your iPad and the app "Explain Everything". **Draw** on the photo any math ideas you find, and **record your voices** explaining!

To put your puzzle in the Equilibrio puzzle book, circle the **level of difficulty** for your puzzle:

<span style="background-color:yellow">yellow</span>    <span style="background-color:orange">orange</span>    <span style="background-color:green">green</span>    <span style="background-color:blue">blue</span>    <span style="background-color:purple">purple</span>    <span style="background-color:red">red</span>

**Explain** why your puzzle is that level of difficulty.

## Part IV: Defend Your Puzzle (Explain)

Here are **best** four **math** ideas that make your tower mathematical and tricky:

1. _____

   _____

   _____

   _____

2. _____

   _____

   _____

   _____

3. _____

   _____

   _____

   _____

4. _____

   _____

   _____

   _____

## Part IV: Defend Your Puzzle (Draw)

Here are some drawings to defend your **best** four **math** ideas:

1.

2.

3.

4.

# Spark Your Math Thinking: Geometry Ideas!

**Aim for your learning**: Describe the characteristics of 3-D objects & 2-D shapes and analyze the relationships among them.

**Word hints**:
- ✓ Prism
- ✓ Pyramid
- ✓ Symmetry
- ✓ Parallel
- ✓ Intersect
- ✓ Perpendicular
- ✓ Right Angle
- ✓ Parallel
- ✓ Horizontal
- ✓ Vertical
- ✓ Congruent
- ✓ 2 dimensional
- ✓ 3 dimensional
- ✓ Length
- ✓ Width
- ✓ Height
- ✓ Vertex/vertices
- ✓ Edge
- ✓ Base
- ✓ Triangle
- ✓ Face
- ✓ Cube
- ✓ Translation
- ✓ Rotation
- ✓ Reflection
- ✓ Quadrilateral
- ✓ Rectangle
- ✓ Square
- ✓ Rhombus
- ✓ Parallelogram
- ✓ Trapezoid

---

**Lines of symmetry and symmetrical shapes**:
- I can find shapes that are symmetrical around me.
- I can create shapes that are symmetrical.
- I can draw/show where a line of symmetry is on a shape, even more than one!
- I can explain why lines of symmetry are features of a shape.

---

**Attributes (features) of shapes that are the same (congruent) or different**:
- I can find two shapes that are congruent and explain why.
- I can compare two shapes and explain what attributes are different.
- I can make or draw a shape that is congruent to a shape I'm given.
- I can sort quadrilaterals into groups of rectangles, squares, trapezoids, parallelograms, and rhombuses.
- I can analyze a shape and give a list of its attributes, using length of sides, number of faces, size of faces, shapes of faces, and number of vertices.

---

**How lines, edges and faces are related**:
- I can identify two lines, edges or faces that are parallel on a shape.
- I can identify two lines, edges or faces that are perpendicular on a shape.
- I can draw lines that are parallel or perpendicular or intersect each other.
- I can explain why edges and faces are related in different ways.

---

**Right ( 90°) angles and shapes that have 90° angles**:
- I can identify 90° angles on shapes.
- I can accurately draw a 90° angle.
- I can create a group of shapes that all have 90° angles (squares, rectangles, right rectangular prisms, right triangular prisms, and others).
- I can explain how sides of a shape that meet at 90° are perpendicular.

---

**Moving shapes (transforming)**:
- I can move a shape by rotating, reflecting or translating it from its original spot.
- I can find two shapes that are congruent, and explain how one was moved into the other's spot by twisting, flipping, or sliding.