THE EDUCATION FUND 40 YEARS

FOR EXCELLENCE IN MIAMI-DADE PUBLIC SCHOOLS

2024
2025

Ideas with IMPACT

STEM

Tangram Dash! Race Against Time

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TANGRAM DASH! RACE AGAINST TIME

NINA PLOT

ninaplot@dadeschools.net

FAIRLAWN ELEMENTARY -1801

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Goals and objectives

Tangram Dash! Race Against Time is an exhilarating STEAM game designed to ignite students' passion for spatial reasoning, fractions, and geometric concepts, seamlessly blending Chinese and Japanese cultures into an engaging experience. Its innovative approach empowers students from grades 3 to 12 to explore over a thousand tangram combinations while racing against time, at once fostering critical thinking and creativity.

Beyond academic growth, this game nurtures teamwork, resilience, and cultural appreciation, making learning truly immersive and meaningful. Teachers attending this workshop will discover a dynamic tool to cultivate both cognitive and affective skills in their students, leaving them eager to adapt Tangram Dash! Into their classrooms for unforgettable learning adventures. In addition, teachers will want to attend to learn how to render a geometry class both fun and a challenging social experience. For which kids do not love to compete among themselves?

‘Florida Standards

MA.5.GR.1.1

- Classify triangles or quadrilaterals into different categories based on shared defining attributes.
- Explain why a triangle or quadrilateral would or would not belong to a category.

MA.4.GR.1

- Draw, classify and measure angles.

MA.3.GR.1.2

- Identify and draw quadrilaterals based on their defining attributes. Quadrilaterals include parallelograms, rhombi, rectangles, squares, and trapezoids.

VA.5.O.1

- Understanding the organizational structure of an art form provides a foundation for appreciation of artistic works and respect for the creative process.

VA.4.S.2

- Development of skills, techniques, and processes in the arts strengthens our ability to remember, focus on, process, and sequence information.

VA.3.H.3

- Connections among the arts and other disciplines strengthen learning and the ability to transfer knowledge and skills to and from other fields.

Course Outline/Overview

Tangram Dash! Race Against Time -A STEAM game, for students in grades 3 thru 12th to develop spatial reasoning, explore fractions and a variety of geometric concepts. The activity affords students the opportunity to get to know one leisure aspect of two distinct Asian cultures -Chinese and Japanese, through the manual creation of a game in which players create and decorate an origami box that will contain seven (7) Tangs or polygons with which to form one and up to a thousand possible tangrams or figures! Any number of players, possibly divided in teams, are set to play the game against time. The first player, or team, to solve the given puzzle in the least amount of time wins the game.

Added benefits of this game:

- Serves to develop spatial reasoning, explore fractions and a variety of geometric concepts.
- It is at once interactive, constructivist and innovative.
- It offers students the ability to simultaneously develop psychomotor and higher order thinking skills.
- Actively engages students in the creation of their own manipulatives.
- Enables discovery during the learning process.
- Contributes to students' achievements, both cognitive and affective.
- Improves attention, rehearsal in working memory, retrieval from long-term memory, and metacognitive monitoring.
- Helps in reaching objectives pertaining to interest, attitude, and values related to learning the information.

Lesson Plan

Grade: **Date(s):** **Time:** 4 contact hours

Lesson: After a brief conversation on Chinese and Japanese culture, the student will create an origami box and 7 tangram pieces. Student will then try to solve a given Tangram in a given time frame.	**Media** Crayons, colored pencils, markers, stickers
Materials 1. Construction Paper - 12" x 12" or 10 x 10 " in 2 complimentary colors –for origami box 2. Construction Paper – 9" x 11 or 10" x 10" in color of choice –for gluing tangram sheet before cutting 3. Craft Stick –to crease paper crisply 4. Elmer's Glue Stick – to glue photocopy on color paper 5. Geometry Sticker –as decoration for box lid 6. Scissors to cut 7 tangram pieces 7. Roller or Brayer for proper adherence of tangram sheet to color paper **Standards** V.A.2.S.1.1 V.A.2.O.1.1 V.A.2.H.1.1 V.A.3.S.1.1. V.A.3.O.2.1. V.A.3.H.3.1 V.A.4.S.1.1. V.A.4.O.2.1. V.A.4.H.3.1 MA.GR.1 MA.GR.1.1 MA.GR.1.2	**Visual/Resources** Teacher's demo, both on promethean board and face-to-face **ESOL Strategies** **1.** A4-Whole language approach **2.** B5-Visuals (sample) **3.** B14-Demonstrations **4.** C1-Peer buddy **5.** E5-Use of Home language (Spanish) for instruction **6.** F4-Varied activities **Interdisciplinary Correlations** Social Sciences: Math:
Vocabulary Geometry, geometric, orthogonal, diagonal Rhombus, parallelogram Symmetry, Organic vs. Geometric Two dimensional vs. Three dimensional	**Performance Assessment** ☒ Observation of Final Project ☒ Observation of process (student working) ☐ Self-assessment by student ☐ Portfolio A. tracking B. demonstrates growth C. compiles a variety of processes, techniques, media

Tools needed

- Scissors to cut, separate each Tangram piece from Tangram sheet.
- Craft Sticks to crease each paper fold -this is recommended to obtain crisp folds
- Elmer's Glue Sticks -Pkg of 30, 0.24 oz to paste the handout of photocopied tangrams.
- Roller or brayer -to roll over Tangram copy once pasted onto colored paper to assure proper adherence.

Setting Up -Teacher will:

- Use paper guillotine to cut paper to 12 x 12in in advanced in a choice of two colors -can mix and match, 1 for construction of box base and 1 for construction of box lid.
- After scaling Tangrams sheet so that sides of the square figure holding all 7 Tangrams measures 4.25 inches, make as many copies as needed.
- Provide a third paper -choice of color, onto which to glue uncut Tangrams sheet.

Procedure -Students will:

Part One: Create Chinese Tangrams

- Paste the entire Tangrams sheet with Elmer's glue stick onto colored paper of choice
- Roll brayer onto pasted sheet to assure paper adherence
- Once dry, cut and gather the Tangrams (total of 7 pieces: 2 large triangles, 1 medium triangle, 2 small triangles, 1 parallelogram and 1 square)

Part two: Origami - Create the box and lid

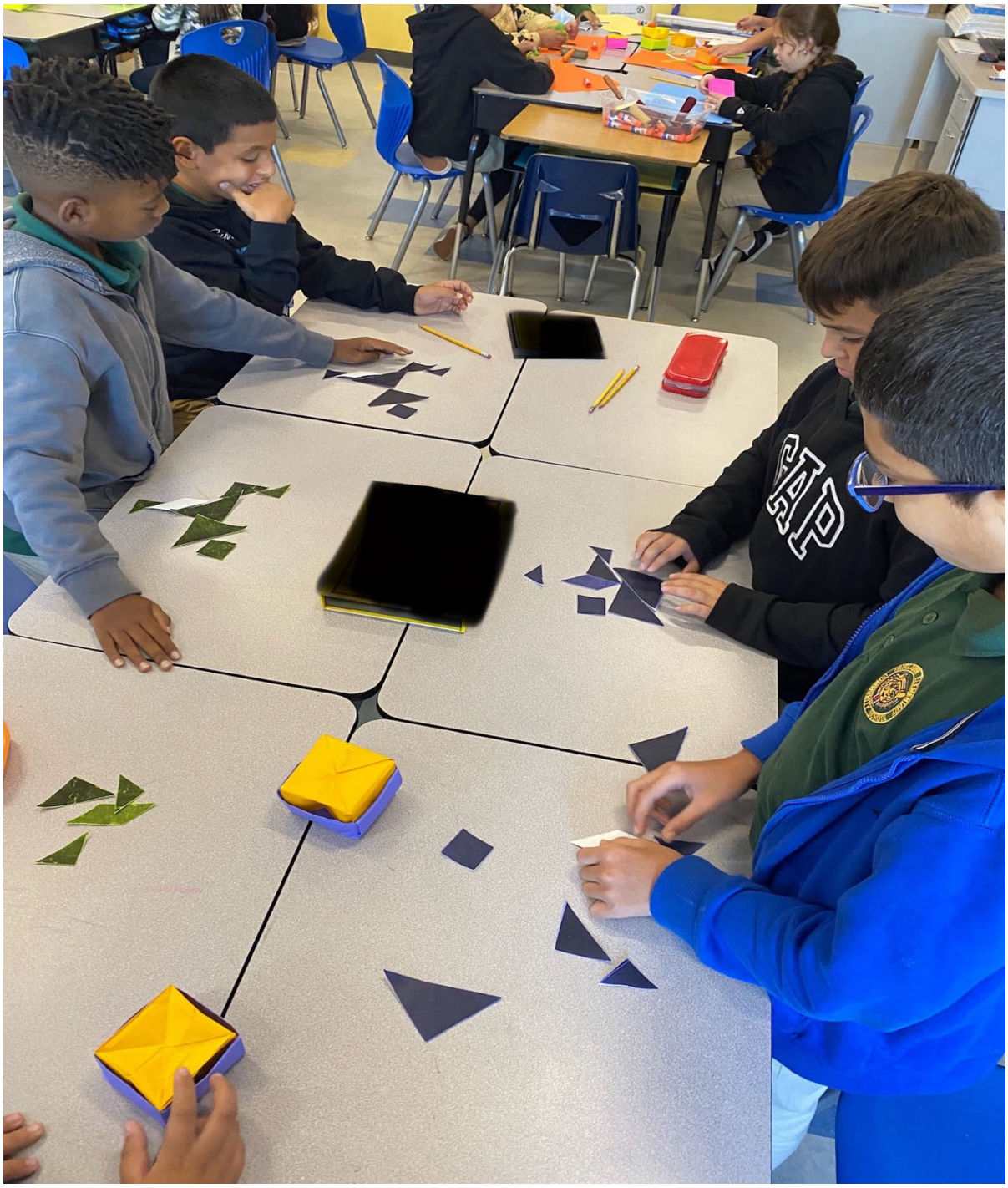
1. Fold paper diagonally -only in one direction
2. Fold paper vertically, then horizontally
3. Fold each corner to the center, where the two lines intersect
4. Grab both folded ends of paper and fold to the center
5. Repeat the gesture on all 4 sides
6. Grab one inside corner of paper and lift open
7. Pull both sides of the box in, then fold corner back onto interior of box
8. Repeat same on the opposite side of the box

Proceed in the same way for the lid of the box, except for step 4.

- This time, when folding both ends of the paper -step 4, proceed as above with the first fold, but when folding the opposite side leave 1/16 of an inch between the fold and the center.
- Repeat this process when folding the two remaining sides -this is done so that the lid is slightly larger than the base of the box.
- Stick sticker on top surface of lid.

It all will seem much easier by following visual instructions from the video of which link is provided below.

Part Three: Start the Game!



Materials and Cost

Supplies -Blick Art and/or Amazon

ITEM DESCRIPTION	UNIT PRICE $	QUANTITY	ITEM SUBTOTAL
Creativity Street Craft Sticks - Bag of 150, Natural	3.39	1	3.39
Elmer's Glue Stick - All Purpose Washable Clear Glue Sticks, Pkg of 30, 0.24 oz	11.99	1	11.99
Pacon Tru-Ray Construction Paper - 12" x 18", Black, 50 Sheets	5.34	1	5.34
Pacon Tru-Ray Construction Paper - 12" x 18", Electric Orange, 50 Sheets	6.54	1	6.54
Pacon Tru-Ray Construction Paper - 12" x 18", Atomic Blue, 50 Sheets	6.54	1	6.54
Pacon Tru-Ray Construction Paper - 18" x 24", Brilliant Lime, 50 Sheets	11.95	1	11.95
OLYCRAFT 9Pcs Sacred Geometry Metal Energy Stickers Flower of Life, Orgone Pyramid Stickers, Golden Stickers for Scrapbooks	9.79	4	39.16
Estimated Order Totals			**$84.91**

Resource List - Visual Resources

- PRINTABLE TANGRAMS SHEETS -LINK
  https://math-drills.com/geometry/tangrams_001.1360948442.pdf

- TANGRAM HISTORY –YOUTUBE LINK
- https://youtu.be/X5mc-dkYLfI?si=TMqSNO4MvmVJekkA

- ORIGAMI HISTORY -YOUTUBE LINK
- https://youtu.be/H0NxH4SDSNU?si=TV5WIerxKWGVYMy1

- ORIGAMI BOX CREATION- YOUTUBE LINK

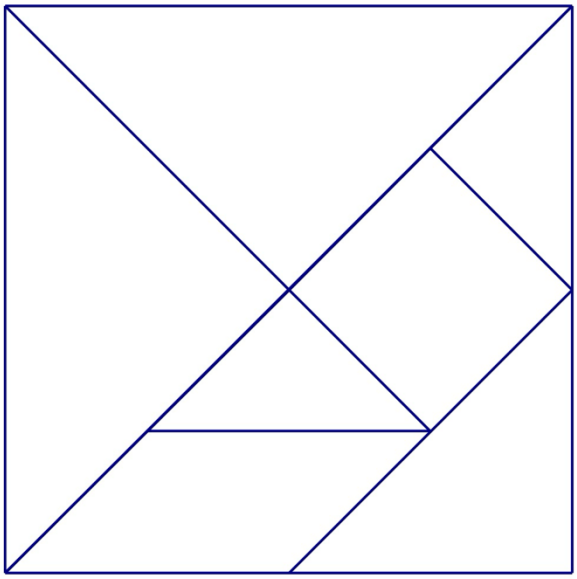
https://youtube.com/watch?v=gdKUkslqwHo&si=ReTD8ExC2s-kQQdo

- MISCELLANEOUS PICTURES

- POWERPOINT SLIDES

Printable Tangrams

Cut out the tangrams and use them for tangram activities.



Math-Drills.Com

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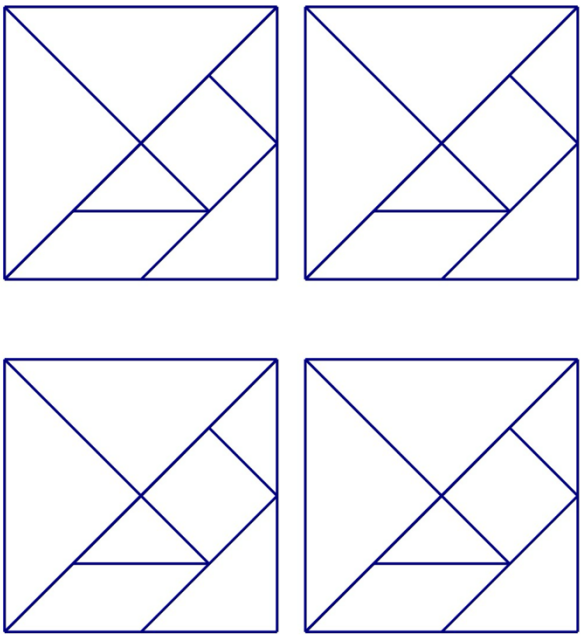

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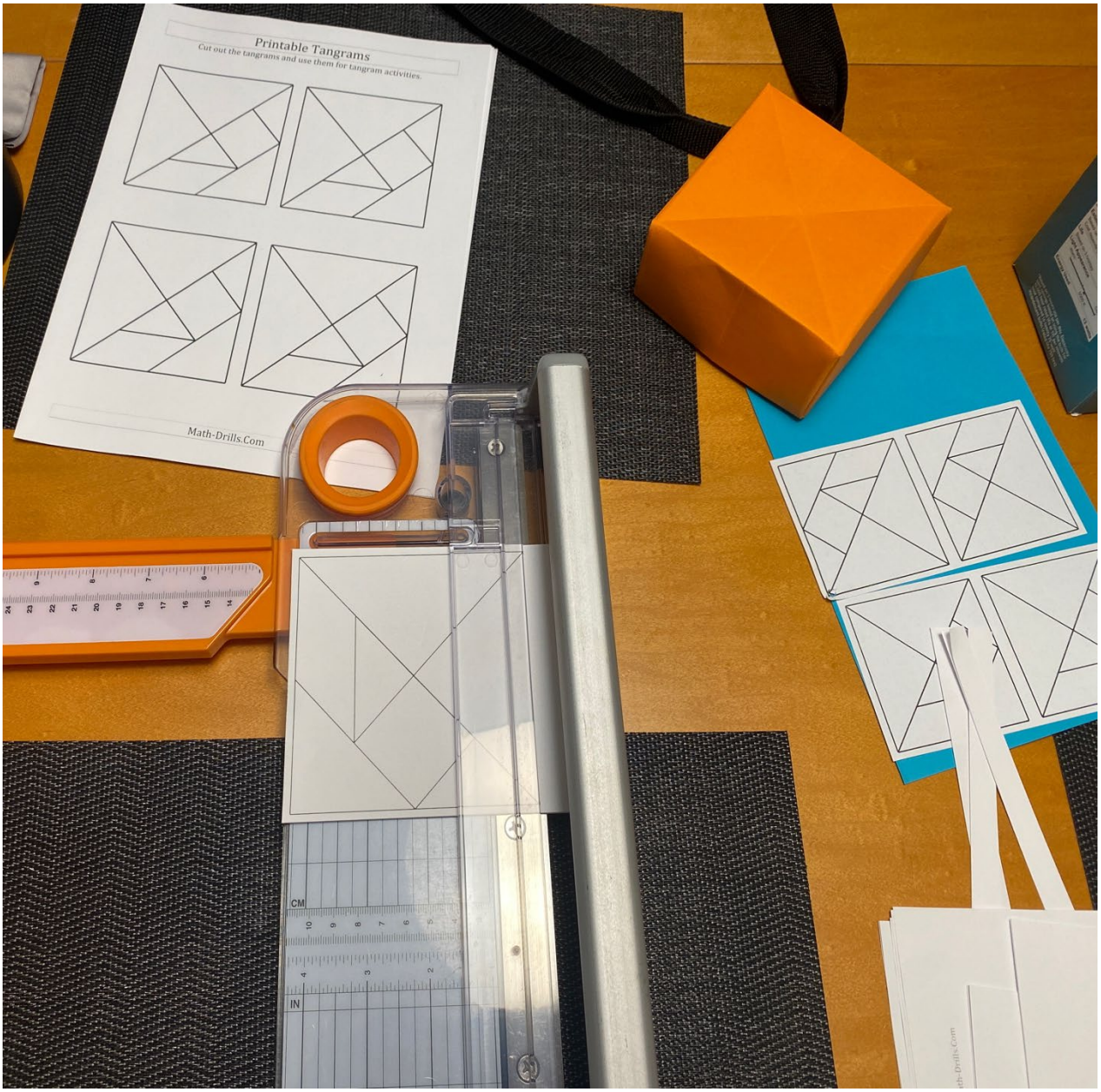
Printable Tangrams
Cut out the tangrams and use them for tangram activities.
Math-Drills.Com
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TANGRAMS

WHO INVENTED THEM?

Tangrams are reputed to have been invented in **China** sometime around the late **18th century**

WHY IS IT CALLED A TANGRAM?

The tangram is an operation puzzle consisting of **seven flat polygons**, called **tans,** which are put together to form shapes. The main objective of making tangrams is to replicate a shape by giving only an outline in a puzzle book with the help of all seven pieces without overlap.

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WHAT IS THE USE OF TANGRAMS IN DAILY LIFE?

Tangrams are a good tool for developing **spatial reasoning** and for exploring **fractions** and a variety of **geometric concepts**, including size, shape, congruence, similarity, area, perimeter, and the properties of **polygons**.

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VOCABULARY

SPATIAL REASONING

- The ability to visualize and manipulate shapes/objects in the mind

POLYGON

- A flat or plane, two-dimensional closed shape, bounded with straight sides

FRACTION

- A fraction is a part of a whole.

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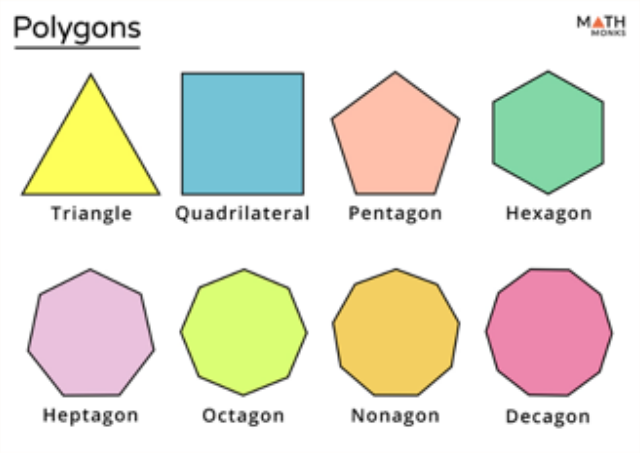
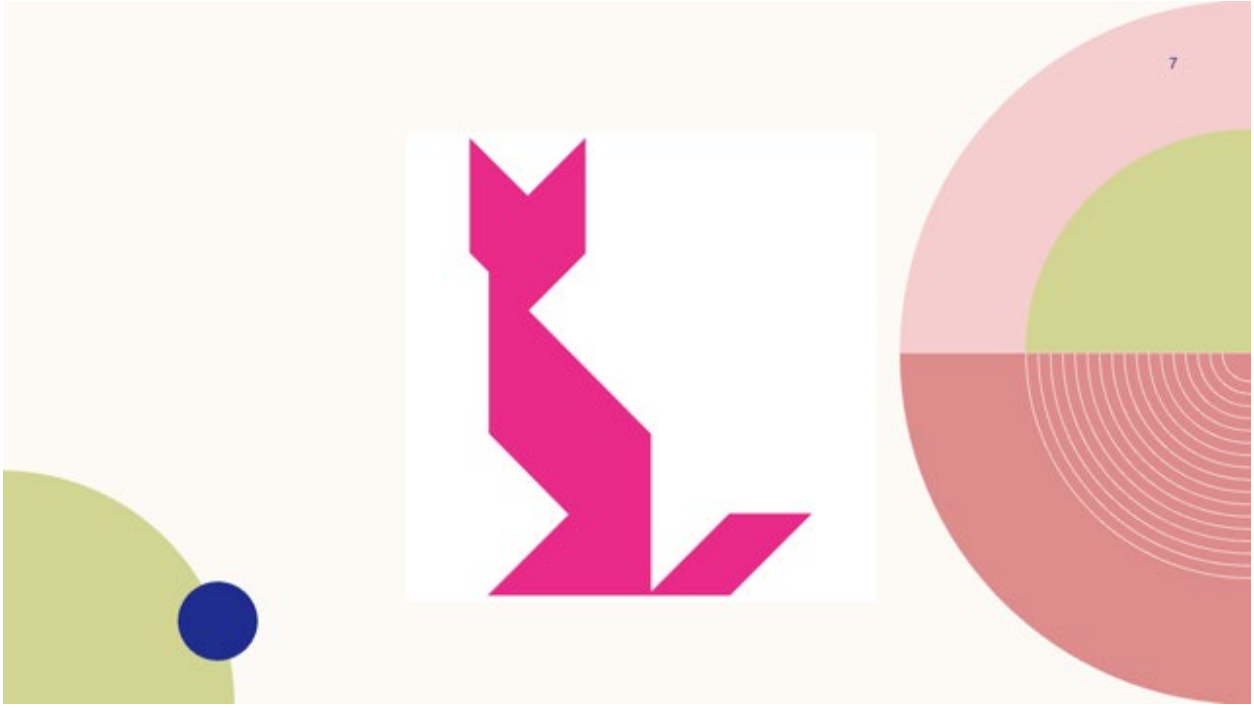
POLYGONS APLENTY!

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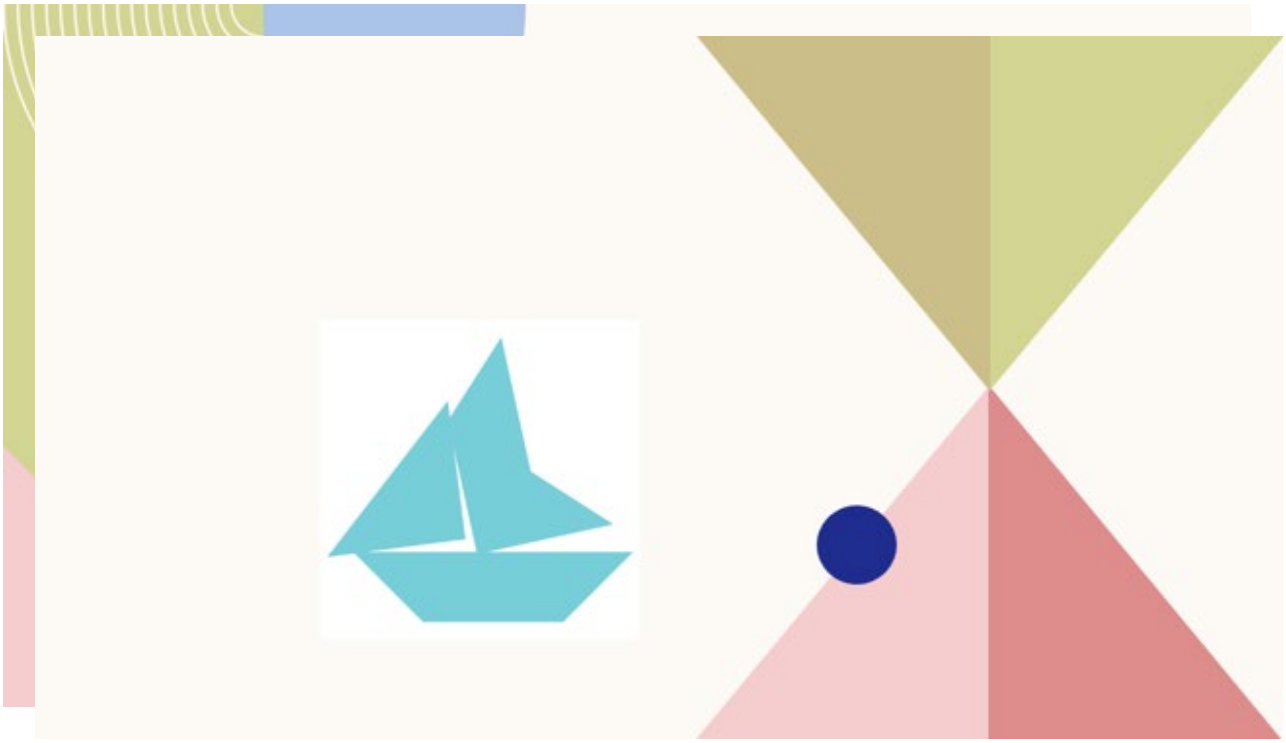

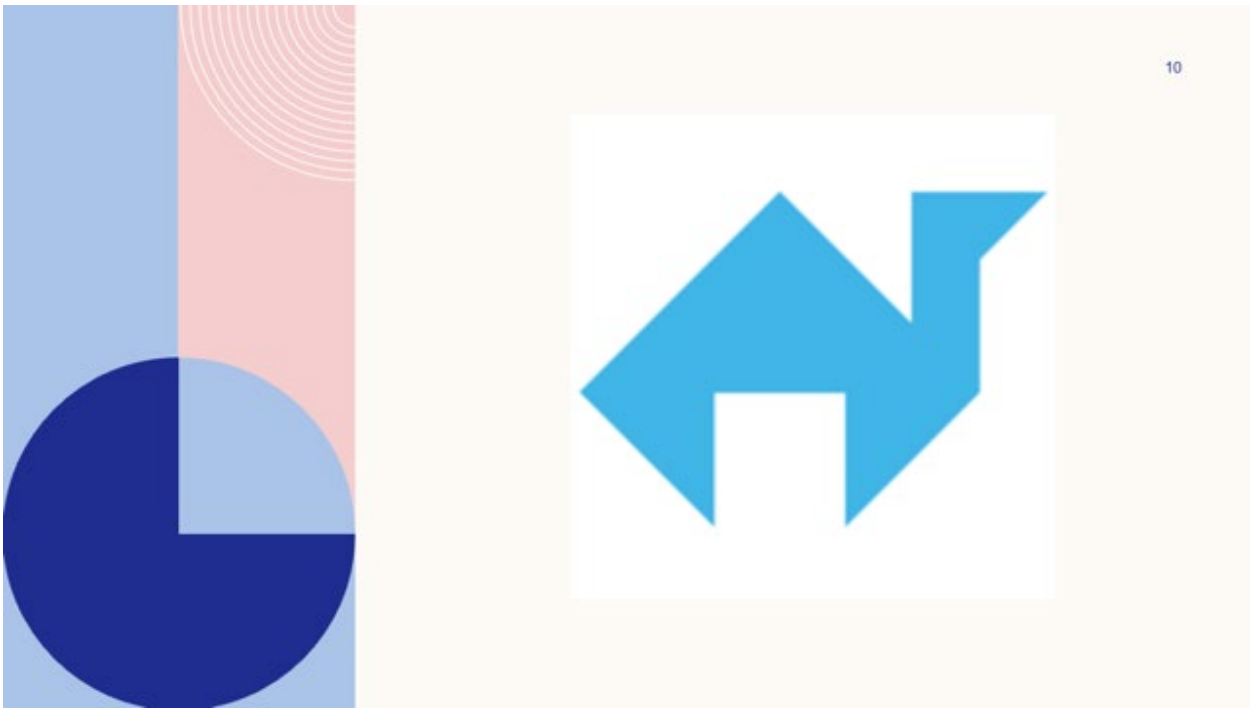
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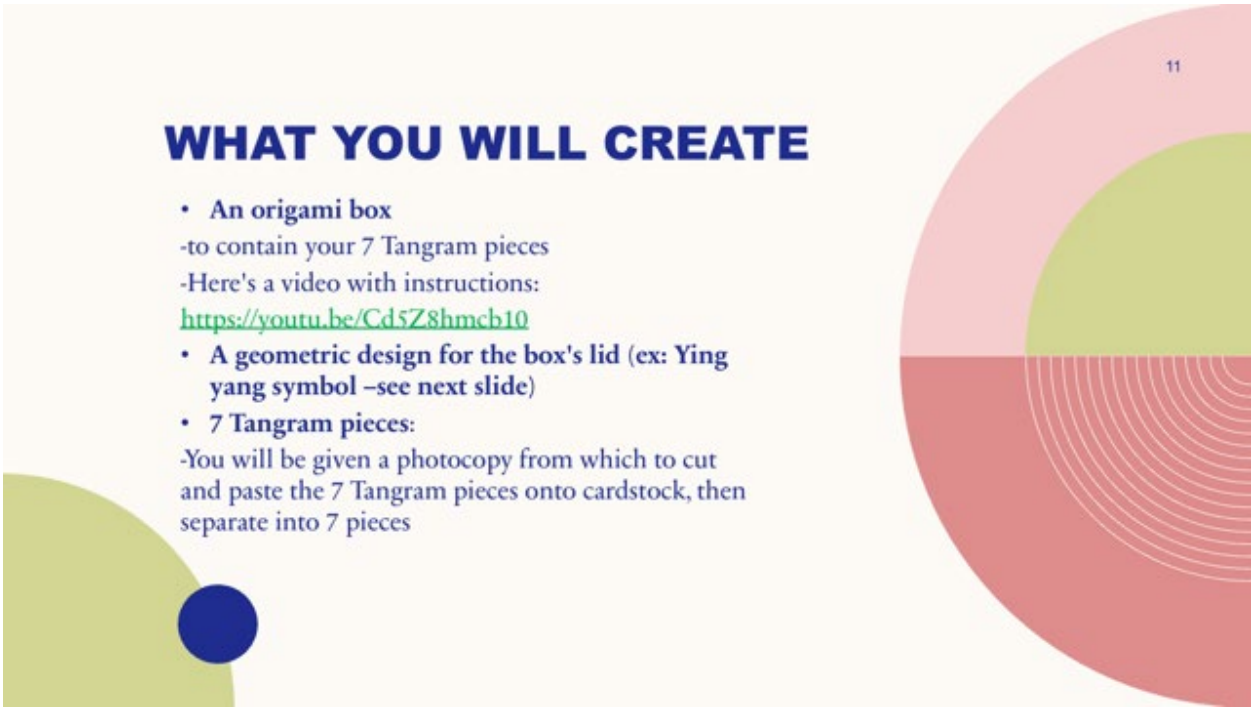
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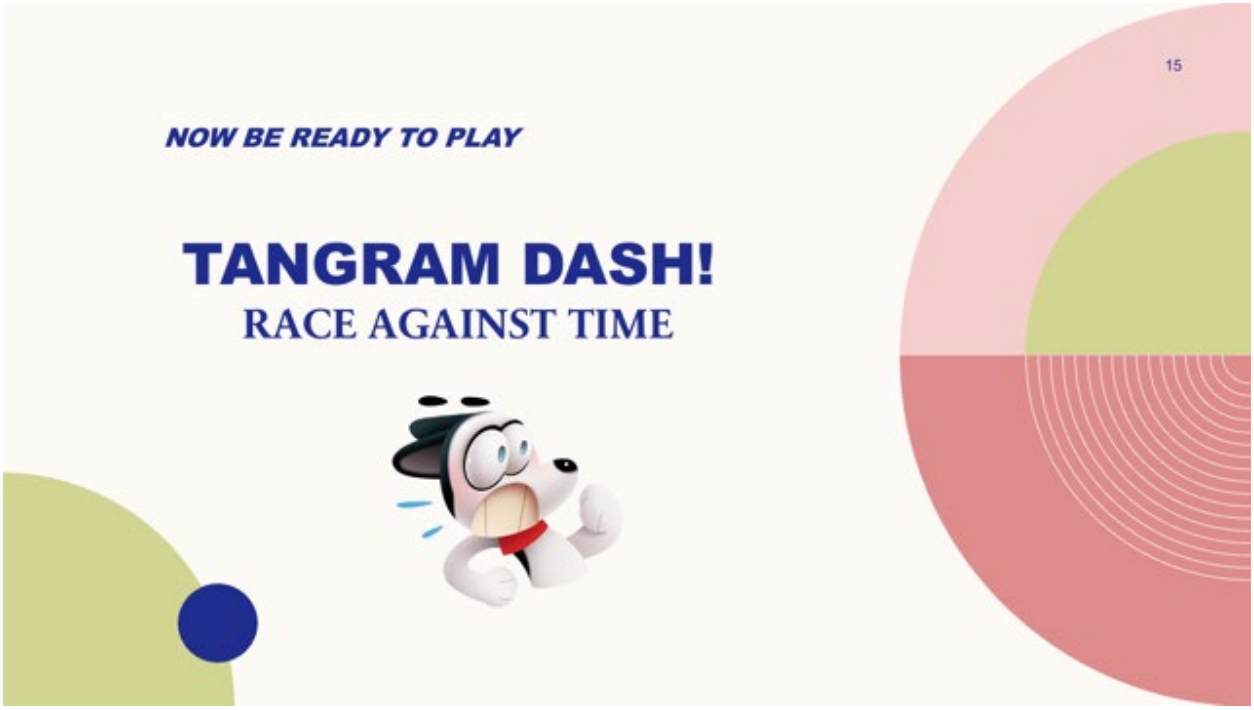
WHAT YOU WILL CREATE
• An origami box
-to contain your 7 Tangram pieces
-Here's a video with instructions:
https://youtu.be/Cd5Z8hmcb10
• A geometric design for the box's lid (ex: Ying yang symbol –see next slide)
• 7 Tangram pieces:
-You will be given a photocopy from which to cut and paste the 7 Tangram pieces onto cardstock, then separate into 7 pieces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NOW BE READY TO PLAY
TANGRAM DASH!
RACE AGAINST TIME

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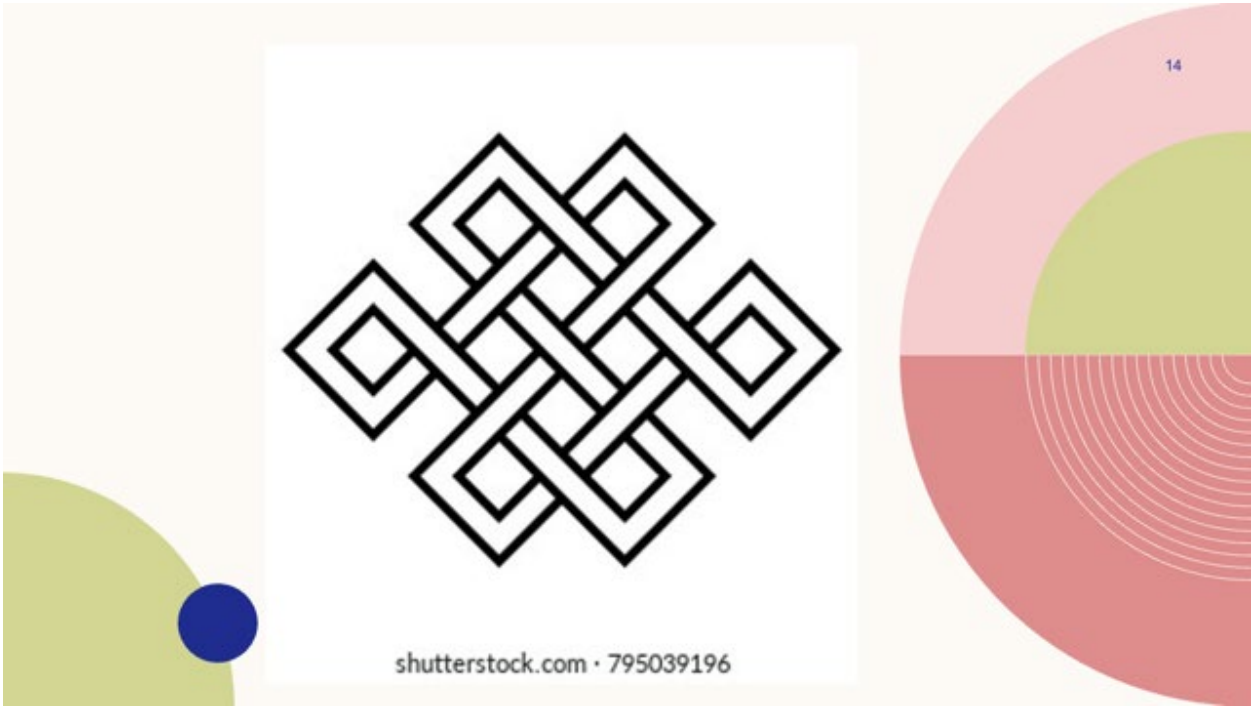
Examples for Box
Lid illustration
shutterstock.com · 49345942

13
Examples of Japanese Illustrations for Box Lid Decoration
shutterstock.com · 186378257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LET THE FUN BEGIN!

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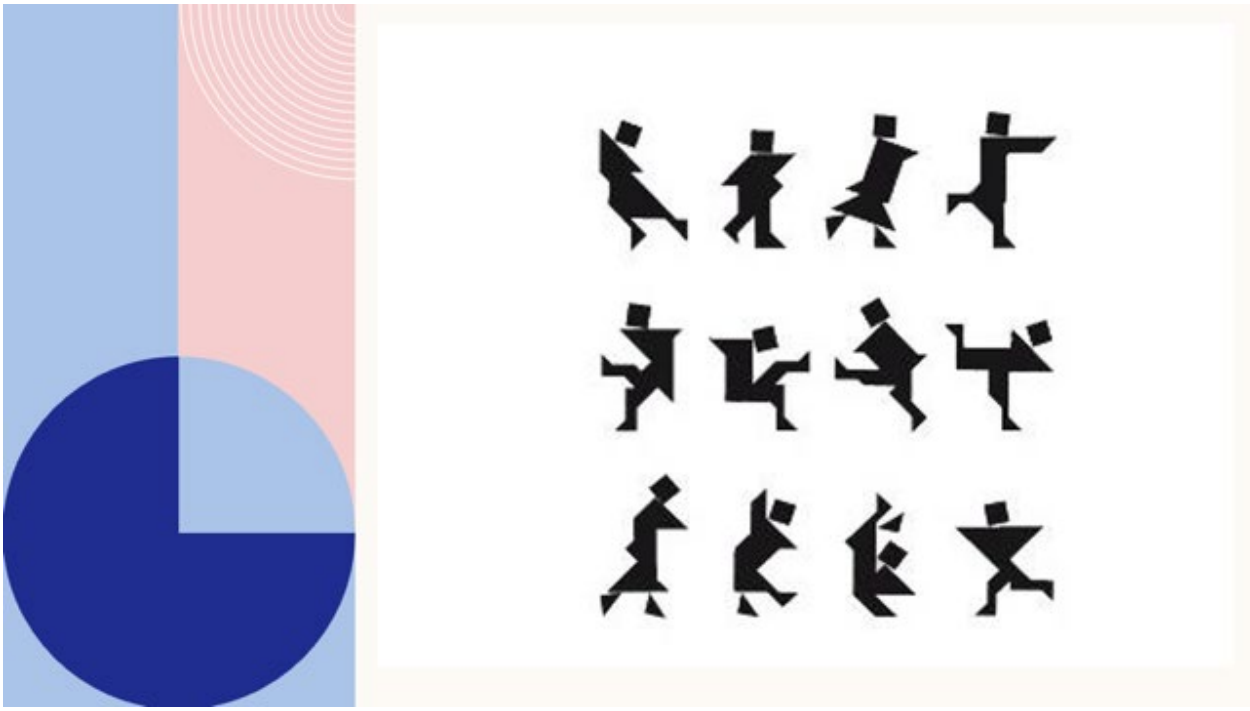

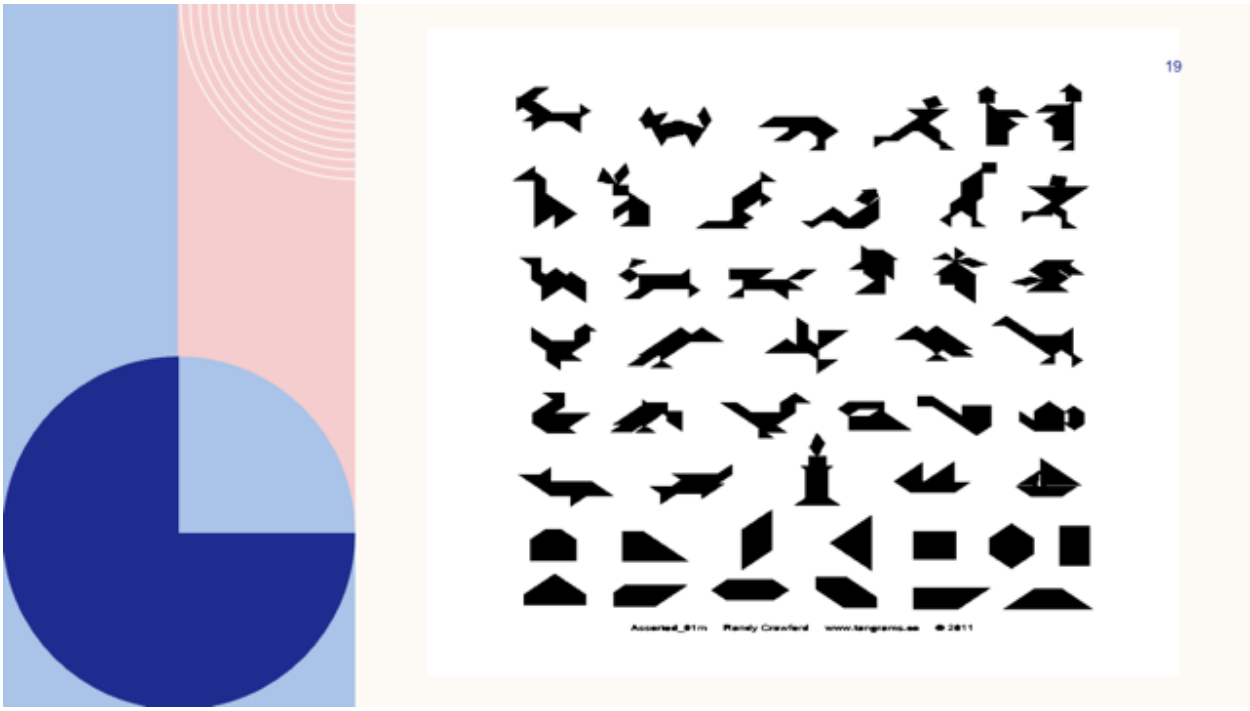
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