Tangram Activity

This resource was developed as part of the Graphics CPD 2018/2019 workshop which was rolled out to teachers in the 2018/2019 academic year.

CPD Workshop Link:
https://www.jct.ie/technologies/cpd_supports_graphics_cpd_workshops_2018_2019

This unit was showcased during this workshop and focused on how a teacher developed a unit of learning with their students and school context in mind. This sample resource may assist you in planning and developing materials suitable for your student's context. The main focus of this unit of learning was developing understanding around geometric constructions and developing spatial reasoning skills. This engagement can be found on slides 42- 57 of the Graphics CPD 2018/2019 PowerPoint.

What is included in this PDF?

1. Sample unit of Learning

Included is the sample unit of learning developed by the JCt4 Graphics team. Highlighted in the plan is what learning outcomes are being activated by the worksheet. A red box will highlight the learning outcomes, key learning, evidence of learning and the learner experience sections within the plan to emphasise where the resource fits within the context of the unit.

2. Tangram Handout

As part of the unit of learning a handout was developed to activate the learning outcomes within the unit. This handout was specifically designed for the CPD 2018/2019 workshop and it is recommended that this resource be tailored to suit your own specific class group and context.

Link to Resource

Note: It is recommended that you engage with the CPD materials in conjunction with using this resource to contextualise the resource and make a better connection between resource and learning outcomes.

Consider the age, stage and prior learning of the students.

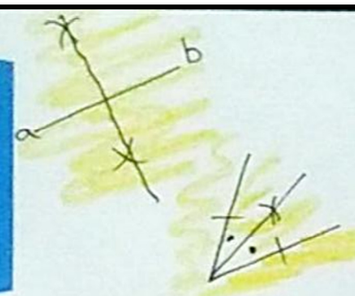
What learning do we want to focus on?

Explore both the strands and elements when choosing learning outcomes.

Identify the learning outcomes for your unit of learning.

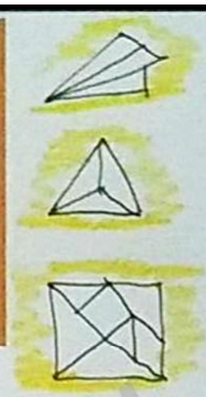
Identify the key learning for students using action verbs to support your thinking.

Consider how we will assess and report evidence of learning



Develop ideas for how students could experience this learning.

How will I know they are learning?



Using your own classroom context, what methodologies and resources will support students in experiencing the learning outcomes.

Ensure assessment aligns with the learning outcomes and their action verbs

AGE / STAGE

SEPTEMBER 1ST YEAR

PRIOR KNOWLEDGE / LEARNING

- BASIC EQUIPMENT SKILLS
- COMMON 2D GEOMETRIC SHAPES - POLYGONS, CIRCLES, TRIANGLES

LEARNING TO FOCUS ON

* BASIC GEOMETRIC CONSTRUCTIONS
  - FUNDAMENTAL CONCEPTS & PRINCIPLES
* SPATIAL REASONING/ABILITY
  - MANIPULATION OF BASIC 2D SHAPES TO PROBLEM SOLVE

LEARNING OUTCOMES & KEY LEARNING

* 1.3 3.10 DERIVE, INVESTIGATE, APPLY
  - WORKING FROM 3D TO 2D TO DERIVE SOLUTIONS TO GEOMETRIC PROBLEMS
* 1.12 1.6 CONSTRUCT, APPLY
  - DEMONSTRATE AN UNDERSTANDING OF PRINCIPLES EXPLORED ABOVE BY CONSTRUCTING SOLUTIONS IN ACCORDANCE WITH GRAPHICAL CONVENTIONS - CONSOLIDATE BOARD SKILLS
* 3.3 1.1 DEMONSTRATE, VISUALISE
  - DEMONSTRATE SPATIAL UNDERSTANDING THROUGH MANIPULATION OF REGULAR 2D SHAPES
* 1.10 UNDERSTAND
  DEMONSTRATE AN UNDERSTANDING OF GEOMETRIC PROPERTIES OF COMMON 2D SHAPES

ASSESSMENT

- CREATION OF 3D MODELS
- COMPLETE 2D SOLUTIONS ON WORKSHEETS

* 1.3 3.10
  - USING 3D EXAMPLES/MODELS TO DERIVE 2D SOLUTIONS
  - PAPER PLANE/PAPER FOLDING TO DERIVE PROOF/REASONING BEHIND PRINCIPLE/CONCEPT OF BISECTING LINES & ANGLES
  - TERMINOLOGY
* 1.12 1.6
  - WORKSHEETS WITH EXAMPLES OF EVERYDAY CONTEXT/SITUATIONS INVOLVING GEOMETRIC PROBLEMS
  ↳ APPLY PRINCIPLES FROM 1.3 & 3.10
* 1.1 3.3 1.10
  - TANGRAM ACTIVITY
  - CONSTRUCTION & PRINCIPLES FROM ABOVE TO CREATE
  - PHYSICAL MODEL CREATED BY STUDENTS FROM CARD
  - WORKSHEET WITH CHALLENGES (DIFFERENTIATION)
  - PROPERTIES OF COMMON 2D SHAPES

* 1.3 3.10
  - PAIRWORK ON PAPER PLANE
  - USE OF DRAWING EQUIPMENT TO PROVE CONCEPT/PRINCIPLE
* 1.6 1.12
  - COMPLETE WORKSHEETS
  - ACCURATE REPRESENTATION OF SOLUTIONS
* 1.1 3.3 1.10
  - CREATE TANGRAM
  - MANIPULATION OF SHAPES
  - LIST PROPERTIES OF 2D SHAPES & CREATE MODELS OF SAME USING TANGRAM PIECES

REFLECTION

* STUDENTS APPLY KNOWLEDGE FROM EARLIER UNITS TO LIST PROPERTIES OF SHAPES
* PAIRWORK TO SOLVE PROBLEMS & ANALYSE SOLUTIONS

An tSraith Shóisearach do Mhúinteoirí
JuniorCYCLE for teachers

JUNIOR CYCLE FOR TEACHERS
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Tangram Challenge

A tangram is a seven-piece puzzle which originated in China. It is basically a jigsaw that is made up of geometric shapes that can be cut from a single square as shown in figure 1. The shapes are a square, 2 large triangles, 2 small triangles, 1 medium triangle and a rhomboid. The medium-sized triangle and the square and the rhomboid are all twice the area of the small triangles; the area of the large triangles is four times the area of the smaller triangles.

Using the diagram in **figure 1** as a guide, complete the tangram layout in **figure 2**.

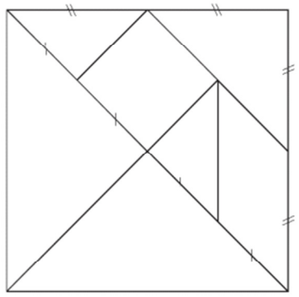


Figure 1

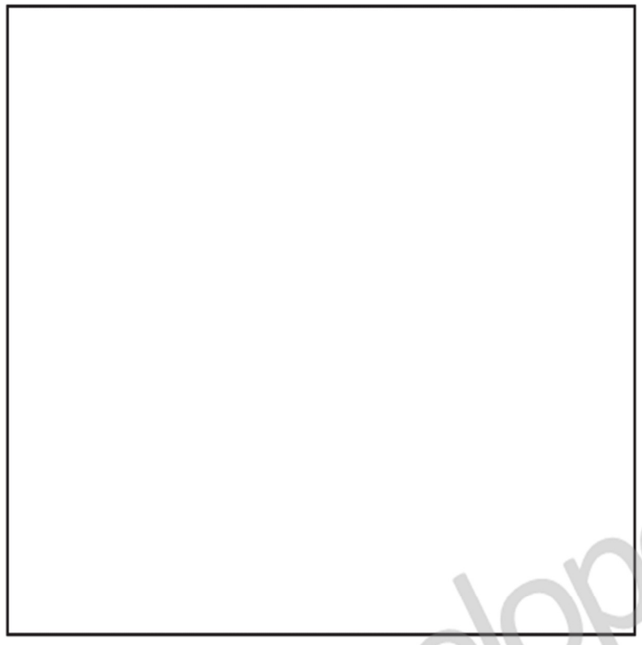


Figure 2

Identify the following:

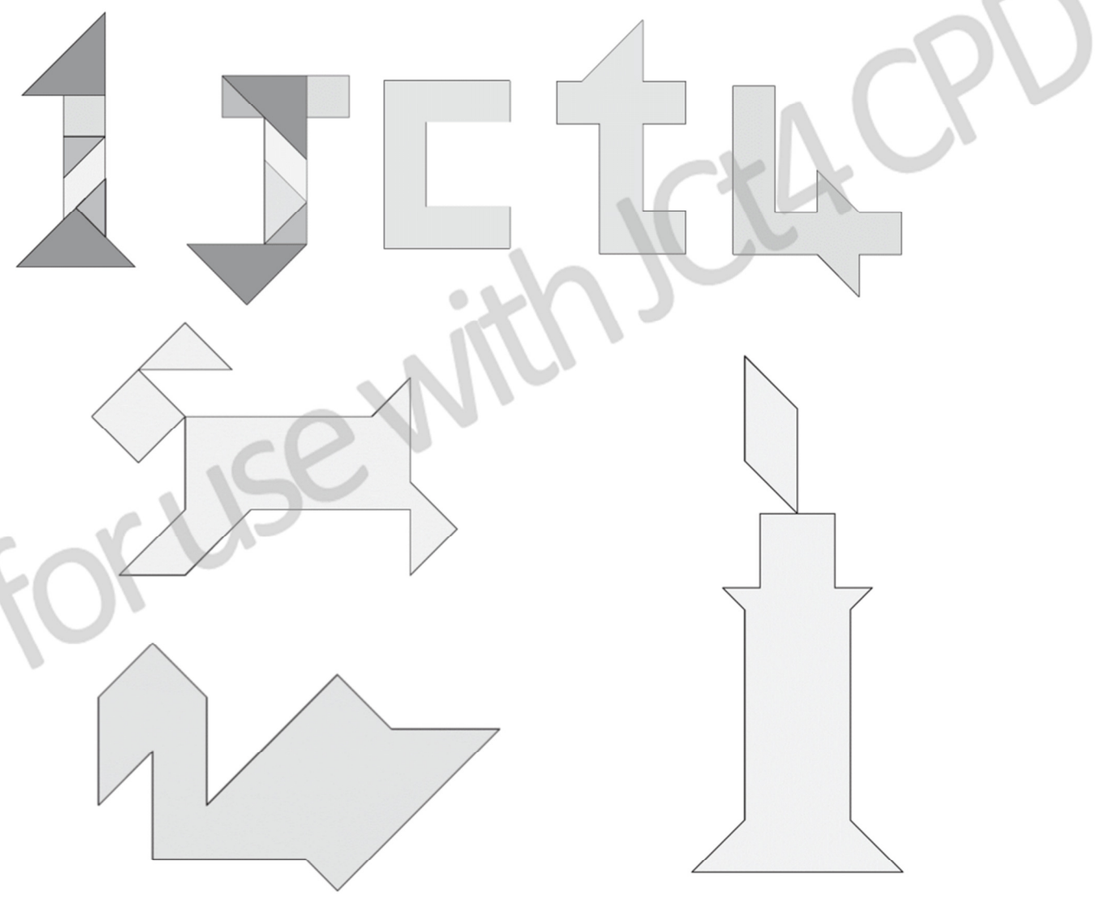
Diagonal	Bisector
Parallel	Horizontal
Vertical,	90° Angle
45°Angle	Isosceles
Parallelogram	

How many triangles can you see?

On a 140mm piece of square card draw out the Tangram puzzle and carefully cut out the pieces as shown in **figure 3**. Complete the exercises on the next page using the tangram pieces. The first few exercises have the outline of the shapes put in to help you.

Figure 3

Complete the following exercises using the tangram pieces you have cut out. The first one is completed for you.



Create a list of geometric properties for each of the four shapes below. Can you create each shape using **all** the tangram pieces? Use your list to verify the shapes you have created have the correct geometric properties

Shape	Rectangle	Parallelogram	Isosceles Triangle	Trapezium
Geometric properties of shapes use sketches, symbols or text				