

# Tangrams

Students explore the concepts of math and arts as they arrange simple geometric shapes to create images of objects, animals and people.

## Prepare the materials

### Necessary materials

Tangram set  
Sign pens

### Optional materials

Paper

## Curiosity

Do a short activity to get students curious about the lesson.

Then ask students to arrange the given pieces of tangram into a square. Let them try for a few minutes. If students struggle a lot, give them hints to help them solve the puzzle.

## Activity

### Make tangrams colorful

Students will find it more fun to play with colorful tangrams rather than the plain ones in the kit. Ask them to use sign pens to color their tangram pieces. They can draw simple hatching lines on the shapes to make it quick and uniform.

### Tangram puzzles

Ask students to refer to this lesson in the student booklet. Ask them to recreate the images given in the puzzle section. Inform students about the rules of tangram.

- The shapes cannot overlap.
- All the seven shapes must be used to create an image. More shapes cannot be used.

If students are struggling, ask them to try to break the puzzle image into the tangram shapes. They can use a notebook and pencil if necessary.

### Create your own images

Ask students to use the tangram pieces to create images out of their imagination. These images can represent objects, people, animals etc. Encourage them to think differently and emphasize that there can be multiple correct ways to represent the same thing.

## Puzzles and guessing games

Once students create an image from their imagination, ask them to draw its outline on a blank paper. Ask them to exchange such outlines with friends and try to recreate those images. Students can also show the image they have created to their friends and ask them to guess the object they have represented.

## Transform the art

Ask students to add to the outlines they traced in the previous activity and convert them into more realistic drawings. Students can refer to the models given in the student booklet.

## Suggestions for the facilitator

We have found these tips helpful while facilitating this lesson:

- Students find it more fun to play with tangrams if they are colorful. It's useful to get them to color the shapes before getting started with the puzzles.
- Having models to follow as examples can be helpful in guiding students. You can prepare some examples to show as models.

## Thinking

### Reflection

Ask questions to get students to think about their learning experience

- What kind of shapes did you enjoy making the most? Why was it so?
- What was challenging about making images with tangram?

### Think like a ...

Ask thought provoking questions to make students think from the perspective of a professional

#### Think like an artist

- Artists often use basic shapes to draw more realistic ones. Can you convert your basic tangram arts into more realistic drawings?

#### Think like a mathematician

- All the images made using tangrams are all of equal area. Do you agree with this statement? Why?

## Concepts and skills

Some concepts and skills students explore in this lesson are:

### Basic shapes as building blocks for complex designs

Complex designs and images can be decomposed into simpler shapes. And simple shapes can be used to create more complex images.

## Sample lesson plans

### 1. A 60 minute class

#### Learning Objectives

To get students to play with tangrams and explore the concepts of math and arts in doing so. The emphasis is on getting them to enjoy and think creatively.

#### Classroom context

This sample lesson is designed for **grade 8** students. The time available for the lesson is **90 minutes**.

#### Lesson Flow

##### Curiosity (5/5 mins)

Ask students to observe the shapes in their tangram set and identify the shapes. They can also group the shapes based on the common characters they notice.

##### Activity (45/50 mins)

##### Coloring the tangram

Ask students to color their tangram shapes using sign pens. They can draw simple hatching lines on the shapes to make them look colorful.

##### Puzzles

Ask students to refer to the lesson in the student booklet and solve the puzzles given there. Scaffold when necessary. Encourage students to seek help and ideas from peers.

##### Imagine and create

Ask students to create images out of their imagination. Ask everyone to make the same object initially, for example dog, or leaf. Ask them to look at each other's images and reflect on the similarities and differences. Then let them choose the things they want to build and work in pairs. Once they are done, they can play a guessing game with their friends, where they ask their friends to guess the image they have made.

##### Thinking (10/60 mins)

Ask questions to help students reflect on their learning experience.

- How were the images you created different from those created by your friends?
- What was challenging about solving tangram puzzles? What ideas or approaches worked for you in solving them?

### 2. Two 45 minutes classes

#### Learning Objectives

To get students to play with tangrams and explore the concepts of math and arts in doing so. The emphasis is on getting them to enjoy and think creatively.

## Classroom context

This sample lesson is designed for **grade 6** students. The time available for the lesson is **two 45 minutes classes**, not necessarily consecutive.

## Lesson Flow

### Class I

#### Curiosity (5/5 mins)

Ask students to use their tangram shapes to create a square. Provide hints if they struggle a lot.

#### Activity (30/35 mins)

##### Coloring the tangram

Ask students to color their tangram shapes using sign pens. They can draw simple hatching lines on the shapes to make them look colorful.

##### Puzzles

Ask students to refer to the lesson in the student booklet and solve the puzzles given there. Scaffold when necessary. Encourage students to seek help and ideas from peers.

##### Imagine and create

Ask students to create images out of their imagination. Let them choose the things they want to build and work in pairs. Once they are done, they can play a guessing game with their friends, where they ask their friends to guess the image they have made.

#### Thinking (10/45 mins)

Ask questions to help students reflect on their learning experience.

- What was challenging about solving tangram puzzles? What ideas or approaches worked for you in solving them?
- The area covered by all the images you created using tangram is equal. Why might it be so?

### Class II

#### Recalling (5/5 mins)

Ask students to be seated in the same groups as in the previous class. Ask them to talk with their group members about the previous class. Get one or two students to share the key points from their discussion with the whole class.

#### Activity (30/35 mins)

##### Imagine and create

Ask everyone to make the same object initially, for example dog, or leaf. Ask them to look at each other's images and reflect on the similarities and differences. Ask them to think about the similarity and differences in their images of the same object.

##### Exchange puzzles

Ask students to trace the outline of the images they have created. They can exchange these images with friends and solve these puzzles.

**Transform your art**

Students can improve the outline they traced earlier and transform it into a more realistic representation of the object. Ask students to refer to the student guide lesson for help.

**Thinking (10/45 mins)**

Ask questions to help students reflect on their learning experience.

- How was the experience of transforming a tangram image outline into a more realistic drawing? Why?