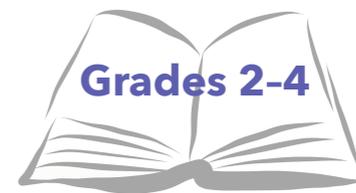


# Tangrams



**Note:**  
This is the same  
Tangrams activity  
used in Grades  
K-2.

**30 min/  
day for  
1 week**

**Overview:** Students manipulate the seven geometric shapes of a tangram puzzle to form larger, composite shapes.

Tap below ↴ for info on Tangrams:

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## Materials

- **Tangrams** — one 7-piece set per student
- **Puzzle cards**
  - ☐ Cards w/**interior outlines** — at least 1 for each pair of students
  - ☐ Cards w/**silhouettes only** — enough for every student to do some easy and some more challenging puzzles

Examples

## Prerequisites

Students must be familiar with:

- the **names of shapes**.
- how to **slide, turn, flip,** and **rotate** puzzle pieces.

## Concepts and Skills Used

<p><b>Spatial Thinking</b></p> <ul style="list-style-type: none"> <li>• Object Manipulation</li> </ul>	<p><b>Computational Thinking</b></p> <ul style="list-style-type: none"> <li>• Decomposition</li> <li>• Debugging</li> </ul>	<p><b>Math</b></p> <ul style="list-style-type: none"> <li>• Geometric shapes</li> <li>• Composite shapes</li> <li>• Symmetry — <i>reflective, rotational, point</i></li> </ul>
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## Standards Addressed



Tap to see standards

# Procedure

## Day 1

1. Review the names of geometric shapes. Explain that when we put shapes together, they can create bigger shapes (**composite shapes**).
2. Show a tangram puzzle card that has interior lines outlining the seven shapes. Describe the card as a picture puzzle that you solve by rearranging and fitting together the tangram pieces to create the bigger shape or figure on the card. Model how to fill in the card with the pieces.
3. Remind students that:
  - they need to use **all 7** of the pieces.
  - the pieces **cannot overlap**.
  - they may need to **flip** the **parallelogram/rhomboid**.

**Why?** The parallelogram is the only tangram piece that may need to be flipped to solve a puzzle because it does not have **reflective symmetry** (mirror symmetry)— it just has **rotational symmetry**, so its mirror image can only be obtained by flipping it over.

4. Put students in pairs (or small groups), and give each pair a complete tangram puzzle set and 1 or 2 puzzle cards with interior outlines.

*(Continued)*

## Using Tangram Puzzle Cards with Interior Outlines



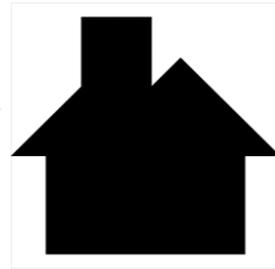
*Puzzle cards can be simple or include colorful scenes like these.*

5. After students have had a few minutes to work on their puzzles, rotate cards between pairs. Go through as many cards as time allows.

## Day 2

Now that your students have had a chance to manipulate the shapes to assemble tangram puzzles with the help of interior outlines, they can move on to the **silhouette-only cards**.

6. Model how to fill in a puzzle card that has only the silhouette of the **composite shape**.



7. Repeat the procedure for partner work using some of the easier silhouette-only cards.

8. Look for students having difficulty filling in the shape without any interior outlines.



## Day 3

9. Repeat the procedure for partner work, this time distributing some of the **more challenging silhouette-only cards**.

## Day 4

10. Model how to **design your own tangram puzzle** and create a puzzle card.
11. Have each student create their own puzzle card for other classmates to complete.
- **Note:** Students can choose to include the interior outlines or leave them out.

## Day 5

12. Have students **trade the puzzle cards** they created, and put together each other's tangram creations. Let them try to complete everyone's in the class if possible.

## Common Errors and Challenges

Students may:

- not fill in the puzzle completely.
- go outside the puzzle shape's outline or silhouette.
- not be flipping or rotating the tangram pieces.



## Extension Activities

- Once students have successfully assembled a particular shape on a puzzle card, ask them to create it again on plain paper, or on their desk (i.e., they should assemble it *next* to the card instead of right on top of it).
- Use tangrams to explore **reflective symmetry** (mirror symmetry) and **lines of symmetry**, as well as **rotational symmetry**. Explain how when a shape has rotational symmetry, it will “match up with itself” (look the same again) at least once as you rotate it around its center point. Parallelograms (and playing cards, and the letters H, I, N, O, S, X, and Z) have a special kind of rotational symmetry called **point symmetry**, where the shape looks the same only once, when rotated halfway around ( $180^\circ$ ).

**TIP**

## Links to Lesson Plan Downloads

Tap to access downloadable versions of the *Tangrams* lesson plan:



Editable .rtf file

## Resources

*Dissection Puzzle*. [https://en.wikipedia.org/wiki/Dissection\\_puzzle](https://en.wikipedia.org/wiki/Dissection_puzzle)

### *Grandfather Tang's Story* — Various Resources

*Grandfather Tang's Story: A Tale Told with Tangrams*, by Ann Tompert, 1997. <https://www.goodreads.com/book/show/15278998-grandfather-tang-s-story>

*Tangrams with Grandfather Tang*, 5th grade lesson plan by Cathy Skinner. Various activities, including engaging students with literature, creating your own tangram pieces, mathematical vocabulary (labeling tangrams), and a “Tangram Challenge.” <https://betterlesson.com/lesson/545182/tangrams-with-grandfather-tang>

“Modeling Analyzing and Synthesizing,” (using *Grandfather Tang's Story*), pp. 105-108 in *Reading Is Our Business*, by Sharon Grimes, 2006. <https://smile.amazon.com/Reading-Our-Business-Libraries-Comprehension-dp-0838909124/dp/0838909124>

(continued)

## Resources, continued

*Point symmetry.* <https://study.com/academy/lesson/point-symmetry-definition-examples.html>

*Quadrilaterals.* <https://www.mathsisfun.com/quadrilaterals.html>

*The Tangram Channel.* <https://www.tangram-channel.com/>

*Tangrams,* by Michelle Manes. <https://pressbooks-dev.oer.hawaii.edu/math111/chapter/tangrams/>