

Manipulatives as a Tool

**FROM
CONCRETE
TO
VISUAL/REPRESENTATIONAL
TO
ABSTRACT**

Pattern Blocks
Color Tiles
Tangrams
Cuisenaire Rods
Snap Cubes
Geoboards

Grade 3 Math Tasks

GRADE 3 MATHEMATICS TASKS

AUTHORS' VISION FOR IMPLEMENTATION

OVERVIEW AND DISCOVERY TIME FOR EACH MANIPULATIVE:

- Teacher distributes manipulatives to partner pairs.
- Partner pairs work together for 10 minutes to discover attributes of manipulative and make a list of the attributes
- Teacher asks partner pairs to share attributes with the whole class – teacher lists attributes on an overhead transparency
- Students work in partner pairs for 10 minutes to make discoveries with the manipulatives and make a list of the discoveries
- Teacher asks partner pairs to share discoveries with the whole class – teacher lists discoveries on an overhead transparency
- Student add to the list during any of the instructional tasks

PROCESS FOR EACH INSTRUCTIONAL TASK:

- Teacher prepares materials as listed on each task for the entire class
- Teacher places instructional task transparency on the overhead and discusses the entire task with the class before they begin working.
- Teacher places assessment transparency on the overhead before students begin working on the tasks so that students will know what questions they will answer during and after completion of the task.
- Teacher distributes 1 copy of the task and assessment to each pair/group of students.
- Students complete task.
- Teacher places assessment transparency on the overhead and debriefs the task as a class.

TANGRAM EXPLORATION

Set of Seven Geometric Figures

- Two small triangles
- One medium triangle
- Two large triangles
 - One square
- One parallelogram

Three Different-sized Triangles

- Similar
 - Right isosceles
- Angles of 45° , 45° , and 90°
- Corresponding sides are in proportion

All Pieces Can be Covered with Small Triangles

- All of the angles of the pieces are multiples of 45
(angles are 45° , 90° , or 135°)
- Small triangle can be used to compare areas of the pieces
(medium triangle area, square area, and parallelogram area = 2 times small triangle area)
(large triangle area = 4 times small triangle area = 2 times medium triangle, square, and parallelogram area)

All Seven Pieces Fit Together to Form a Square

TANGRAMS AS A TOOL

To develop spatial reasoning

To explore fractions

To explore geometric concepts

- Size
- Shape
- Congruency
- Similarity
- Area
- Perimeter
- Properties of polygons

**To encourage independent and
group work**

**To provide an opportunity for
authentic assessment**

Tangram Task #1

How much fencing would you need to go all the way around a field made from Tangram pieces?

Materials you will need per pair:

- 4 Tangrams (2 per partner)
- 2 Number cubes marked 1-6
- White paper for recording
- Small Tangram Triangles activity sheet
- Tangram (centimeter) ruler

Your assignment for this Math Mission:

- Work with a group of 4. Have someone in your group roll 2 number cubes.
- What is the sum of the numbers rolled? Think of the sum as a number of small triangles that will exactly cover a Tangram shape.
- Choose Tangram pieces that together can be exactly covered by your number of small triangles.
- Each person in the group should use these same pieces to make a different shape or “field.”
- Compare your field with those made by others. Decide if all the fields are different.
 - If they are different, record them on white paper
 - If they are not different, come to an agreement on how to change them. Then record your work.
- To know how much fencing you would need to enclose your field, find the perimeter of your field, or the distance around it. Write it on the field.
- Make a chart showing your group’s fields. Write the perimeter of each field below it. Then write this sentence on your chart, filling in the sum you rolled:

The area of our field is _____ small triangles.

- Answer the questions on the back of this task card. Explain your answers.

Tangram Task #1 Assessment

- How did you decide which Tangram pieces to use to make your fields?
- Why do you think more fields can be made for some areas than for others?
- How many different sums could you have rolled using the two number cubes? How do you know?
- Which sums are more likely? less likely? equally likely?
- What do you notice about the perimeters of different fields made with the same Tangram pieces?

TEKS 3.11B Use standard units to find the perimeter of a shape

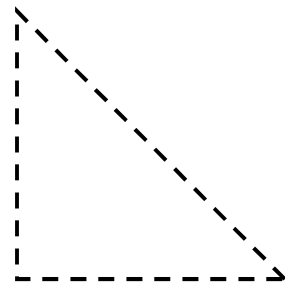
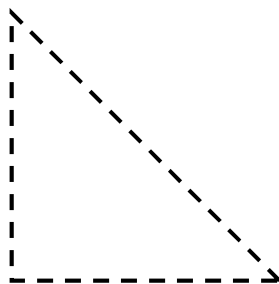
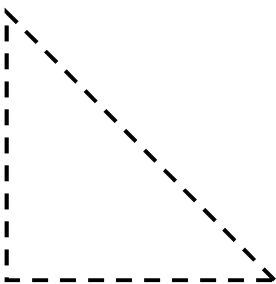
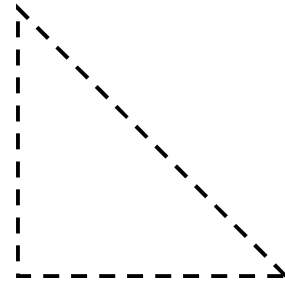
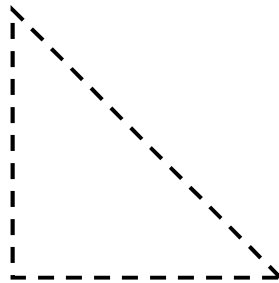
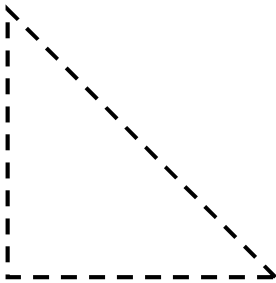
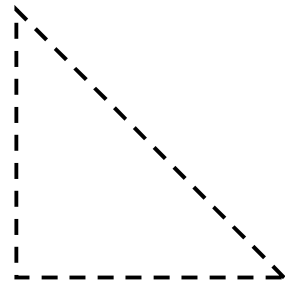
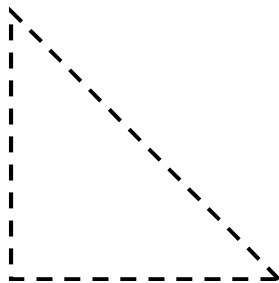
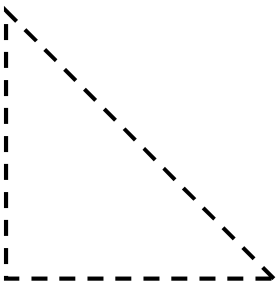
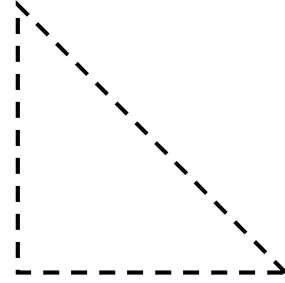
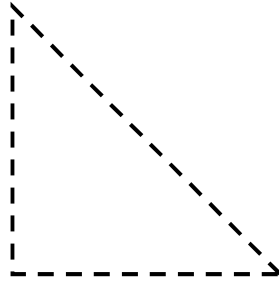
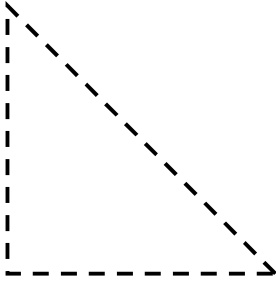
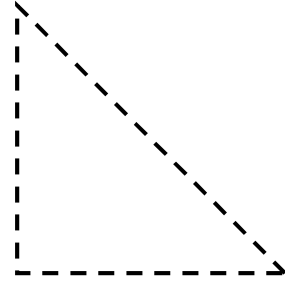
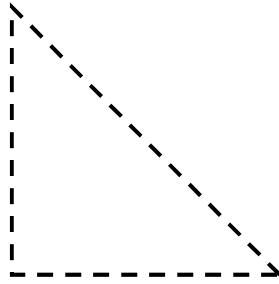
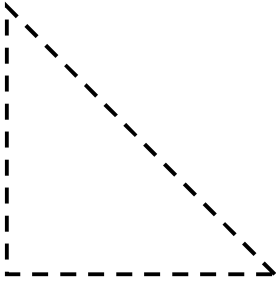
TEKS 3.11C Use concrete or pictorial models of square units to determine the area of shapes

TEKS 3.13C Use data to describe events as more likely than, less likely than, or equally likely as

TEKS 3.14B Solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness

TEKS 3.16B Justify why an answer is reasonable and explain the solution process

Small Tangram Triangles



Tangram Centimeter Rulers

