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All reproducibles are also available as downloadable, printable versions at www.mathsolutions.com/teachingpreschoolreproducibles.

Observation Questions

Mathematics in an Early Childhood Classroom

Observe mathematics in a preschool classroom. Use the following questions to guide you in recording your observations. If you are a teacher, think about these questions as they apply to your own classroom.

1. Do the children hear the words *mathematics* or *math* during the day?
Is there explicit attention to this topic in the daily schedule?
2. What mathematics do you see the children doing?
3. Does the teacher extend children's dramatic play by joining in?
4. Are the questions that are posed open-ended and thought provoking? In what ways?
5. Are children encouraged to make choices? How?
6. Does the teacher show interest in what the children are doing? How?
7. Does the teacher make specific comments that extend children's thinking and language and focus on key experiences? How?
8. Is there a balance between teacher talk and child talk throughout the day? In what ways?

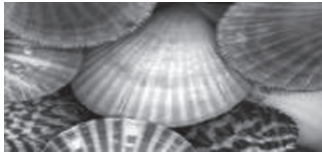
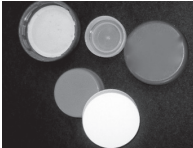
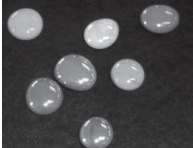


Reproducible B

Letter to Families for Support in Creating Collections of Stuff

Dear Families,

In math class we are learning about counting and sorting collections. Please help us by contributing interesting small items to our classroom collections. We are happy to receive any items that children may use to count, sort, and make projects with. Ideas include the following

Buttons 	Bread tags 
Shells 	Pebbles 
Keys 	Lids 
Nuts and bolts 	Marbles 

Thank you so much!

Sincerely,

[Your Child's Teacher]



Learning Progressions: Materials

Use this list to create a kit of materials for use with the Learning Progressions assessment documents (Reproducibles C2–C7).

Number Tasks

1. Set of dot cards in various arrangements 1–5 and 6–10 (see Reproducible E)
2. Two sets of 10 lima beans or wooden cubes in a sandwich bag
3. Cube train of 3 red, 2 blue
4. Cube train of 3 green, 2 yellow
5. Cards with some capital letters and some numerals
6. Strip of numerals out of order: 6 2 3 1 9 7 8 4 0 5
7. Cube train lengths in various lengths using different colors: 4 red, 5 blue, 6 green, 7 yellow
8. Five cube train 3 yellow + 2 blue and another 2 yellow + 3 blue
9. Cube train of 5 yellow + 2 blue

Measurement Tasks

1. Cube trains in various lengths using different colors: 4 red, 5 blue, 6 green, 7 yellow, 5 green
2. Five ribbon or yarn lengths in various colors: 6 inches, 7 inches, 9 inches, 10 inches, 11 inches
3. Same size snack containers filled with different items
4. Pan balance
5. Four or five clear containers of different shapes and sizes
6. Birdseed or sand for measurement
7. Scoops
8. Sequence drawings for a familiar activity (getting up in AM, planting a seed, etc.)

Graphing Data

1. Class graph with two columns (Yes/No)
2. Class cracker graph data on preferences

(continued)



Reproducible C1 (Materials, *continued*)

Sorting and Classification

1. Objects to sort:

- ☐ buttons
- ☐ lids
- ☐ keys
- ☐ bread tags
- ☐ attribute blocks, geometric shapes
- ☐ shells
- ☐ wooden objects (sticks, cubes, etc.)
- ☐ metal objects (washers, screws, nuts and bolts, etc.)
- ☐ plastic objects (small toys, game pieces, LEGOS, etc.)
- ☐ rocks

Pattern

1. Unsorted single snap cubes in various colors
2. Pattern blocks
3. Sorting objects (above)
4. Wooden or plastic beads in various attributes

Geometry/Spatial Thinking

1. Collection of unit blocks
2. Collection of transparent shapes
3. Light table or overhead projector
4. Pattern block puzzles
5. Tangram puzzles
6. Other shape puzzles
7. Paper shapes, glue sticks, background paper
8. Blue and yellow acetate rectangles

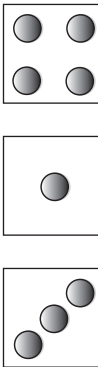




Learning Progressions: Early Childhood/Number

Name of Student:

Dates Noted: (Use different color pen for each observation.)

Number	Details/Prompt	Examples	Notes								
Counting	Counts orally <i>Please count as high as you can go, I want to hear what you say.</i>	One, two, three, four, five. . . . Record what the child says. Note which numbers are skipped and the order the child uses.	How high? Counts to ten? ☐ Yes ☐ No Counts to 20? ☐ Yes ☐ No Beyond 20? ☐ Yes ☐ No Counting backwards from 10? ☐ Yes ☐ No								
	Instant identification of small set of dots or objects—subitizing. <i>What do you see here? How many?</i>	Use dot cards such as these: 	Up to 3? ☐ Yes ☐ No Up to 5? ☐ Yes ☐ No When does the child count the dots instead of saying the number?								
	Counting objects Spread out a collection of about ten beans or cubes. <i>Please count these.</i> <i>So how many are there?</i>	Counts correctly in sequence, tagging each object. Counts correctly in sequence, but does not tag each object, so counting is not accurate. Knows that the last number counted is the amount of the set.	Accurate to which number? ☐ Does not tag objects. (If accurate to ten, try fifteen or twenty items.)								
	Count out a target amount <i>Please give me five beans.</i> <i>Now make sure I have seven beans.</i>	Counts out accurately. Remembers to stop at 5. Counts out accurately. Remembers to stop at 7.	Or does the child add two more to 5?								
Estimating	<i>How many do you think are in the jar?</i> (Start with about eight or nine things.)	Number is way off or a non-number (eleven). Number is their age or friendly number, but not correct. Number seems reasonable	<table><tr><th>Number in Jar</th><th>Estimate Given</th></tr><tr><td>8</td><td></td></tr><tr><td>12</td><td></td></tr><tr><td>5</td><td></td></tr></table>	Number in Jar	Estimate Given	8		12		5	
Number in Jar	Estimate Given										
8											
12											
5											

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Reproducible C2

(Early Childhood/Number, *continued*)

Number	Details/Prompt	Examples	Notes
Comparing	Recognizes when shown two different dot cards: <i>Which is more?</i> <i>Which is less?</i>	Use dot cards such as those above. Then show cube train of three red and two blue. <i>Are there more red or blue?</i> Show cube train of three green and two yellow. <i>Are there less green or yellow?</i>	Instant response for more? ☐ Yes ☐ No Instant response for less? ☐ Yes ☐ No Counts to determine more or less? ☐ Yes ☐ No Does the child need clarification for the meaning of more and less?
Recognizing or Reading Numerals	<i>Point to the numbers.</i> Show a collection of numbers and letters. Show numerals 0–10 (out of order). <i>What's this?</i>	Use capitals and handwritten numbers: A D 3 6 2 T 8 6 2 3 1 9 7 8 4 0 5	Identifies numbers? ☐ Yes ☐ No Circles those that are recognized?
Order	<i>Put dot cards in order from least to most.</i> <i>Put these numbers in order from least to most.</i>	Show dot cards. Record what the child does. Show cube trains of four, five, six, and seven cube lengths and record what the child does. Show numeral cards. Record what the child does.	Does the child need clarification for the meaning of <i>order</i>, <i>least</i> or <i>most</i>? ☐ Yes ☐ No
Operations	<i>How many blue? How many yellow? How many blue and yellow?</i>	Show cube train of three yellow and two blue.	How does the child determine the amount?
	<i>Are there more blue or yellow? How do you know?</i>	Show a train of three blue + two yellow + two blue + five yellow.	How does the child determine the amount?
	One more: <i>How many now?</i>	Show and confirm a group of five cubes and then add one more. How does the child determine how many now?	☐ Counts all to find out. ☐ Knows one more without counting.
Notes:			



Learning Progressions: Early Childhood/Measurement

Name of Student:

Dates Noted:

(Use different color pen for each observation.)

Measurement	Details/Prompt	Examples	Notes
Length	<i>Which is longer?</i> <i>Which is shorter?</i> <i>Which are the same?</i>	Show a collection of four, same color/different length cube trains or lengths of ribbon or yarn.	How does the child determine the lengths?
Weight	<i>Which weighs more?</i> <i>Which weighs less?</i> <i>Which are the same weight?</i>	Show three objects that are all about the same size but different weights (e.g., bean bags filled with gravel, beans and styrofoam). Have a pan balance available for comparison.	What does the child do with the pan balance to check for weight?
Volume	<i>Which holds more?</i> <i>Which holds less?</i> <i>Which ones hold the same amount?</i>	Show four or five clear glass or plastic containers such as jam jars, drinking glass and food storage containers. Have scoops and birdseed or rice for measurements. Challenge the child to consider the volume of a tall thin container (salad dressing bottle, pitcher for iced tea mix) if the first task is too easy.	What does the child do with the objects to check for volume?
Time	<i>What happens first?</i> <i>What happens next?</i> <i>What happens last?</i>	Show sequence pictures for a familiar activity such as getting up in the morning or planting a seed and taking care of a plant.	How does the child arrange the pictures? (left to right?)
Notes:			



Reproducible C4

Learning Progressions: Early Childhood/Graphing Data

Name of Student:

Dates Noted:

(Use different color pen for each observation.)

Graphing, Data	Details/Prompt	Examples	Notes
	Comparing two columns <i>Which has more?</i> <i>Which has less?</i> <i>How do you know?</i> Comparing three columns <i>Which has the most?</i> <i>Which has the least?</i> <i>How do you know?</i>	Use data from a Yes/No class graph: Do you like green eggs and ham? Use data from a preference/choice class graph: Which cracker shape do you like best? Square Circle Triangle	How does the child respond to the data? Comments from the child about the graph:
Notes:			



Learning Progressions: Early Childhood/Sorting and Classification

Name of Student:

Dates Noted:

(Use different color pen for each observation.)

Sorting and Classification	Details/Prompt	Examples	Notes
	Sorts objects by given attribute: <i>Sort the blocks by color.</i> Sorts objects by self-chosen attribute. <i>Tell how you sorted these.</i> Sorts objects by attribute other than color (shape or size, for example).	Present a variety of objects that have multiple attributes on different days: ☐ buttons ☐ lids ☐ keys ☐ bread tag fasteners ☐ attribute blocks, geometric shapes ☐ shells ☐ wooden objects (sticks, cubes, etc.) ☐ metal objects (washers, screws, nuts and bolts, etc.) ☐ plastic objects (small toys, game pieces, LEGOS, etc.) ☐ rocks (polished, rough, various colors and shapes) ☐ other _____	Record how the child sorts the objects. How does the child name the groups? To move a child beyond sorting by color, present a set of objects that are all red, yellow, or blue.
Notes:			



Learning Progressions: Early Childhood/Pattern

Name of Student:

Dates Noted:

Pattern	Details/Prompt	Examples	Notes
Copy cube train pattern with colors	<i>Can you make this pattern with these cubes?</i> ☐ AB ☐ ABC ☐ ABB ☐ Other _____	Record what the student does. How does the student read the pattern? Record the words chosen.	Break the pattern into three sections. <i>Can you fix it?</i>
Make own cube train pattern with colors	☐ AB ☐ ABC ☐ ABB ☐ Other _____	Record what the student does. How does the student read the pattern? Record the words chosen.	Break the pattern into three sections. <i>Can you fix it?</i>
Pattern block patterns	☐ AB ☐ ABC ☐ ABB ☐ Other _____	☐ Linear ☐ Two-dimensional ☐ Symmetrical	How does the student describe the pattern?
Using found objects	☐ AB ☐ ABC ☐ ABB ☐ Other _____	Record what the child says about the pattern. Use beads, shells, metal objects, keys, color cubes, Cuisenaire rods, etc.	
Bead patterns	☐ AB ☐ ABC ☐ ABB ☐ Other _____		



Learning Progressions: Early Childhood/Geometric and Spatial Thinking

Name of Student:

Dates Noted:

(Use different color pen for each observation.)

Geometric and Spatial Thinking	Details/Prompt	Examples	Notes
	Sorts shapes by matching up congruent shapes <i>What can you do with these blocks?</i> <i>Which ones go together?</i>	Present a variety of blocks. Present a variety of transparent shapes on the light table.	Record how the child sorts the shapes.
	Makes equivalent shapes <i>Which are the same?</i>	Present a variety of blocks. Present a variety of transparent shapes on the light table.	Record how the child matches the shapes.
Puzzles	Present shape puzzles, tangram puzzles, and other mosaic-type resources.	Rotates shapes to fit in the frames. Enjoys working with puzzles.	
Geometric Pictures	Present cut-paper shapes, background paper and glue sticks.	Child makes original pictures with the pieces.	Record what the child says about the shapes. ☐ names some shapes ☐ uses language such as <i>over</i> , <i>under</i> , <i>near</i> , <i>above</i>
Creating Shapes	<i>Can you make a green triangle?</i> <i>Can you make a green square?</i> <i>Can you make a green rectangle?</i>	On the light table, present blue and yellow rectangular acetate sheets of various shapes and sizes.	Record what the child does.

Reproducible D

Selected Bibliography of Children's Books for Supporting Mathematical Ideas

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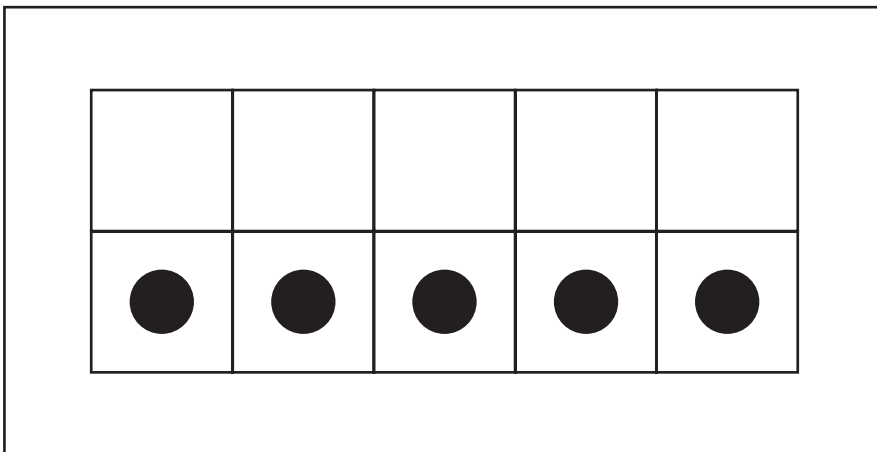
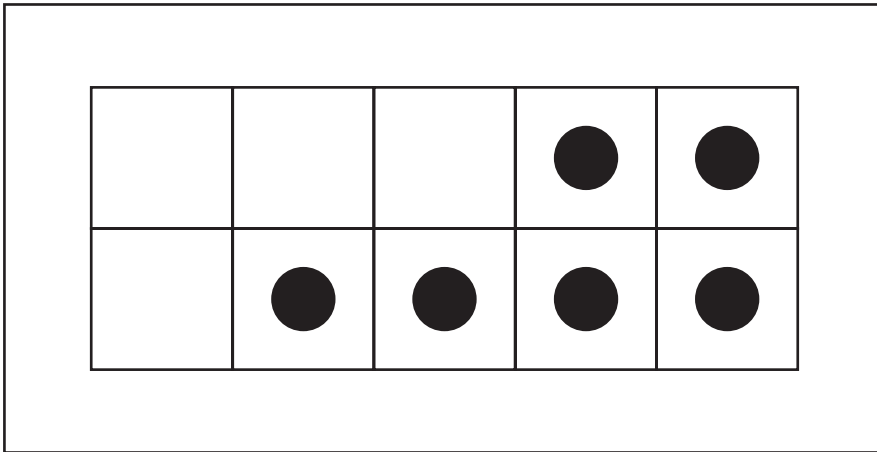


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Quick Images: Dot Cards

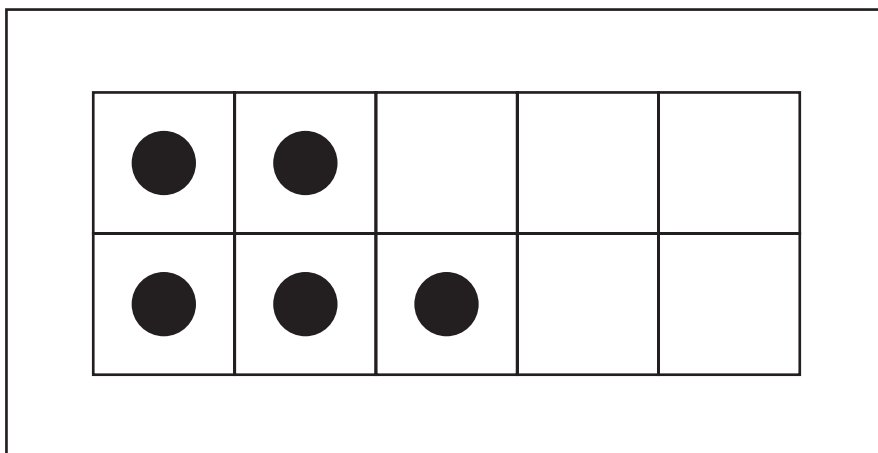
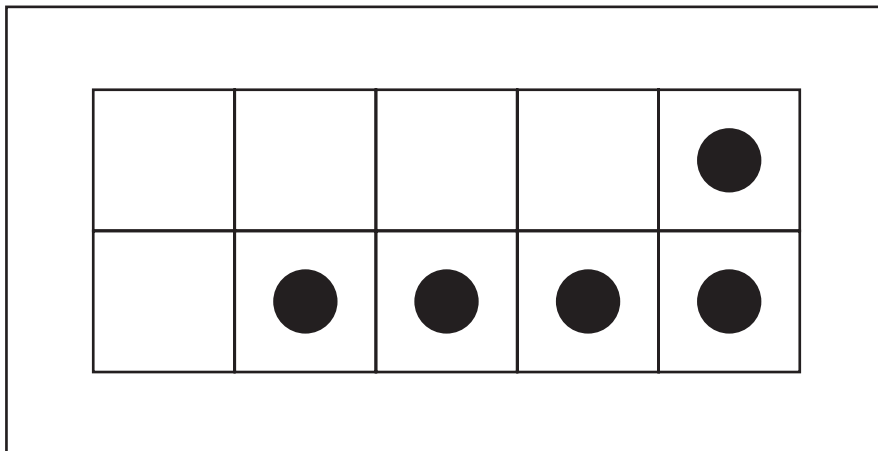


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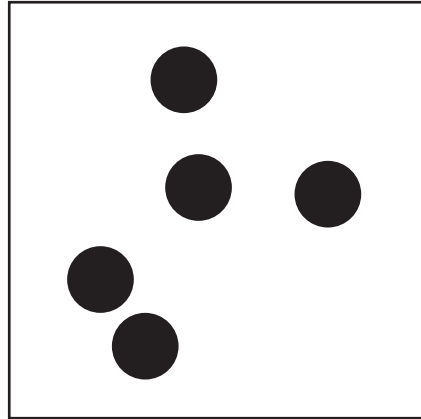
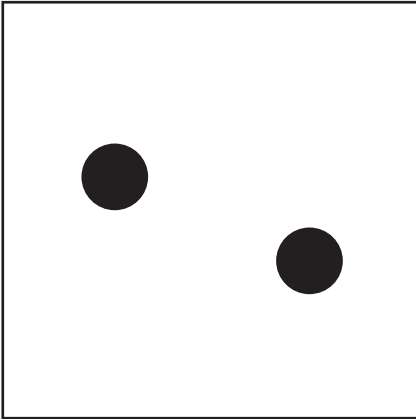
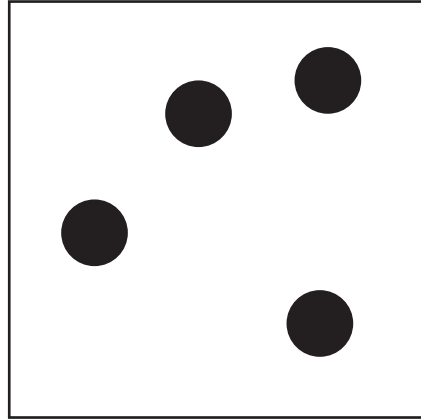
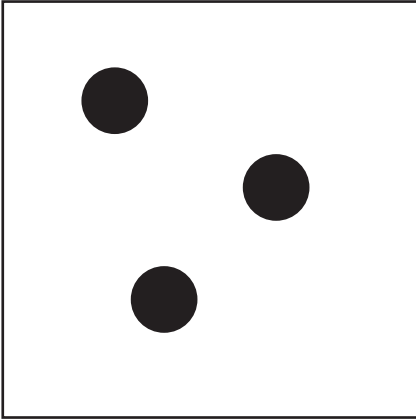


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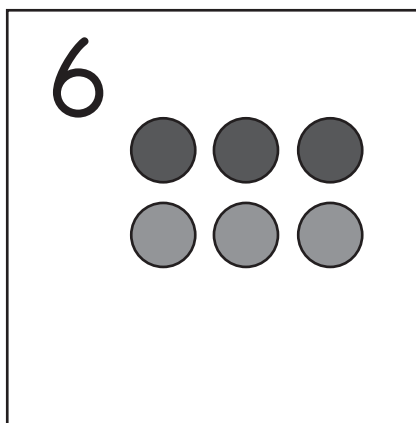
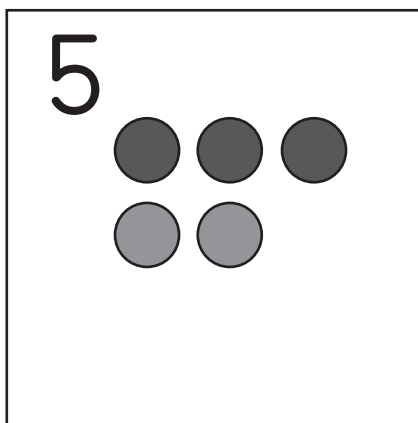
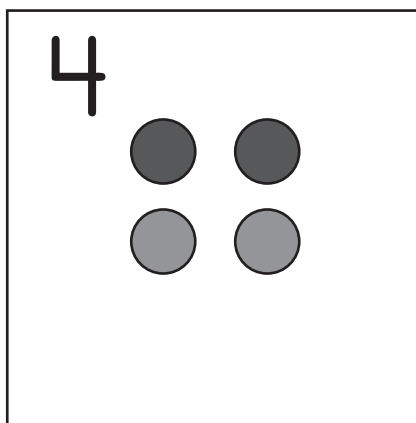
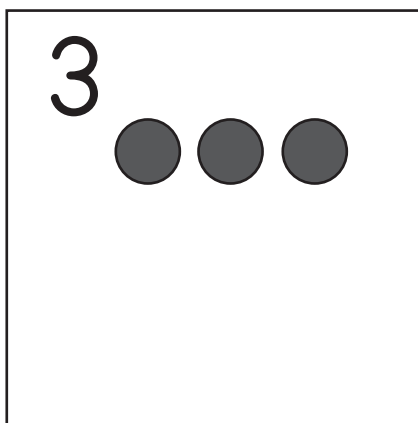
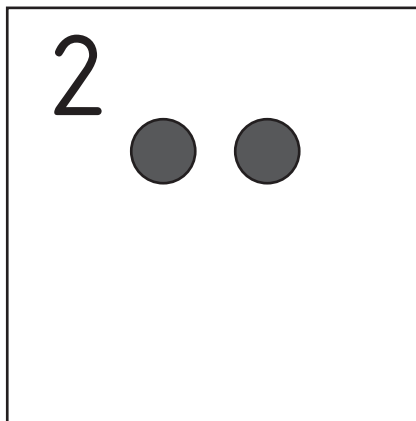
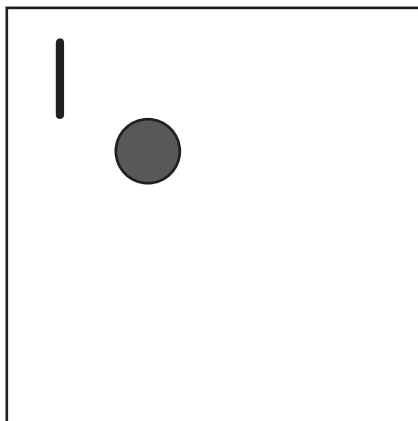
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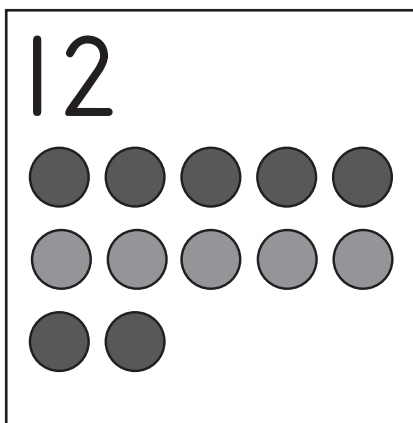
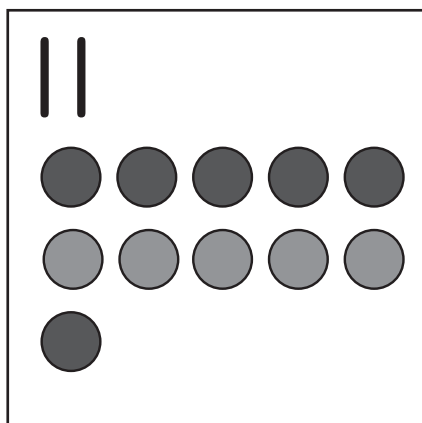
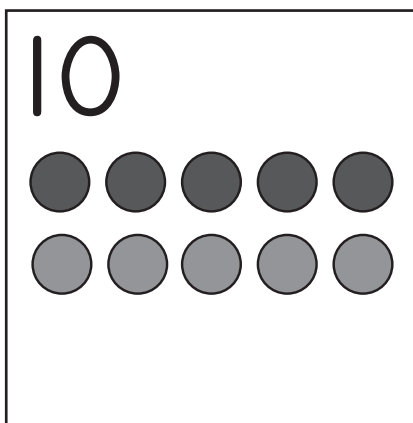
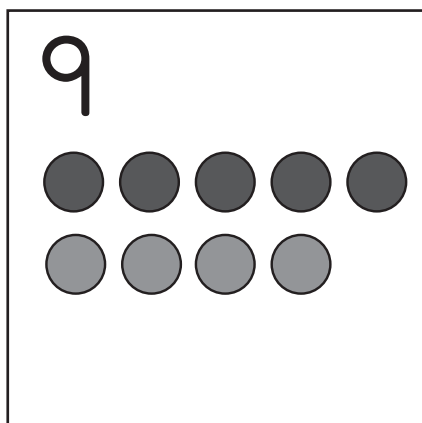
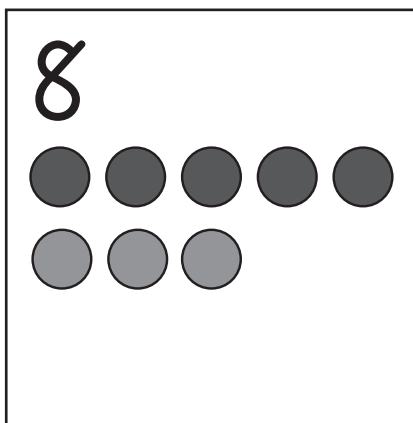
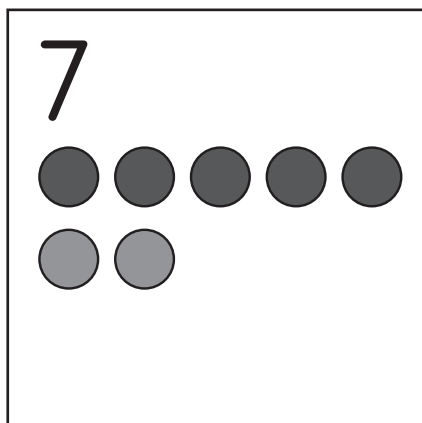
Number Cards 1-20



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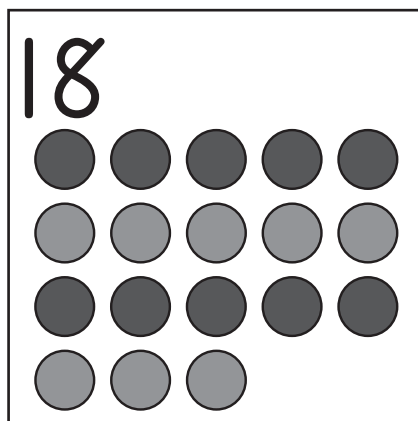
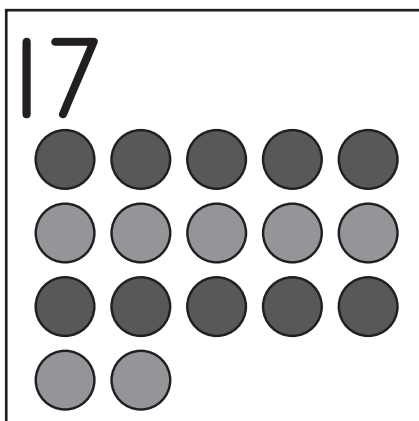
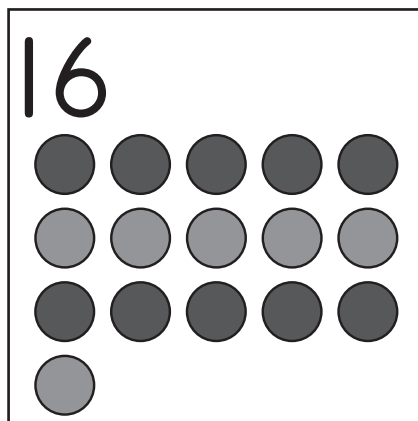
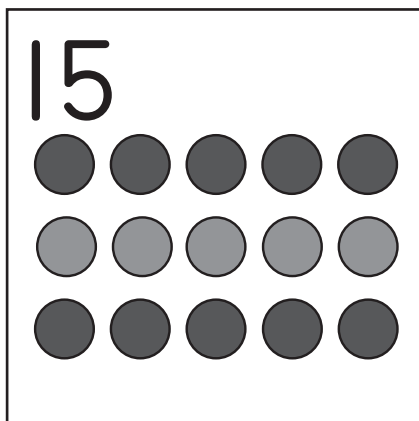
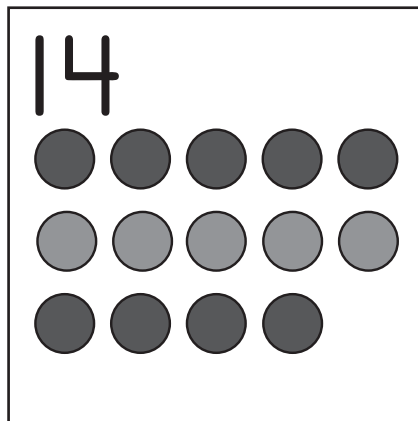
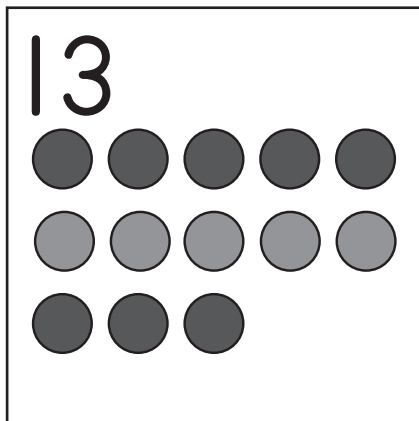


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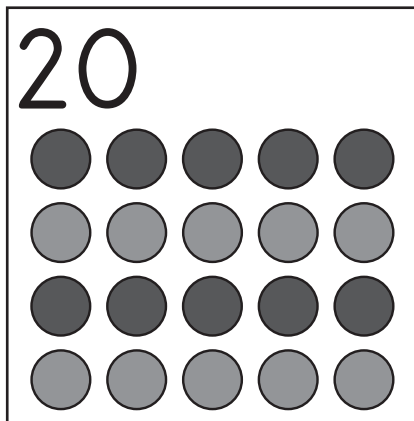
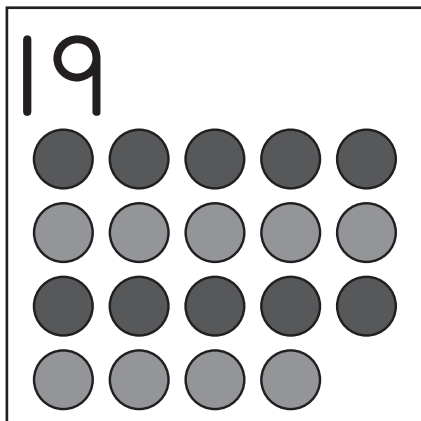
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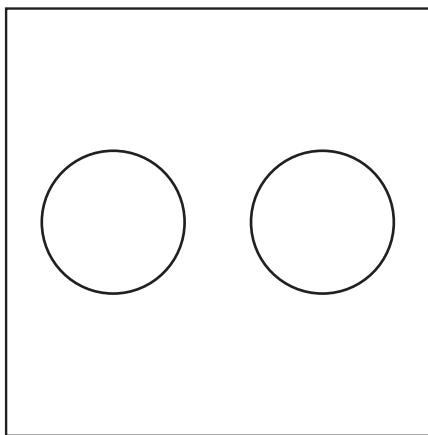
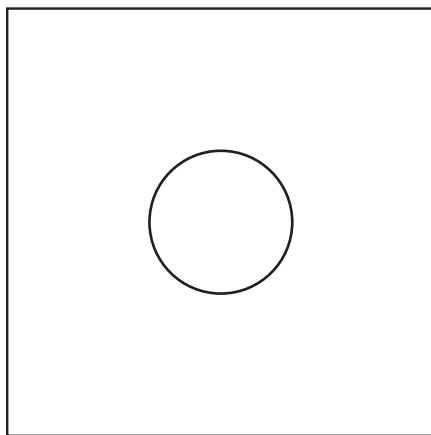
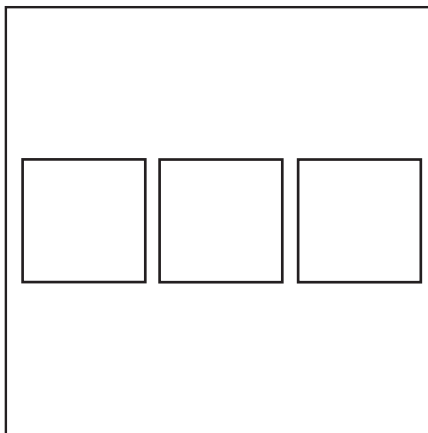
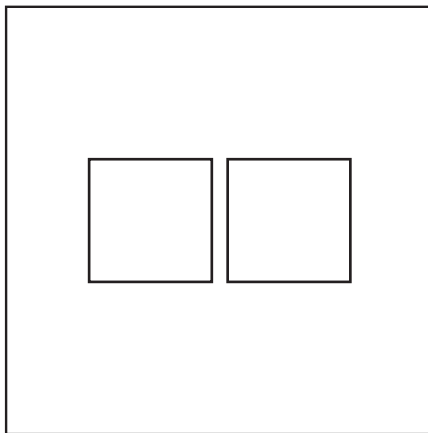
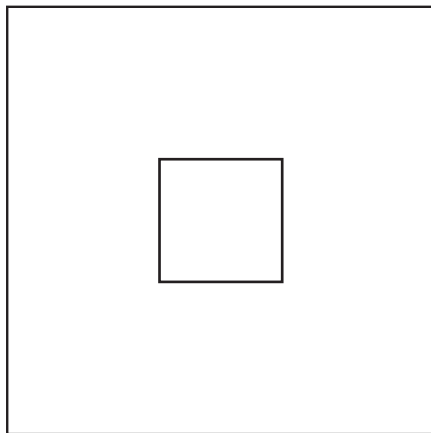


(Number Cards 1–20, *continued*)



Reproducible G

Matching Picture Cards

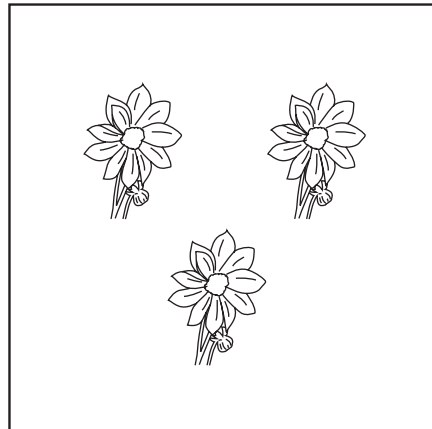
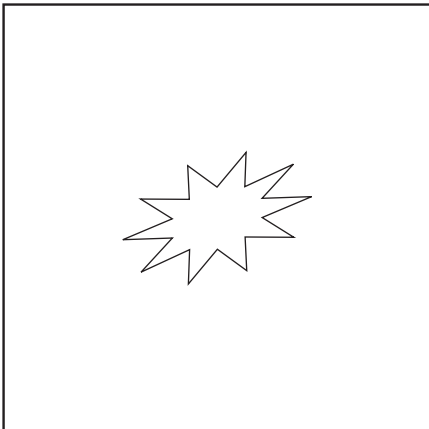
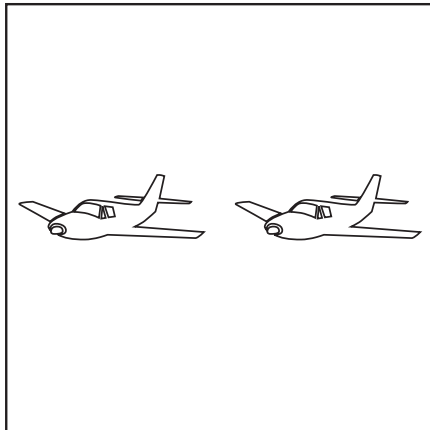
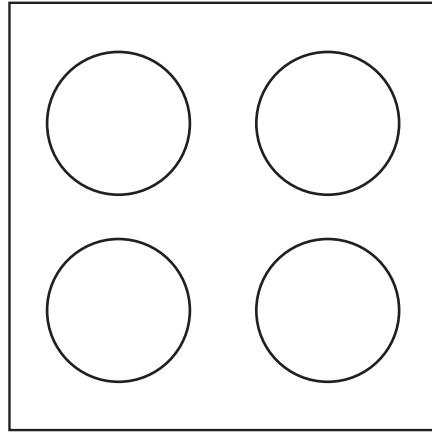
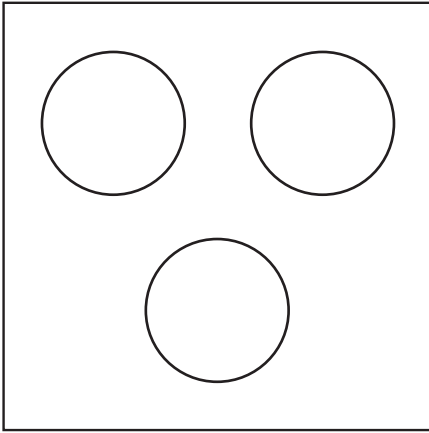


(continued)



Reproducible G

(Matching Picture Cards, *continued*)

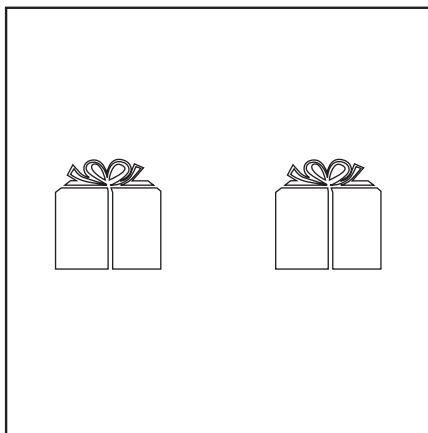
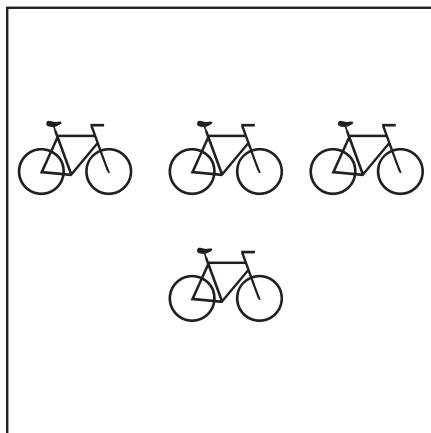
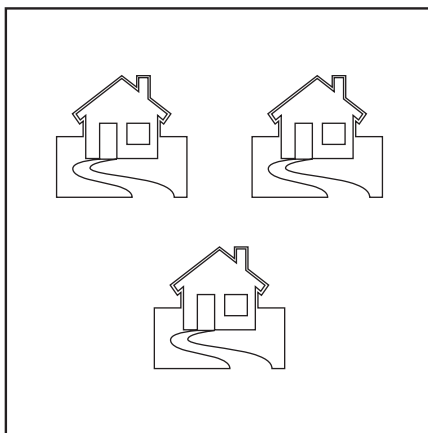
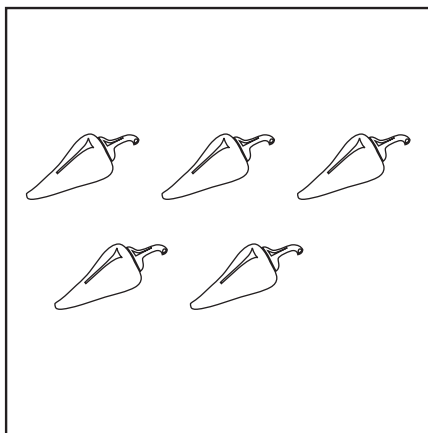
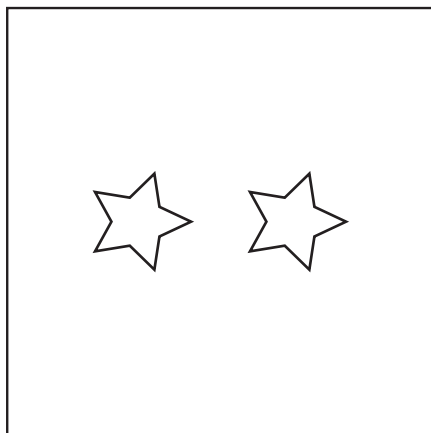


(*continued*)

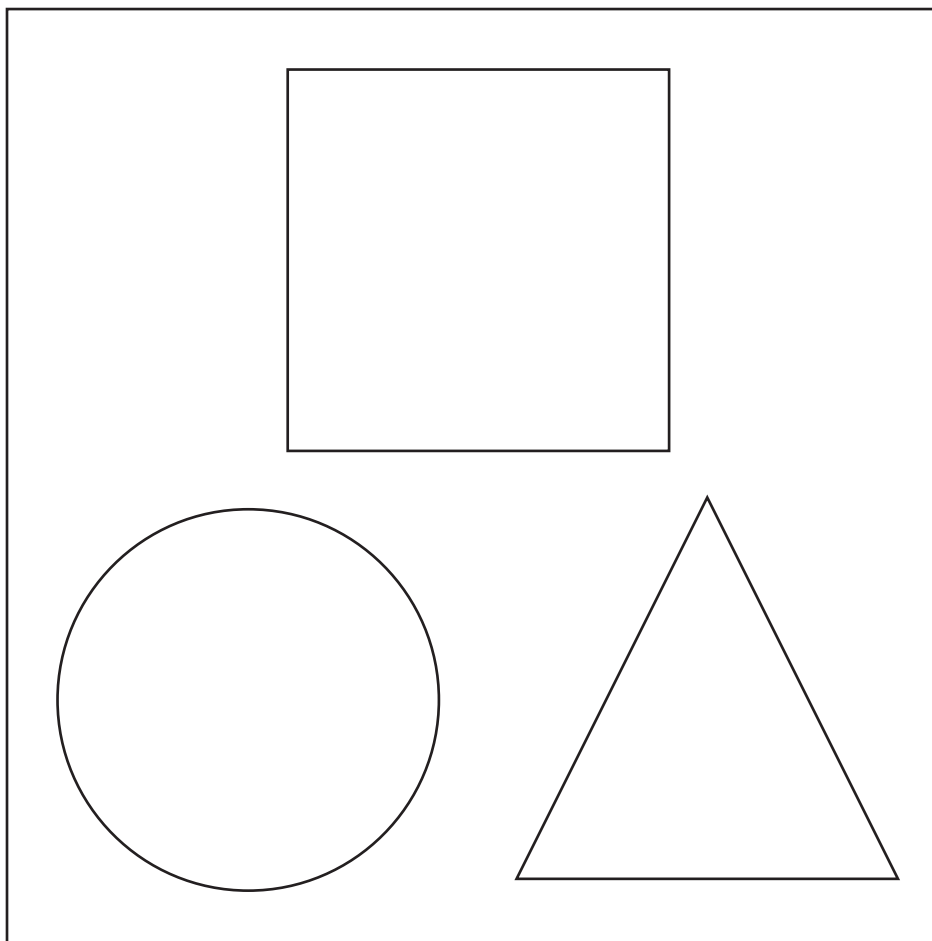


Reproducible G

(Matching Picture Cards, *continued*)

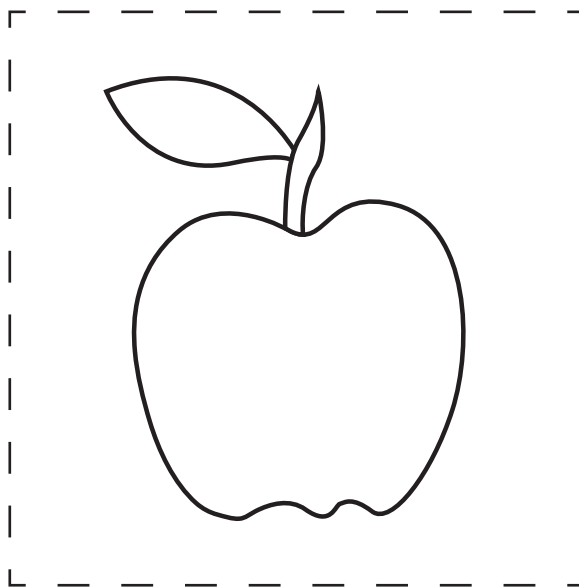
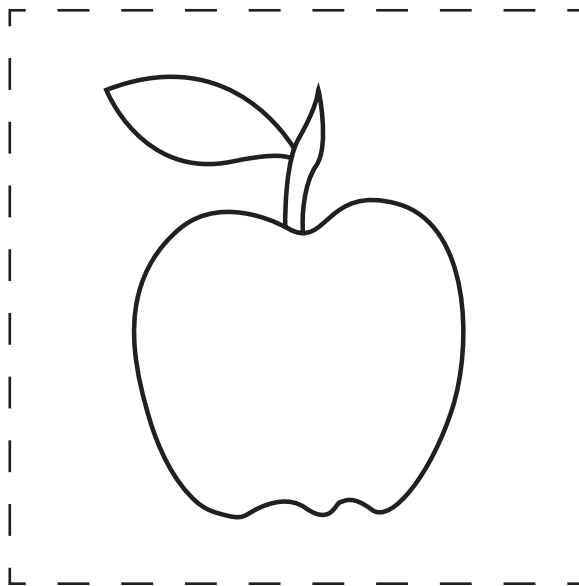


Shapes Placemat



Reproducible I

Apple Template



Five Frame



Reproducible K

Ten Frame



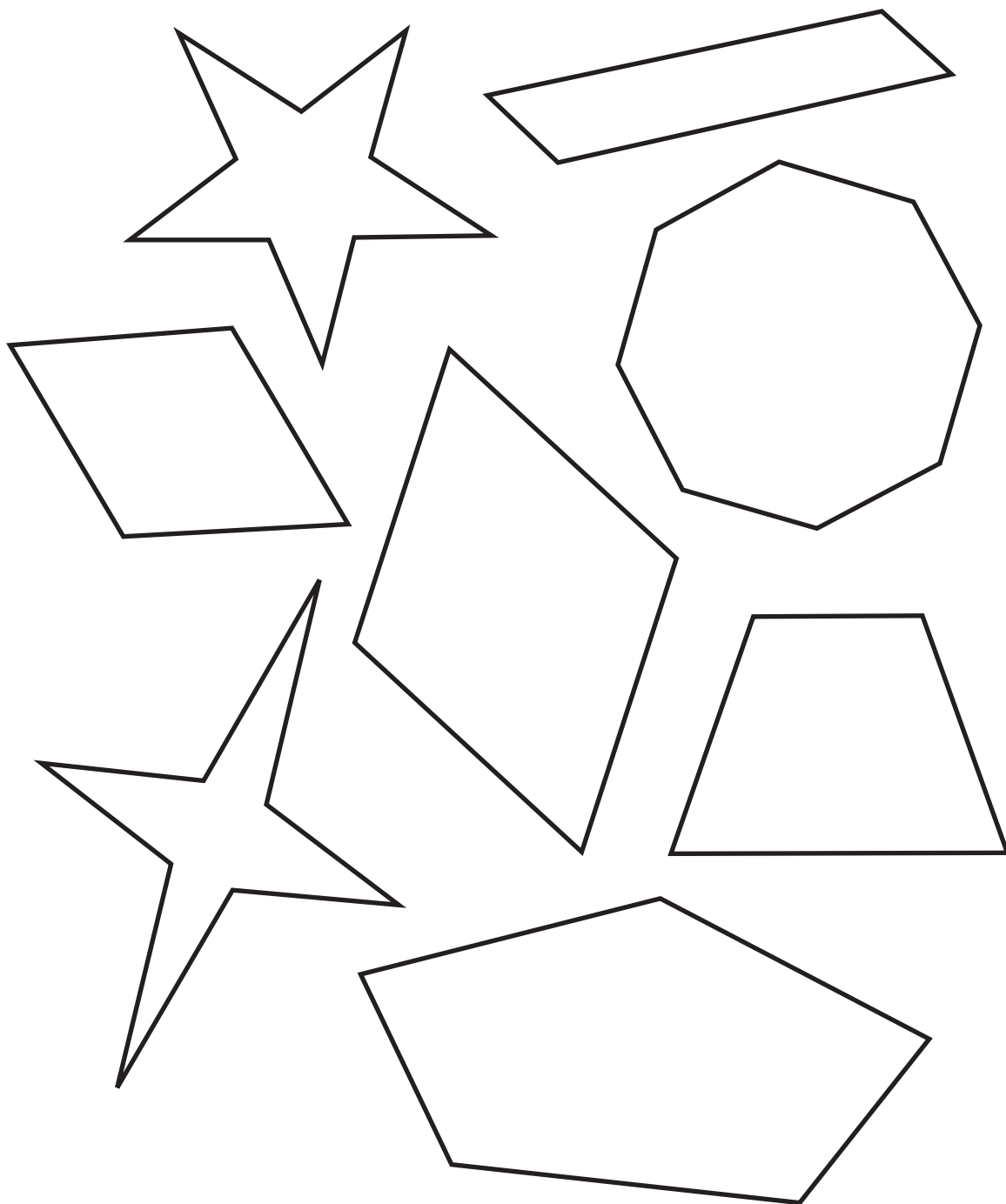
Number Chart 1-20

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20



Reproducible M

Shapes Templates

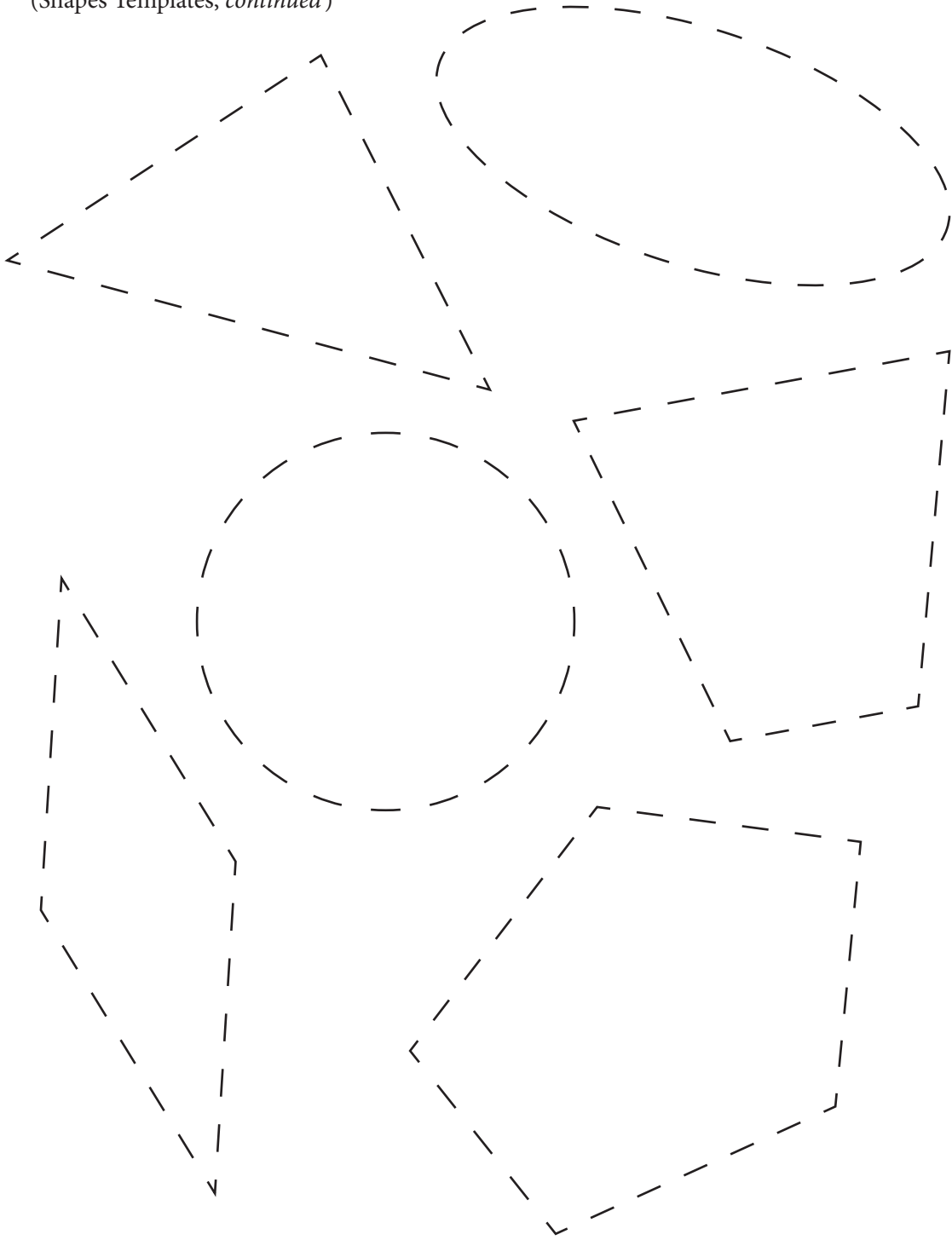


(continued)



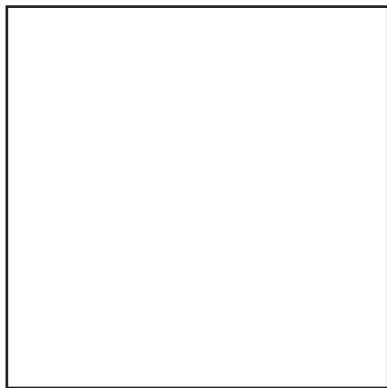
Reproducible M

(Shapes Templates, *continued*)



Reproducible N

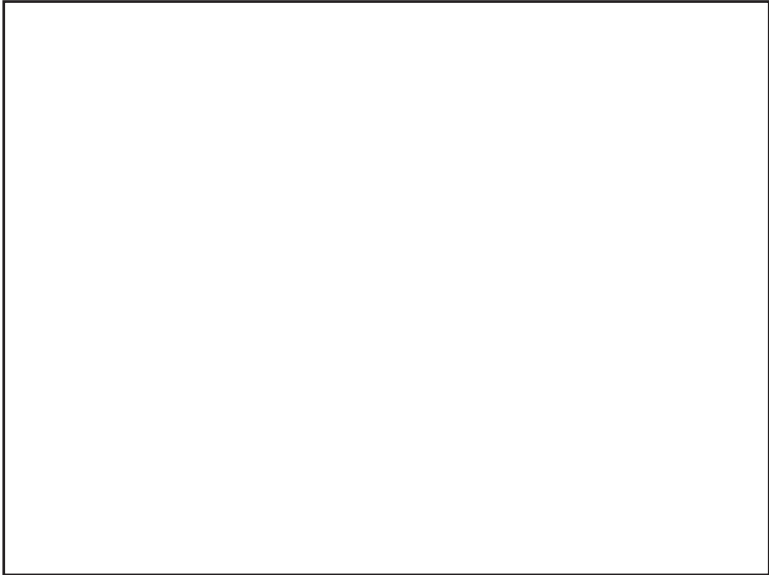
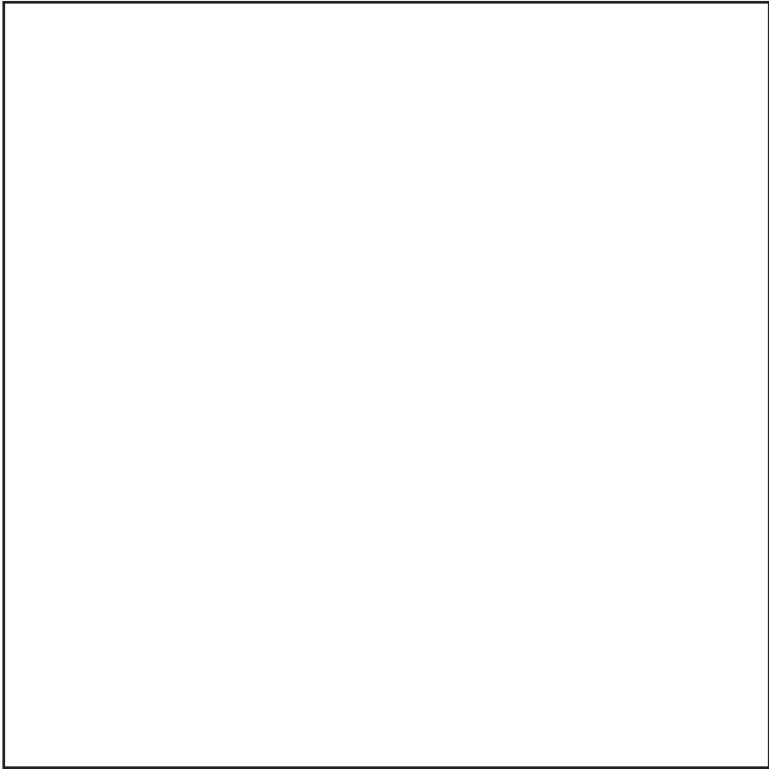
Rectangle Puzzle Templates



(continued)



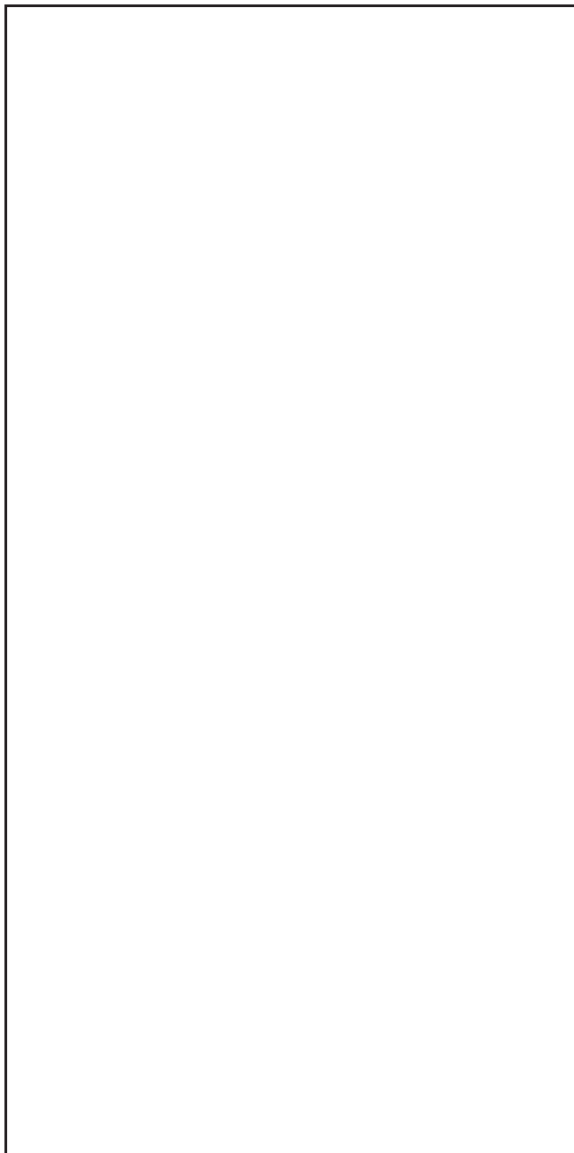
(Rectangle Puzzle Templates, *continued*)



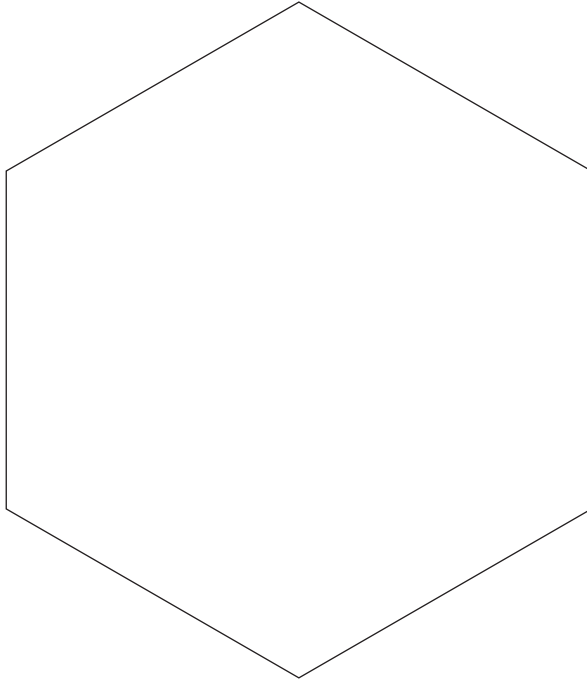
(*continued*)

Reproducible N

(Rectangle Puzzle Templates, *continued*)



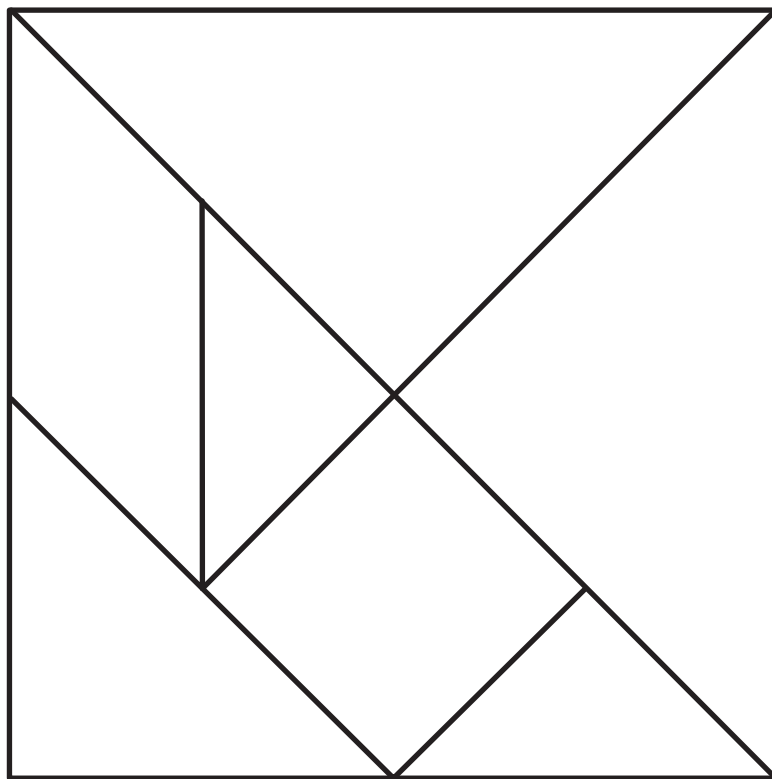
Hexagon Puzzle Template



Reproducible P

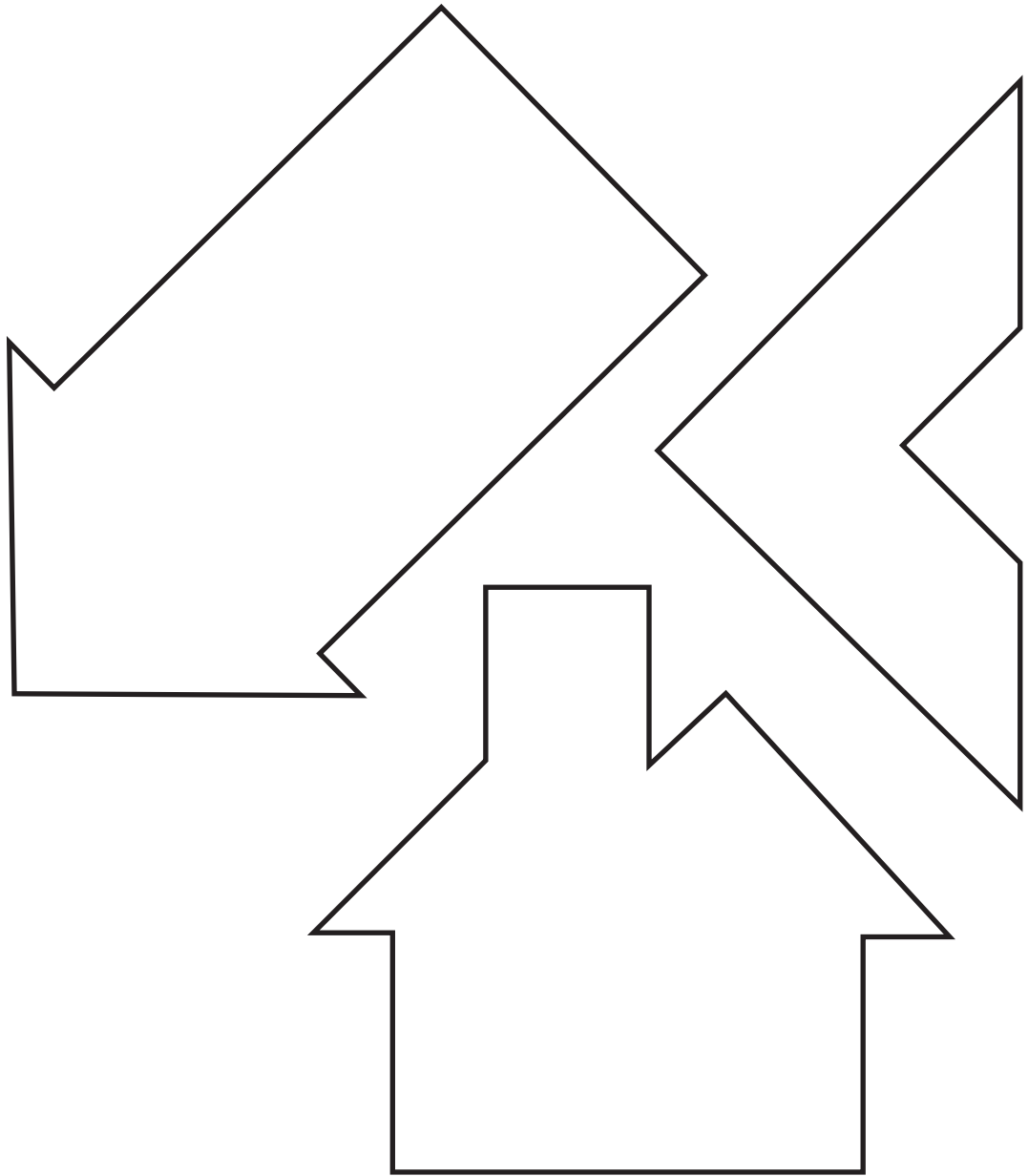
Tangram Shapes Puzzle

Instructions: Cut along the lines to form seven shapes (pieces).



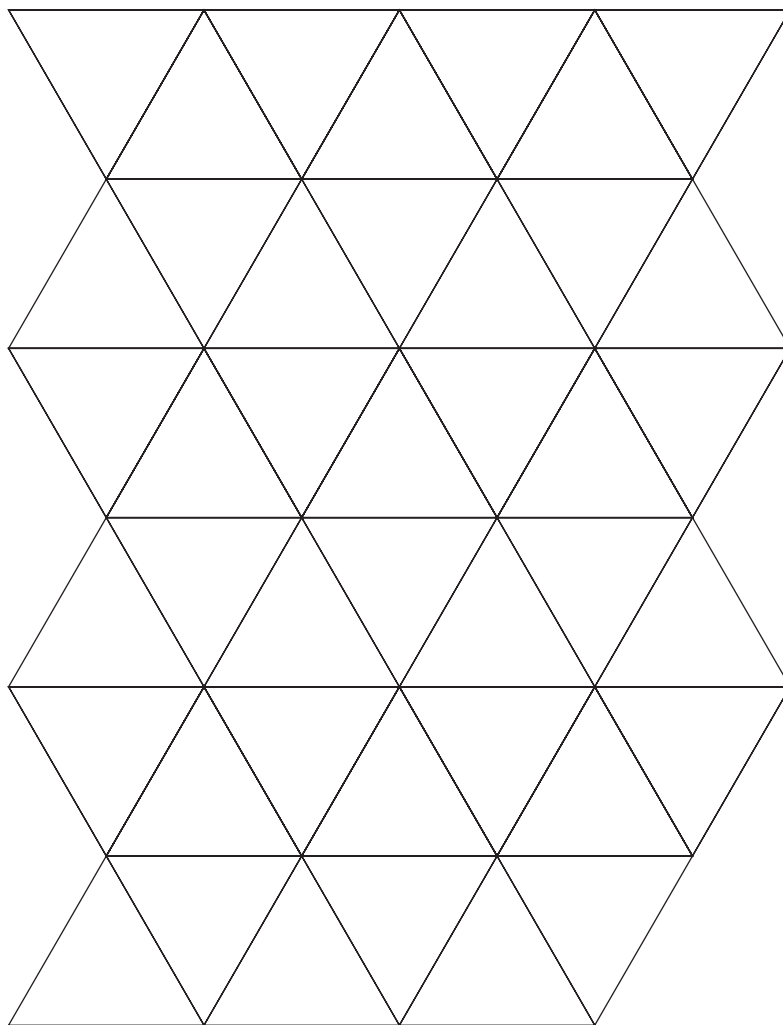
Tangram Puzzle Shapes

Children can create shapes like these with their tangram pieces.

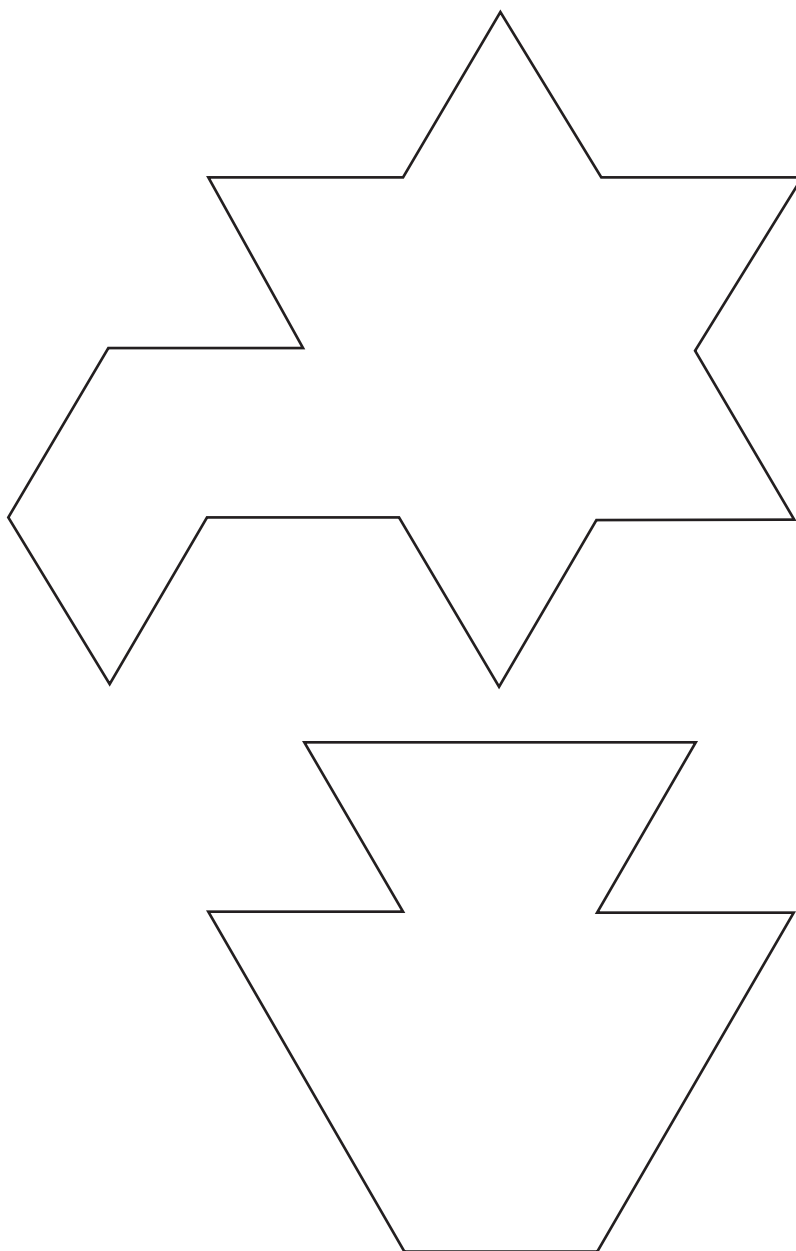


Reproducible R

Pattern Block Triangle Template



Pattern Block Puzzle Shapes

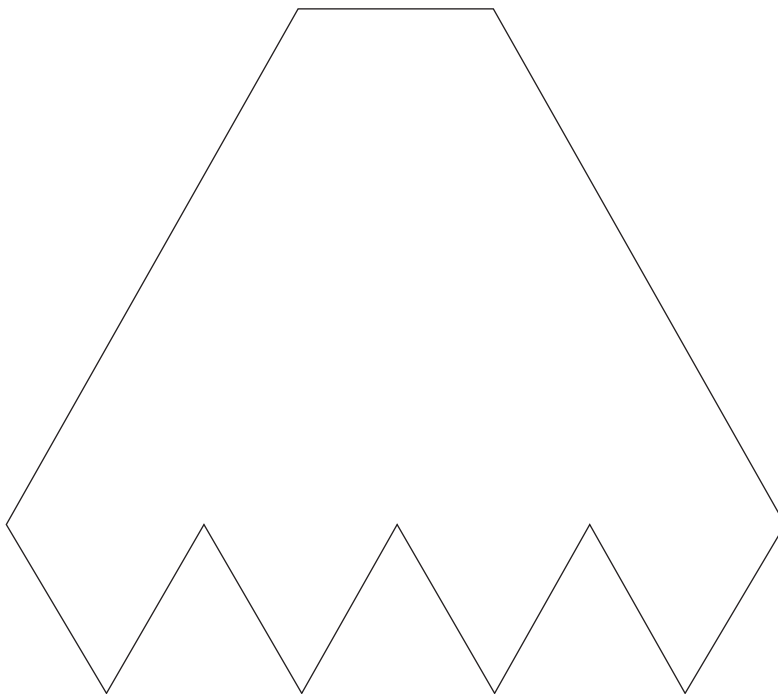
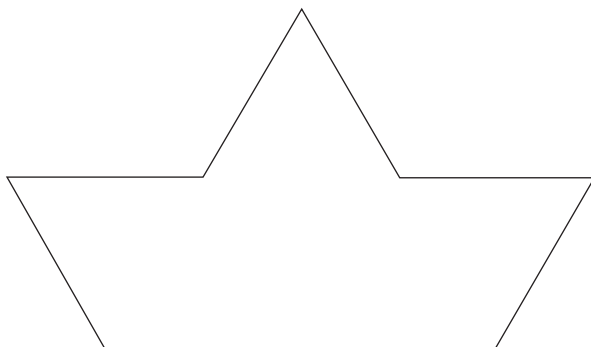


(continued)



Reproducible S

(Pattern Block Puzzle Shapes, *continued*)



Hundreds Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

