Build and Compare Shapes

Unit 12 Overview: 8 lessons

Children look closely at the shapes they already know. They count sides and corners, tell how shapes are alike and different whatever their size or turn, and test which solid shapes roll and which stack. Then they build shapes with sticks and clay, draw them on dots, put shapes together to make bigger ones and fill outlines with pattern blocks and paper pieces. Every lesson starts with shapes to hold: blocks, sticks, paper shapes, cans and boxes. Read every direction aloud. Lesson 12.8 (building with blocks and counting them) is for the states that teach it in Kindergarten.

THE UNIT, DAY BY DAY

Day 1	**Pre-Check**	What children already know, before the first lesson.
Day 2	**12.1** Sides and corners	I can count the sides and corners of a shape.
Day 3	**12.2** Alike and different	I can tell how shapes are alike and different.
Day 4	**12.3** Roll, stack or both	I can tell which shapes roll and which shapes stack.
Day 5	**12.4** Build shapes with sticks	I can build shapes with sticks.
Day 6	**12.5** Draw shapes	I can trace and draw shapes.
Day 7	**12.6** Put shapes together	I can put two shapes together to make a bigger shape.
Day 8	**12.7** Fill an outline	I can fill a shape with smaller shapes.
Day 9	**12.8** Build with blocks ★	I can build with blocks and count them.
Day 10	**Unit Review**	The review, to go over together.
Day 11	**Unit Test**	Form A, read aloud to small groups; Form B (other pictures and numbers) is for a retest.

★ Taught in Kindergarten in some states. Skip these lessons if yours teaches them in another grade; animalmath.com/standards shows your state's list.

GET READY FOR THE UNIT

- Pattern blocks for each pair, and paper shapes in many sizes, colors and turns
- Solid shapes or real things: blocks, boxes, cans, balls and a party hat cone
- Craft sticks (long and short), and play dough or clay balls for corners
- Dot paper or geoboards, child scissors, glue sticks and crayons

HOW EACH LESSON GOES

1. Warm up (5 min)
2. Teach (10 min)
3. Try it together (5 min)
4. Practice (10 min)
5. Exit ticket (5 min): a quick check on the lesson.

Each lesson page ends with the Animal Math sheets, makers, tools and quizzes for it. "Sheet 3" is the third worksheet of a pack; a color pack prints each sheet again in black and white.

CHECKING AS YOU GO

PRINTABLE **Pre-Check**: Day 1, with a key

PRINTABLE **Unit Review**: the day before the test

EXIT TICKET **Exit Tickets**: one a lesson, two to a page

PRINTABLE **Unit Test**: Forms A and B, with keys

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Build and Compare Shapes

Lesson 12.1: Sides and corners

GOAL Children count the sides and corners of flat shapes (triangle, square, rectangle, hexagon), touching each one once, and find that a circle has no sides and no corners.

I can count the sides and corners of a shape.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Make a big tape square on the rug. A few children at a time walk along it, and the class counts each side out loud and claps at each corner.
2. **Teach** (10 min) Hold up a paper triangle. Run a finger along each side and count: 1, 2, 3. Put a sticker on each corner and count: 1, 2, 3. Do the same with a square (4 and 4) and a hexagon (6 and 6). Trace a circle: it curves all the way, so no sides and no corners.

   > **Say:** "A side is straight. A corner is where two sides meet. I touch each one once and count."

3. **Try it together** (5 min) Pairs take turns pulling a pattern block from the bag. They trace each side with a finger and count, poke each corner and count, and show both numbers with fingers.
4. **Practice** (10 min) Children count and write how many sides and corners on sheet 1 of Flat Shapes: Sides and Corners. Read each shape's name aloud; children write only the numbers.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.1** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. The square is turned on its corner: a child who still writes 4 and 4 is counting sides, not going by the look.

Need help? Count the sides of a big paper triangle and square only, tracing each side with a finger.

Ready for more? Count the sides and corners of the red and blue blocks. What do you notice about the two numbers?

GET READY

- A bag of pattern blocks for each pair
- Big paper shapes: triangle, square, rectangle, hexagon, circle
- Small round stickers for corners

WORDS TO USE

side: a straight edge of a shape

corner: the point where two sides meet

flat shape: a shape you can draw on paper

ASK

- How many sides? How many corners?
- Where did you start? How do you know you are done?
- Why does a circle have no corners?

WATCH FOR

Counts a corner twice or skips one. Put a sticker on the first corner and go around one way until you are back at it.

Says a circle has 1 side. Trace it together: it curves all the way, so it has no straight sides.

Thinks a turned square has a new number of sides. Turn it back while they watch and count again: turning changes nothing.

ON ANIMAL MATH

PRINTABLE **Flat Shapes: Sides and Corners**: sheet 1, the numbers only

TOOL **Pattern Blocks**: drag out each block and count its sides and corners

QUIZ **Shapes Quiz**: the Flat Shapes level

EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.1

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Build and Compare Shapes

Lesson 12.2: Alike and different

GOAL Children compare flat shapes by their sides, corners and curves, and learn that a shape keeps its name whatever its size, color or turn.

I can tell how shapes are alike and different.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Play I Spy with shapes in the room: "I spy a shape with 4 sides and 4 corners." Children point to it and name it.
2. **Teach** (10 min) Hold up a big red triangle and a tiny blue one turned upside down. Ask how they are alike (3 sides, 3 corners) and how they are different (size, color, turn). Then compare a square and a rectangle: both have 4 sides and 4 corners, but a square's sides are all the same length.

   > **Say:** "Big or small, turned or not, it has 3 sides and 3 corners, so it is still a triangle."

3. **Try it together** (5 min) Put out two hoops. Children sort paper shapes: 3 sides in one hoop, 4 sides in the other, round shapes outside. Then sort by size and talk about which sort tells a shape's name.
4. **Practice** (10 min) Children cut and glue the shapes into 3 sides, 4 sides and round on sheet 2 of Shape Sort and Position Words, then talk about its question with a partner.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.2** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. The big square has fewer corners than the small hexagon: a child who circles the big one is going by size.

Need help? Compare two shapes at a time, a triangle and a square, counting the sides of each.

Ready for more? Answer the "Are they both ...?" questions at the top of sheet 3 of Flat Shapes: Sides and Corners as you read them.

GET READY

- Paper triangles, squares, rectangles, hexagons and circles in many sizes, colors and turns
- Two hoops or yarn loops for sorting
- Child scissors and glue sticks

WORDS TO USE

alike: the same in some way

different: not the same

sort: put things that are alike together

ASK

- How are these two shapes alike? How are they different?
- Is it still a triangle if I turn it over?
- Which tells the name: the size or the sides?

WATCH FOR

Says an upside down triangle is not a triangle. Count its sides and corners together: 3 and 3, so it is a triangle in any turn.

Sorts by color or size instead of sides. Ask "How many sides?" for each shape before it goes in a hoop.

Thinks a bigger shape has more corners. Put a big and a small square side by side and count both: 4 and 4.

ON ANIMAL MATH

- PRINTABLE **Shape Sort and Position Words**: sheet 2
- PRINTABLE **Flat Shapes: Sides and Corners**: sheet 3, the top half, read aloud
- QUIZ **Shapes Quiz**: the Flat Shapes level
- EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.2

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Build and Compare Shapes

Lesson 12.3: Roll, stack or both

GOAL Children test solid shapes to find which roll, which stack and which do both, and tell why: curved parts roll and flat faces stack.

I can tell which shapes roll and which shapes stack.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Hold up a ball and a block. Children give a thumbs up if they think it will roll down the ramp, then watch it go.
2. **Teach** (10 min) Test each solid on the ramp: the ball rolls, the block slides, the can rolls on its side. Then try stacking: blocks stack, a can stacks standing up, the ball falls off. Feel the faces, then sort the solids into rolls, stacks and both.

   > **Say:** "A curved part lets it roll. Flat faces let it stack. A can has both, so it can do both."

3. **Try it together** (5 min) Small groups test a basket of real things (a can, a box, a ball, a block) on a ramp and put each one on a mat: rolls, stacks or both.
4. **Practice** (10 min) Children cut and glue the solids into rolls, stacks and both on sheet 3 of Shape Sort and Position Words. Early finishers circle yes or no on sheet 5 of 3D Shapes as you read.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.3** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. A box only stacks: a child who circles both may be thinking of how it slides.

Need help? Test one solid at a time, first on the ramp and then on a stack, before sorting.

Ready for more? Circle stack, roll or both on the top half of sheet 3 of Building with 3D Shapes, then find two things in the room that do both.

GET READY

- Solids or real things: blocks, a box, a can, a ball, a party hat cone
- A ramp: a board or big book leaned on a few books
- Child scissors and glue sticks

WORDS TO USE

roll: move by turning over and over

stack: put one on top of another

flat face: a flat side of a solid shape

curved: round, not flat

ASK

- Will it roll? What part lets it roll?
- Can you stack one on top? Why?
- Why can a can do both?

WATCH FOR

Says a box rolls because it moves down the ramp. Sliding is not rolling: watch the box slide, then the can turn over and over.

Says a cone stacks. Try it: it stands on its flat face, but nothing stays on its point. The sheets count it as rolls only.

Says a can only rolls. Stand it up and stack a second can on top.

ON ANIMAL MATH

PRINTABLE **Shape Sort and Position Words**: sheet 3

PRINTABLE **3D Shapes**: sheet 5, read aloud

PRINTABLE **Building with 3D Shapes**: sheet 3, the top half

QUIZ **Shapes Quiz**: the Solid Shapes level

EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.3

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Build and Compare Shapes

Lesson 12.4: Build shapes with sticks

GOAL Children build triangles, squares and rectangles with sticks and clay balls, and see that the sticks must meet at every corner to close the shape.

I can build shapes with sticks.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Children make a triangle with their thumbs and pointer fingers, then a big triangle on the rug with three friends' arms.
2. **Teach** (10 min) Build a triangle with 3 sticks and 3 clay balls at the corners. Pull one stick away: a gap, so it is not closed. Then build a square with 4 sticks the same length, and a rectangle with 2 long and 2 short sticks. Ask: can 3 sticks make a square?

   > **Say:** "Each stick is a side. Each clay ball is a corner. The sticks meet at every corner, so the shape is closed."

3. **Try it together** (5 min) Call a shape. Children build it with sticks and clay at their seats and hold it up. Check together: count the sides and corners, and look for gaps.
4. **Practice** (10 min) Children draw a line from each set of sticks to the shape it can make on sheet 2 of Building Shapes with Sticks, then circle yes or no in problems 1 to 6 of sheet 5: do the sticks meet at every corner?
5. **Exit ticket** (5 min) Read **Exit Ticket 12.4** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. A child who picks the 2 long and 2 short sticks for the square is not checking that all 4 sides are the same length.

Need help? Build on top of a paper shape card, laying one stick along each side.

Ready for more? Sheet 1 of Building Shapes with Sticks: some sides take two sticks, so count the sticks, then name the shape.

GET READY

- About 8 craft sticks, long and short, for each child
- Play dough or clay balls for the corners
- Paper triangle, square and rectangle cards

WORDS TO USE

build: make something by putting parts together

closed: no gaps: all the sides meet

same length: just as long

ASK

- How many sticks make a triangle? Why?
- Is your shape closed? Where are the corners?
- How is your rectangle different from your square?

WATCH FOR

Leaves a gap at a corner. Run a finger around the shape: where it slips into a gap, push both sticks into one clay ball.

Uses 2 long and 2 short sticks for a square. Lay the 4 sticks side by side: a square needs 4 the same length.

Calls any 4 sticks a square. Count the sticks, then compare their lengths before naming the shape.

ON ANIMAL MATH

PRINTABLE **Building Shapes with Sticks**: sheets 2 and 5 (problems 1-6), then sheet 1 for early finishers

EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.4

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Build and Compare Shapes

Lesson 12.5: Draw shapes

GOAL Children trace and then draw triangles, squares and rectangles on dots, joining dots with straight lines and closing each shape, and draw a circle as one round line.

I can trace and draw shapes.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Children draw shapes in the air with a finger as you name them, saying "side, corner, side" as they go: triangle, square, circle.
2. **Teach** (10 min) On the dot board, draw a triangle slowly: start at a dot, go straight to another dot, turn at the corner, go to a third dot and back to the start. Count the sides. Then draw a square, and a rectangle with 2 long and 2 short sides. Draw a circle: one round line, no corners.

   > **Say:** "I go straight from dot to dot and turn at each corner. I end where I started, so the shape is closed."

3. **Try it together** (5 min) Call a shape. Children make it on a geoboard or draw it on whiteboard dots and hold it up. Partners count each other's sides and check that the shape is closed.
4. **Practice** (10 min) Children trace the first shape in each row, then join the dots to draw it twice more, on sheet 3 of Building Shapes with Sticks. Early finishers draw shapes of their own on geoboard dot paper.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.5** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. Any triangle or rectangle on the dots is right if its sides are straight and it is closed; it need not match the traced one.

Need help? Make the shape on a geoboard first, then copy it dot for dot onto the paper.

Ready for more? Draw a shape from a clue as you read it, on sheet 4 of Flat Shapes: Sides and Corners: "3 sides and 3 corners."

GET READY

- Dot paper (sheet 6 of Dot Paper and Isometric Paper) and crayons
- A whiteboard with rows of dots on it
- Geoboards and rubber bands, if you have them

WORDS TO USE

trace: go over the dashed lines

join: draw a line from one dot to the next

straight: no bends and no curves

ASK

- Where will you start? Where will you end?
- How many sides will you draw for a square?
- Is your shape closed?

WATCH FOR

Draws wavy or curved sides. Slide the crayon along the edge of an index card from dot to dot.

Leaves a gap at the last corner. Keep a finger on the first dot and draw back to it.

Draws a square with sides of different lengths. Count the dots along each side: the same number on every side.

ON ANIMAL MATH

- PRINTABLE **Building Shapes with Sticks**: sheet 3
- PRINTABLE **Dot Paper and Isometric Paper**: sheet 6 (geoboard dots)
- PRINTABLE **Flat Shapes: Sides and Corners**: sheet 4, read aloud, for early finishers
- MAKER **Graph Paper**: Paper Type Square Dots, Square Size 1 Inch
- EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.5

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Build and Compare Shapes

Lesson 12.6: Put shapes together

GOAL Children put two or more shapes together to make a bigger shape or a picture, and name the shapes they used: two triangles make a square, two half circles make a circle.

I can put two shapes together to make a bigger shape.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Shape riddles: "I have 3 sides and 3 corners." "I have no corners." "I have 4 sides, all the same length." Children call out the shape.
2. **Teach** (10 min) Slide two triangle blocks together: they make a blue rhombus. Put two red trapezoids together: a hexagon. Make a house from a square and a triangle, and a circle from two paper half circles. Each time, ask which shapes made it.

   > **Say:** "I put two shapes together, side to side, with no gaps. They make a new, bigger shape."

3. **Try it together** (5 min) Children build a picture on their mats (a house, a flower, a rocket) with pattern blocks, then tell a partner which shapes they used and how many of each.
4. **Practice** (10 min) Children cut out the pieces and glue them where the dashed lines show on sheet 1 or 2 of Shape Puzzles. Early finishers count the shapes in the pictures on sheet 4 of Building Shapes with Sticks.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.6** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. A child unsure of a pair can point to where each piece would go in the big shape: only one pair fits it exactly.

Need help? Make a square from two paper triangles first, laid on top of a paper square.

Ready for more? Circle the two shapes that make each big shape at the top of sheet 5 of Flat Shapes: Sides and Corners.

GET READY

- Pattern blocks and a mat for each child
- Paper squares, triangles and half circles to fit together
- Child scissors and glue sticks

WORDS TO USE

put together: join shapes side to side

fit: touch all along, with no gaps

make: build a new shape from smaller ones

ASK

- Which shapes did you use? How many of each?
- What new shape did two triangles make?
- Is there a gap? How can you close it?

WATCH FOR

Leaves gaps or lets pieces overlap. Slide the pieces until their sides touch all along, like puzzle pieces.

Names only the big shape, not its parts. Point to each piece and ask "What shape is this one?"

Picks a pair that is too big or too small. Lay the pair on top of the big shape to check that it fits.

ON ANIMAL MATH

- PRINTABLE — **Shape Puzzles: Composing Shapes**: sheets 1-2
- PRINTABLE — **Building Shapes with Sticks**: sheet 4, for early finishers
- PRINTABLE — **Flat Shapes: Sides and Corners**: sheet 5, the top half, for early finishers
- TOOL — **Pattern Blocks**: build a picture, then count each kind of block
- QUIZ — **Shapes Quiz**: the Flat Shapes level
- EXIT TICKET — **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.6

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Build and Compare Shapes

Lesson 12.7: Fill an outline

GOAL Children fill an outline with smaller shapes, with no gaps and nothing over the line, count how many they used, and find more than one way to fill it.

I can fill a shape with smaller shapes.

About 35 minutes

THE LESSON

1. **Warm up** (5 min) Show the yellow hexagon block. Children guess how many green triangles will cover it, and you write their guesses.
2. **Teach** (10 min) Lay green triangles on the hexagon outline one at a time, counting: 6. Check the guesses. Clear it and fill it again with blue rhombuses: 3. Then with 2 red trapezoids. Show that no white shows and no block hangs over the line.

   > **Say:** "I fill the outline all the way, with no gaps and nothing over the line. Then I count the pieces."

3. **Try it together** (5 min) Pairs fill a big triangle outline with pattern blocks and count the blocks, then fill it a new way. Then they cover a paper rectangle with paper squares: how many squares fill it?
4. **Practice** (10 min) Children cut out the pieces and fit them into the outlines on sheet 3 or 4 of Shape Puzzles; there are no dashed lines to help.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.7** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. Point to the piece in its box as you read "How many of these fill the hexagon?": children may have no name for it yet.

Need help? Fill a hexagon with 2 trapezoids first, then with 3 rhombuses.

Ready for more? Sheet 5 of Shape Puzzles: the cat and the robot take 5 and 6 pieces.

GET READY

- Pattern blocks, and paper outlines of a hexagon and a big triangle
- A paper rectangle with paper squares to fill it
- Child scissors and glue sticks

WORDS TO USE

outline: the line around the outside of a shape

fill: cover the whole inside

no gaps: no empty spaces left

ASK

- How many blocks did it take?
- Can you fill it another way, with more blocks or fewer?
- Are there any gaps?

WATCH FOR

Leaves gaps or lets blocks hang over the line. Run a finger around the outline: every block stays inside and no white shows.

Counts a block twice. Move each block off into a row as it is counted.

Gives up when a piece will not fit. Turn the piece, flip it, or try another kind of block.

ON ANIMAL MATH

PRINTABLE **Shape Puzzles: Composing Shapes**: sheets 3-4, then sheet 5 for early finishers

PRINTABLE **Flat Shapes: Sides and Corners**: sheet 5, problem 4 (triangles in a hexagon)

TOOL **Pattern Blocks**: Shape to Fill Hexagon, Big Triangle or Fish

EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.7

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Build and Compare Shapes

Lesson 12.8: Build with blocks

GOAL Children build with solid blocks (cubes, boxes, cylinders, cones), copy a build from a picture, and count the blocks in a build: all of them, or one kind.

I can build with blocks and count them.

About 35 minutes

★ Taught in Kindergarten in some states

THE LESSON

1. **Warm up** (5 min) Hold up each block (cube, box, cylinder, cone, sphere). The class says its name, then rolls their arms if it rolls or stacks their fists if it stacks.
2. **Teach** (10 min) Show a picture of a small build: 2 cubes with a cylinder and a cone on top. Copy it with real blocks, naming each one as it goes on. Count the blocks in all: 4. Then count only the cubes: 2. Take one block away while children hide their eyes: which one is missing?

   > **Say:** "I touch each block once as I count. I can count all the blocks, or only the cubes."

3. **Try it together** (5 min) Groups copy a build from a picture card, count all its blocks and each kind, and hold up the numbers. Then each group makes a build for the next group to count.
4. **Practice** (10 min) Children count each kind of block in the castle and write how many on sheet 1 of Building with 3D Shapes, then circle the set of blocks that made each build on sheet 2.
5. **Exit ticket** (5 min) Read **Exit Ticket 12.8** aloud, one question at a time. Children answer, then circle a face as you read the "I can" line. Every block in the ticket's builds shows, so tap each one while counting; the second question counts only the cubes.

Need help? Count a build of 3 or 4 real blocks before counting a picture.

Ready for more? Sheets 4 and 5 of Building with 3D Shapes: find the missing block, then count the blocks in three builds.

GET READY

- A tub of wooden blocks or solid shapes for each group
- Picture cards of small builds: a tower, a bridge, a castle
- Sticky notes

WORDS TO USE

build: put blocks together to make something

cube: a block with 6 square faces

cylinder: a block shaped like a can

ASK

- How many blocks did you use in all?
- How many cubes? How many cones?
- Which block is missing? How do you know?

WATCH FOR

Counts a block twice. Put a finger or a sticky note on each block as it is counted.

Counts every block when asked for cubes. Find the cubes first and touch only those.

Mixes up a cube and a box. Look at the faces: every face of a cube is a square.

ON ANIMAL MATH

PRINTABLE **Building with 3D Shapes**: sheets 1-2, then 4-5 for early finishers

PRINTABLE **3D Shapes**: sheet 3 (count the shapes in a castle)

QUIZ **Shapes Quiz**: the Solid Shapes level

EXIT TICKET **Kindergarten Build and Compare Shapes Exit Tickets**: Exit Ticket 12.8

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