

Unit 4 Patterns and Algebra: Patterns and Ordinal Numbers

Introduction

In this unit, students will learn to use ordinal numbers from first to fifth (although they are not expected to read the ordinal words). They will also learn some basic ideas about simple patterns, such as:

- Patterns are made of repeating parts,
- The repeating part of the pattern is called the core, and
- Because the parts of a pattern repeat, you can predict what comes next.

Students will reproduce, identify, and extend patterns, first with actions, then with objects, and finally with pictures. They will describe the core of a pattern and predict what comes next. In the last lesson of the unit, students will use what they have learned to create patterns of two or more elements.

NOTE: The following pattern notations are used in this unit: AB or BA means alternating between two different things; ABC means a sequence of three different things; AAB or BBA means two of one thing and one of another; and ABB and BAA means one of one thing and two of another.

Meeting Your Curriculum

Alberta—Lesson PAK-1 is recommended and Lesson PAK-2 is optional. All other lessons in this unit are required.

British Columbia—Lesson PAK-1 is recommended and Lesson PAK-2 is optional. All other lessons in this unit are required.

Manitoba—Lesson PAK-1 is recommended and Lesson PAK-2 is optional. All other lessons in this unit are required.

Ontario—All lessons in this unit are required.

Materials. In addition to the BLMs provided at the end of this unit, the following Generic BLMs, found in section I, are used in Unit 4:

BLM Hundreds Chart (p. I-40)

BLM Animal Cards (pp. I-2–3)

BLM Number Cards (1) to (5) (pp. I-6–10)

BLM Pattern Blocks (p. I-41)

BLM Circles and Squares (p. I-1)

Assessment. The assessment checklist for this unit can be found in section J.

PAK-1 Counting to 40

Page 111

CURRICULUM REQUIREMENT

AB: recommended
BC: recommended
MB: recommended
ON: required

VOCABULARY

counting
number

Goals

Students will count fluently to 40.

PRIOR KNOWLEDGE REQUIRED

Can count to 30

MATERIALS

number cards for 31 to 40
modelling clay (see Activity Centre 1)
paint, paint brushes, and large sheets of paper (see Activity Centre 2)
sand table or sandpaper cut into the shape of the number 3
(see Activity Centre 3)
counters, at least 40 per student (see Extension 1)
BLM Hundreds Chart (p. I-40, see Extension 1)

Counting practice. Practise counting to 30 as a class (see Introduction, p. A-23). Play “Let’s Compare” using numbers between 1 and 5.

Learning numbers to 40. SAY: Let’s count past 30. To count past 30, we say 30 and then we say one of the numbers from 1 to 9. Demonstrate by counting from 30 to 39 slowly, emphasizing the ones digit for each number. Have volunteers say the numbers from 1 to 9 (one number per volunteer), but before each says their number, you say “thirty.” Repeat with other volunteers, each saying an entire number, such as 31.

SAY: Put up your hand if you know what number comes after 39. If no one knows, SAY: The number after 39 is 40. Practise counting from 30 to 40 as a class. Add movement, such as jumping, as students say each number.

Counting one at a time. Start at 30. Have a different student say the next number until you reach 40. Repeat until everyone has had a turn.

Adding 31 to 40 to the number chart. Make enough number cards for 31 to 40 available so that each student has a number card and you have a set of number cards. Distribute a number card to each student. ASK: Whose number has a 3 and a 1? Have those students hold up their number cards and ask a volunteer to add the number to the number chart. Make sure it is oriented correctly. Continue until all of the numbers have been added to the chart. Have the class say the count sequence from 31 to 40 as you point to each numeral on the chart, so that students begin to associate the spoken and written numbers.

Counting 1 to 40. As a class, count from 1 to 40. You may wish to have one or more students lead the count, allowing each student to count at least 10 numbers. You may also wish to point to the numbers on the number chart as everyone counts.

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ACTIVITY

Play **I Start, You Finish** (see introduction to Unit 1, p. C-2) for the numbers from 30 to 40, first as a class, and then in pairs.

Preparing for the AP pages. Most students may be able to practise writing 3s directly on AP Book K.1, Unit 4, p. 111. Students who are struggling with writing may benefit from other types of practice first, using one or more of the activity centres below.

Activity Centres

For guidance on selecting and using the activity centres, see Introduction, p. A-17.

1. Clay Numbers

Type: Individual, creative

Objective: To practise making the number 3 using clay

Preparation: Distribute modelling clay to students.

Instructions: Have students make the number 3 in clay.

2. Painting Numbers

Type: Individual, creative

Objective: To practise painting the number 3

Preparation: Provide paint, a paint brush, and paper to each student.

Instructions: Have students paint the number 3 on paper.

3. Numbers in Sand

Type: Individual

Objective: To practise forming or tracing the number 3

Preparation: Provide a sand table or a sandpaper number 3 to each student.

Instructions: Have students write the number 3 in a sand table or trace it with their fingers on sandpaper.

Extensions

1. Distribute at least 40 counters and **BLM Hundreds Chart** to each student. Students place one counter per square, counting as they go, until they reach 40.
2. Students play **I Start, You Finish** (see introduction to Unit 1, p. C-2) in pairs, starting from a number less than 30 and continuing to 40.
3. **Counting correctly or incorrectly?** Say the count sequence from 30 to 40, but make a mistake (e.g., skip a number or repeat a number). Students should raise their hand or say “stop” when you make a mistake. Ask them to explain your mistake.

Bonus: Say the entire sequence to 40, sometimes correctly and sometimes making a mistake. Have students say if you counted correctly or not. **NOTE:** This extension can be done in pairs.

PAK-2 Ordinal Numbers

Pages 112–114

CURRICULUM REQUIREMENT

AB: optional

BC: optional

MB: optional

ON: required

VOCABULARY

1st

2nd

3rd

4th

5th

Goals

Students will use ordinal numbers in a variety of everyday contexts.

PRIOR KNOWLEDGE REQUIRED

Can recognize numbers 1 to 5

Can arrange numbers 1 to 5 in ascending order

Can circle or draw a mark on a picture to identify it

Can draw a matching line

MATERIALS

BLM Animal Cards (1) (p. I-2)

BLM Number Cards (1) to (5) (pp. I-6–10, see Activity Centres 1, 3)

5 small objects per group (see Activity Centre 1)

masking tape (see Activity Centre 2)

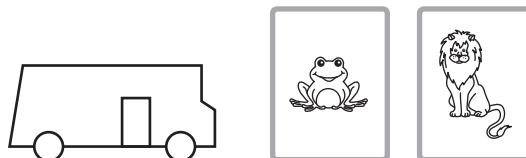
BLM Matching Numbers with Ordinals (p. F-23, see Extension 1)

BLM Matching Actions with Ordinals (p. F-24, see Extension 2)

BLM Mistakes in Ordinals (p. F-25, see Extension 3)

Counting practice. Practise counting to 40 as a class. Play **I Start, You Finish** (see introduction to Unit 1, p. C-2) as a class for the numbers from 20 to 30.

Introduce first and second. Draw a large, simple outline of a bus on the board, as shown below. Hold up the lion and frog animal cards from **BLM Animal Cards (1)** and SAY: The lion and the frog are going on a bus ride. ASK: How many animals are there? (2) Which one gets on the bus first? (answers will vary) Which one gets on second? (answers will vary) SAY: It's really hard to know which animal gets on first and which gets on second. Affix the animal cards to the board as shown below:



SAY: Now the animals are waiting in a line, so it's easy to see which one gets on first. ASK: Which animal gets on first? (frog) Write "1st" below the frog card. Point to the "1" in "1st" and SAY: This is how we show that the animal in position 1 gets on first. ASK: Which animal gets on second? (lion) Write "2nd" below the lion. Point to the "2" in "2nd" and SAY: This is how we show that the animal in position 2 gets on second. Erase the ordinal numbers, switch the order of the animal cards, and repeat. Then, repeat using the hamster and monkey animal cards, again ordering them both ways.

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Introduce third to fifth. Hold up the lion, hamster, frog, monkey, and elephant animal cards from BLM Animal Cards (1) and SAY: Let's put the animals in a line so we can see which one gets on the bus first. Affix the monkey, frog, lion, elephant, and hamster animal cards in a line in front of the bus, as shown below:



ASK: Which animal gets on the bus first? (monkey) Write “1st” below the monkey. Which animal gets on second? (frog) Write “2nd” below the frog. ASK: Which animal gets on the bus third? (lion) Write “3rd” below the lion. Point to the “3” in “3rd” and SAY: This is how we show that the animal in position 3 gets on third. Repeat for the fourth and fifth animal cards. Erase the ordinal numbers and repeat the demonstration with the five animal cards in a different order.

ACTIVITY

Work through **Questions 1–20** on AP Book K.1, Unit 4, pp. 112–114, with students. For **Question 1**, point to “2nd” and SAY: This means second, so we need to circle the second animal. Point to each dog in turn and SAY: This is the first dog. This is the second dog. Circle the second dog, and explain that you circled it because the question says to circle the second dog. Repeat the explanation for a few more questions, gradually letting students work on their own.

Activity Centres

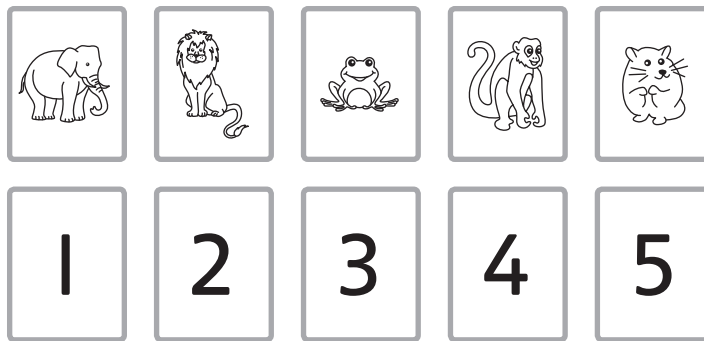
1. Using Numbers 1 to 5 to Say the Ordinal Numbers “First” to “Fifth”

Type: Pairs or groups of three

Objective: To line up five animal cards, assign the cards numbers, and then say the corresponding ordinal number sequence

Preparation: Give each group one set of five animal cards from BLM Animal Cards (1) and one set of number cards for 1 to 5 from **BLM Number Cards (1) to (5)**. Place all 10 cards face up on a table in a random arrangement.

Instructions: Students take turns moving one animal card at a time in any order, until all the animal cards are in a line. Then, they take turns placing one number card at a time in ascending order, below an animal card. For example, in the completed sample shown on the next page, the number 1 card was placed first below the elephant animal card, then the number 2 card was placed second, below the lion animal card, and so on.



Each student then points to the five animal cards, one card at a time, and says the corresponding ordinal number aloud.

Variations

1. Use five small objects instead of five animal cards.
2. **Memory.** Give each group two matching sets of 5 animal cards and one set of number cards from BLM Number Cards (1) to (5). Place the 10 animal cards face down on the table in a random arrangement. Students take turns turning over two animal cards at a time. When two identical animal cards are turned over, the student stacks them on top of each other and then places the stack face up on the table. If the animal cards are not identical, the student turns them face down again and the next student takes a turn. Students place the stacked, matching animal cards in a line as they were found. When all the animal cards are in a line, students place numbers cards below each animal card, as described above, and then take turns saying the corresponding ordinal sequence.

2. **Saying the Ordinal Number of Your Turn**

Type: Groups of five

Objective: To say the ordinal number that corresponds to each student's turn

Preparation: Put a long piece of masking tape (about 1 m in length) on the floor.

Instructions: Have all five students stand in a line beside each other on one side of the masking tape line. One at a time, each student steps across the piece of tape and says aloud the corresponding ordinal number of his or her turn. Repeat the activity until every student has had at least one turn at stepping across first and one turn at stepping across fifth.

Variations

1. Have the first student choose a movement or gesture that all the other students repeat as they step across the masking tape line.
2. Take the class outside to do this activity.

3. **Saying Ordinals in Sequence for Lines of People**

Type: Groups of six, active (outdoor)

Objective: To put five students in a line, assign numbers 1 to 5 to the line of people, and then have them say the ordinal number sequence

Preparation: Provide the group with one set of number cards for 1 to 5

from BLM Number Cards (1) to (5).

Instructions: A group leader puts the five other students in a line, in any order, and then gives each student a number card in ascending order. The leader then points to one student at a time, starting with the student holding the number 1, who each respond by saying their ordinal number. Repeat the activity until every student has had a turn at being the leader.

Extensions

1. Give each student a copy of **BLM Matching Numbers with Ordinals**. Point to the numbers 1 to 5 in the grey box at the top and SAY: These are the numbers 1, 2, 3, 4, and 5. Point to the number 1 and the ordinal 1st and SAY: This is one and this is first. Repeat for the other numbers. Point to the matching line in **Question 1** and SAY: This line shows that “1” and “1st” go together. Point to “4th” and ASK: What number does “4th” go with? (4) Draw a matching line between them. Have students complete the rest of the BLM on their own.
2. Give each student a copy of **BLM Matching Actions with Ordinals**. In **Question 1**, point to the matching line between the picture of the child pointing up and the ordinal “1st” and SAY: We draw a matching line between the child pointing up and “1st” to show that this is the first action the child does. Point to the picture of the child clapping and ASK: What do we match this action to? (2nd) Draw the matching line. Have students complete the rest of the BLM on their own.
3. Give each student a copy of **BLM Mistakes in Ordinals**. In **Question 1**, point to the ordinal “1st” on the left and ASK: Is the circled mouse first in line? (no) SAY: That means this is not a correct match, so we will colour the sad face. Colour the sad face. Explain that students need to colour the sad face for incorrect matches or the happy face for correct matches. Have students complete the rest of the BLM on their own.

PAK-3 Patterns in Motion

Pages 115–117

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

next
pattern

Goals

Students will reproduce, identify, and say what comes next in rhythmic and kinesthetic patterns consisting of mostly two or three elements.

PRIOR KNOWLEDGE REQUIRED

none

MATERIALS

BLM Action Cards (pp. F-26–27)

bins (see Activity Centre)

tape (see Activity Centre)

BLM Mistakes in Action Patterns (pp. F-28–29, see Extension 1)
objects, such as pencils, cups, scissors, and paper (see Extension 2)
plastic numbers and letters (see Extension 3)

BLM Codes (p. F-30, see Extension 4)

Counting practice. Practise counting to 40 as a class, and have students clap once for each number they say. Play **I Start, You Finish** (see introduction to Unit 1, p. C-2) as a class for the numbers from 30 to 40.

Patterns using words and actions.

NOTE: The first part of this lesson is very active and can be done outside.

Lead the class in several repetitions of an AB pattern, where A represents one word and action and B represents another word and action. Have the class repeat “up, down” with you several times. Then add actions: everyone points up when they say “up” and points down when they say “down.”
SAY: We just made a *pattern*. ASK: What two words did we say again and again? (up, down)

SAY: Let’s do a harder pattern, one that uses three words. Lead the class in several repetitions of a pattern of the form ABC, where A is up, B is down, and C is clap. SAY: Let’s do an even harder pattern, one that uses one of the words twice. Repeat for several repetitions of patterns of the forms AAB and ABB, where A is up and B is down.

Have students suggest other action words for patterns. Use the students’ suggestions to lead more patterns, using the same four forms as above (i.e., AB, ABC, AAB, and ABB).

What is a pattern? ASK: What do you think a pattern is? (doing the same thing many times) Have students watch carefully as you point up, clap, stomp, and turn around without repeating any action. ASK: Was that a pattern? (no) How do you know? (you didn’t repeat anything) Do one

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more pattern and then two non-patterns. After each, ask if what you did was a pattern.

What comes next? Prepare four sets of action cards from **BLM Action Cards (1)**. SAY: Let’s show a “clap-step” pattern with pictures. Ask a volunteer to act out and say several repetitions of the AB pattern “clap-step.” Stop the volunteer after three repetitions. On the board, affix three “clap” action cards and three “step” action cards, alternating them as shown below:



SAY: This shows the pattern the volunteer just did. Point to each action card, moving from left to right, and have everyone say the action together. Point to the space after the last action card (step). ASK: What comes next, clap or step? (clap) Add a “clap” action card to the pattern. ASK: What comes next, clap or step? (step) Add a “step” action card to the pattern. The final picture should look like this:



Leave the cards affixed to the board.

ACTIVITIES 1–3

1. **Reproduce the pattern.** Demonstrate several repetitions of different action patterns of the forms used earlier in the lesson (i.e., AB, ABC, AAB, and ABB). Accompany each action with a word. After each demonstration, have the students reproduce what you did. You may have to demonstrate each pattern more than once.
2. **Translate the pattern.** Refer students back to the “clap” and “step” action cards on the board. SAY: We’re going to make another pattern from this pattern. For every “clap” action card, we’ll use a “point down” action card. Have a volunteer affix a “point down” action card below every “clap” action card. SAY: For every “step” action card, we’ll use a “touch your tummy” action card. Have another volunteer affix a “touch your tummy” action card below every “step” action card. SAY: We turned one pattern into another pattern. Have the class act out the two patterns. Repeat the activity, using several repetitions of an ABC pattern (e.g., sit-clap-face left) and translating it into a different pattern (e.g., stand-jump-face right).

3. **What comes next?** Turn to **Question 1** on AP Book K.1, Unit 4, p. 115. Point to each picture in the row, moving from left to right, and have the class say the action aloud. ASK: What action will be next, jump or sit? (jump) Circle the picture that shows jumping, and explain that you circled that one because it comes next in the pattern. Have everyone do Question 1 in their own AP Books. Walk students through **Question 2**. Then have students complete the remaining questions on their own.

Activity Centre

Type: Individual, pairs, or small groups

Objective: To extend a given pattern

Preparation: In advance, tape together action cards from **BLM Action Cards** to make six unique patterns, each composed of two repetitions of a different pattern form (e.g., AB, ABB, AAB, ABC, BAA, BBA). Place the completed patterns in a bin. Distribute seven sets of action cards to each student, pair, or small group.

Instructions: Students pick a pattern from the bin. They extend the pattern until all their matching action cards have been used, taking turns placing cards if they are in pairs or small groups. They then return the pattern to the bin, pick another pattern, and repeat.

Variation: Have students perform the action shown on the action card after adding it to the pattern.

Extensions

1. Give each student **BLM Mistakes in Action Patterns**. Have them circle the first mistake they see in each question.
2. Have each student use action cards from BLM Action Cards to make a pattern of three repetitions of “sit-stand-clap-jump.” Then have them translate this pattern into a pattern of four objects, such as “pencil-cup-scissors-paper.”
3. Have each student translate three repetitions of the number sequence 1, 2, 3, 4, 5 into three repetitions of the letter sequence A, B, C, D, E using plastic numbers and letters.
4. Give each student a copy of **BLM Codes** and have them fill in the missing numbers. **NOTE:** Ensure students save the completed BLMs, as they will be used in Extension 3 of Lesson PAK-5.

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PAK-4 Patterns with Objects

Pages 118–120

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

next
pattern

Goals

Students will reproduce, identify, extend, translate, and answer questions about what comes next in patterns of two or three objects.

PRIOR KNOWLEDGE REQUIRED

Can identify what comes next in a pattern

MATERIALS

4 each of three identical (or similar) objects, such as books, cups, and crayons
bins
class set of triangle and square pattern blocks or **BLM Pattern Blocks** (p. I-41)
collection of various small objects for making patterns (see Activity Centres 1–3, Extension 3)
coloured beads or dry penne pasta and string (see Activity Centre 2)
opaque bags (see Activity Centre 2)
red, blue, yellow, and green equal-sized cube blocks, 12–16 of each colour per group (see Activity Centre 3)
BLM Objects That Come Before and Next (p. F-31, see Extension 1)
plastic letters (see Extensions 2, 3)

Counting practice. Practise counting to 40 as a class, and have students clap for each number they say. Play **I Start, You Finish** (see introduction to Unit 1, p. C-2) as a class, starting with numbers between 15 and 19 and stopping at the number 25. As a class, play **The Counting Game** (see introduction to Unit 1, p. C-3). Touch between 10 and 15 objects around the classroom. Remind students to count the touches, not the objects.

What comes next? SAY: Last class, we made patterns using words and actions. Today, we'll make patterns using objects. Make three repetitions of an ABC pattern using three identical (or similar) objects, such as books, cups, and crayons. Point to one object at a time, moving from left to right, and have everybody say the pattern aloud together. ASK: What three objects are being repeated? (a book, a cup, and a crayon) Point to the last crayon and then the space after it and ASK: What comes next? (book) Add a book. ASK: What comes next? (cup) Add a cup. ASK: What comes next? (crayon) Add a crayon. Leave the pattern on display.

ACTIVITY

Extending the pattern. Put two bins at the front of the class, one containing a class set of triangle pattern blocks and the other containing a class set of square pattern blocks (or make the sets using

the triangles and squares from **BLM Pattern Blocks**). On the floor, set up three repetitions of an AB pattern using pattern-block triangles and squares. Explain that one student at a time will add one shape to the pattern. Have a volunteer add the next shape, and then have another volunteer add the shape that comes after that. Continue until everyone has added a shape. Repeat the activity, but this time set up two repetitions of an AAB pattern that starts with a pattern-block square. Repeat the activity again by setting up two repetitions of an AAB pattern that starts with a pattern-block triangle.

Activity Centres

1. Reproducing a Pattern with Objects

Type: Individual, pairs, or groups of three

Objective: To reproduce a given pattern

Preparation: Set up three repetitions of an AB pattern with pattern-block triangles and squares, placing either pattern block first. (You can use pattern blocks made from BLM Pattern Blocks.) Provide each student or group with three triangle pattern blocks and three square pattern blocks.

Instructions: Students reproduce the pattern by putting one pattern block down at a time, taking turns if they are in groups.

Variations

1. Use different objects to set up various patterns of the forms used in this unit.
2. Use two colours of identical objects (e.g., red beads and yellow beads) to set up various patterns of the forms used in this unit.
3. Have students reproduce the pattern upwards, to form a tower.

2. Extending a Pattern

Type: Individual, pairs

Objective: To extend a given pattern

Preparation: Set up two repetitions of an AB pattern, where A is a square pattern block and B is a triangle pattern block. (You can use pattern blocks made from BLM Pattern Blocks.) Provide each student or pair with six triangle pattern blocks and six square pattern blocks.

Instructions: Students extend the pattern by adding the next shape in the pattern, taking turns if they are in pairs. Students continue until they have used up all their pattern blocks.

Variations

1. Use identical objects of two different colours to create and extend the pattern, such as by threading red and yellow beads or different-coloured dry penne pasta on a string.
2. Use objects to make other patterns of the forms used in this unit, and have students extend the patterns. For example, make two repetitions of an AAB pattern, and give each student or pair six A objects and three B objects to extend the pattern with.

- Put six triangle pattern blocks and six circle pattern blocks into an opaque bag. Students take out one shape at a time and then, if possible, add it to the end of the pattern. If the block cannot be added, the shape is returned to the bag and the student continues to take shapes out until they pick one that can be added.

3. Translating a Pattern

Type: Groups of three or four

Objective: To translate a given pattern

Preparation: Gather equal-sized cube blocks of two different colours.

Set up an ABB pattern where A is a red block and B is a blue block.

For each group of three students, set up three repetitions of the ABB pattern; for each group of four students, set up four repetitions. Provide a bin containing one red block and two blue blocks per group member, and a second bin containing either 6 green and 12 yellow blocks (for groups of three) or 8 green and 16 yellow blocks (for groups of four).

Instructions: One at a time, students each extend the pattern by adding another red-blue-blue block combination to the end. Then, one at a time, each student translates one red-blue-blue block combination into a green-yellow-yellow combination, until all blocks have been used.

Variations

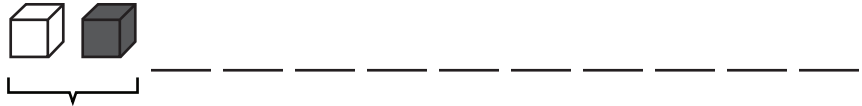
- Use objects to set up patterns of the forms used in this unit, and have students extend and translate the patterns using different objects.
- Use objects to set up patterns of the forms used in this unit, and have students extend and translate by adding to the beginning of the pattern.

Extensions

- Give each student a copy of **BLM Objects That Come Before and Next**, and have them circle the pictures that come before and next in each question.
- Students use the letters in the word NEXT to make a pattern. Give students enough plastic letters to make the word NEXT three times. Have them make the word NEXT and turn this into a pattern by adding NEXT two more times, once at the end (what comes next) and once at the beginning (what comes before).
- Students use the letters in their first name to make a pattern. Give students enough plastic letters to make their name three times. Have them make their name and turn this into a pattern by adding their name two more times, once at the end (what comes next) and once at the beginning (what comes before).

4. Have students extend patterns by first adding every second or every third object. Below is an example of how you can show adding every second object:

Step 1: Show a starting pattern



Starting pattern

Step 2: Add all black blocks

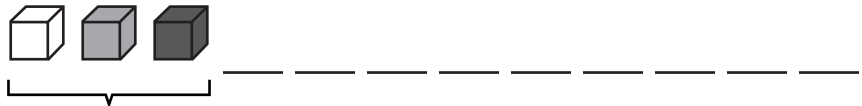


Step 3: Add all white blocks



Below is an example of how you can show adding every third object:

Step 1: Show a starting pattern



Starting pattern

Step 2: Add all black blocks



Step 3: Add all grey blocks



Step 4: Add all white blocks



PAK-5 Patterns with Pictures

Pages 121–124

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

core
next
pattern

Goals

Students will reproduce, identify, extend, translate, describe the core of, and answer questions about what comes next in patterns of two or three pictures.

PRIOR KNOWLEDGE REQUIRED

Can reproduce a pattern
Can identify what comes next in a pattern
Can extend a pattern

MATERIALS

BLM Animal Cards (1) (p. I-2)
3 each of three different objects, such as plates, cups, and spoons
BLM Circles and Squares (p. I-1, see Activity Centres 1, 2)
BLM Object Cards (pp. F-32–33, see Activity Centres 2, 4, Extensions 1, 2)
opaque bags (see Activity Centre 2)
bins (see Activity Centre 3)
envelopes (see Extensions 1, 2)
BLM Codes completed in Lesson PAK-3 (p. F-30, see Extension 3)

Counting practice. Practise counting to 40 as a class, and have students hop for each number they say. Play **I Start, You Finish** (see introduction to Unit 1, p. C-2) as a class, starting with numbers between 25 and 29 and stopping at the number 35.

Finding the core in patterns of pictures. Affix frog and elephant animal cards from **BLM Animal Cards (1)** to the board to make five repetitions of an AB pattern, starting with the frog animal card. Have the class say the pattern aloud. ASK: What two pictures are being repeated? (frog, elephant) SAY: The part that is repeated is called the *core*. Underline all five cores and SAY: The core is frog-elephant, and we underline all the cores to show that they repeat. Make other patterns of the same forms used in this unit, and have students identify the core for each pattern.

ACTIVITIES 1–4

1. **The core of an action pattern.** Lead the class in three repetitions of an AB pattern, where A is “point up” and B is “point down.” ASK: What two actions are being repeated? (point up, point down) SAY: That means the core of this pattern is “point up-point down.” Repeat for two other action patterns of the same forms used in this unit, each time asking students to say the core.

2. **The core of an object pattern.** Make a pattern of three repetitions of the form ABC, using objects such as plates, cups, and spoons. ASK: What objects are being repeated? (plate, cup, spoon) What is the core of this pattern? (plate-cup-spoon) Repeat, using three repetitions of the forms ABB and AAB.
3. **The core of a picture pattern.** Affix tiger and lion animal cards from BLM Animal Cards (1) to the board to make three repetitions of an ABB pattern, starting with the tiger animal card. ASK: What animals are being repeated? (tiger, lion, lion) What is the core? (tiger-lion-lion) Underline the first core. Ask a volunteer to underline the other two cores. Repeat, using three repetitions of the forms ABC and AAB.
4. **Extending from the core.** Affix animal cards from BLM Animal Cards (1) to the board to make the first core of an ABC pattern. SAY: This is the core of the pattern. Have one volunteer at a time add another core to extend the pattern. Repeat with different cores using patterns of the same form used in this unit. Have students suggest cores.

Activity Centres

1. Reproducing a Pattern

Type: Individual, pairs, or groups of three

Objective: To reproduce patterns of the forms used in the lesson

Preparation: Set up a pattern of three repetitions of the form ABB, using three mouse and six cat animal cards from BLM Animal Cards (1).

Provide each student or group with their own set of three mouse and six cat animal cards.

Instructions: Students reproduce the given pattern using their animal cards. If working in groups, students take turns placing one animal card at a time until they have reproduced the pattern.

Variations

1. Use animal cards to set up patterns of the forms used in this unit and have students reproduce them.
2. Use identical shapes in two different colours, such as red and yellow circles made from **BLM Circles and Squares**, to set up patterns of the forms used in this unit and have students reproduce them.

2. Extending a Pattern

Type: Individual or pairs

Objective: To extend a known pattern

Preparation: Set up three repetitions of an AAB pattern using six tricycle and three bicycle object cards made from **BLM Object Cards (1)**.

Provide each student or pair with eight tricycle cards and four bicycle object cards.

Instructions: Students use their object cards to extend the pattern, taking turns if they are in pairs, until they have used up all their object cards.

Variations

1. Use object cards to set up other patterns of forms used in this unit.
2. Use identical shapes in two colours, such as red and yellow circles made from BLM Circles and Squares, to set up other patterns of the forms used in this unit.
3. Put students' eight tricycle object cards and four bicycle object cards into an opaque bag. Students take out one object card at a time and, if possible, add it to the end of the pattern. Otherwise, the object card is returned to the bag, and the student continues taking out and returning object cards until they pick one that can be added.

3. Translating a Pattern

Type: Groups of three or four

Objective: To translate a known pattern

Preparation: Set up an AAB core for every group using two monkey animal cards and one elephant animal card from BLM Animal Cards (1). For each group, provide a bin containing two monkey animal cards and one elephant animal card per group member and a second bin containing either six cat and three dog animal cards (for groups of three) or eight cat and four dog animal cards (for groups of four).

Instructions: One at a time, each student extends the pattern by adding a core to the end. Then, one at a time, each student translates the "monkey-monkey-elephant" core into a "cat-cat-dog" core until all the animal cards have been used.

Variation: Students extend and translate other patterns of animal cards of the forms used in this unit.

4. Identifying the Core of a Pattern

Type: Individual

Objective: To identify and underline the core of a given pattern

Preparation: Set up three repetitions of the form AAB using six teddy bear and three baseball object cards from **BLM Object Cards (2)**.

Instructions: Students underline every core in the pattern.

Variation: Use object cards to set up other patterns of the forms used in this unit.

Extensions

1. Give each student an envelope containing six car and six house object cards from BLM Object Cards (1) and a large sheet of paper on which they arrange the cards. Students use all the cards to create patterns and then underline the cores.

Answers: AB AB AB AB AB AB, BA BA BA BA BA BA

2. Give each student an envelope containing eight hand and four mitten object cards from BLM Object Cards (2) and a large sheet of paper on which they arrange the cards. Students use all the pictures to create patterns and then underline the cores.

Sample answers: AAB AAB AAB AAB, BAA BAA BAA BAA, AAAABB
AAAABB, BBAAAA BBAAAA

3. Have students underline the cores on **BLM Codes**, which they completed in Lesson PAK-3.

PAK-6 Creating Patterns

Pages 125–126

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

core
next
pattern

Goals

Students will create patterns of two or more elements.

PRIOR KNOWLEDGE REQUIRED

Can extend patterns
Can identify the core of a pattern

MATERIALS

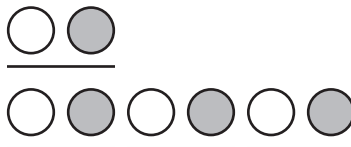
chalk of two different colours
pencil crayons or crayons of three different colours
blocks of equal size but three different colours or blocks of three different sizes but the same colour (see Activity Centre 2)
BLM Animal Cards (pp. I-2–3, see Activity Centre 2)
pattern blocks or **BLM Pattern Blocks** (p. I-41, see Activity Centre 2)
BLM Number Cards (1) to (5) (pp. I-6–10, see Activity Centre 2)
plastic letters (see Activity Centre 2)
BLM Action Cards (pp. F-26–27, see Activity Centre 3)
BLM Finding Patterns in Patterns (p. F-34, see Extension 2)
BLM 2 cm Grid Paper (p. F-35, see Extension 2)
large sheet of paper per pair (see Extension 3)
BLM Circles and Squares (p. I-1, see Extension 3)

Counting practice. Practise counting to 40 as a class and have students touch their heads for each number they say. Play **The Counting Game** (see introduction to Unit 1, p. C-3) as a class. Touch between 15 and 20 objects. Practise counting backwards from 5, then 6.

Preparing for the AP pages. Draw two circles on the board. SAY: We're going to make a core for a pattern, using two circles. We'll make them different colours. Colour and underline the circles, as shown below:



SAY: This is the core. Draw a row of six circles below the pair. Have a volunteer colour the six circles so they make a pattern using the core you just made and then underline the three cores, as shown below:



Have students make their own two-coloured pattern in **Question 1** on AP Book K.1, Unit 4, p. 125. Then have them make their own three-coloured pattern in **Question 3** on AP Book K.1, Unit 4, p. 126.

Creating patterns. The remainder of the lesson is designed for students to explore patterns through play, using the knowledge they have acquired over the course of the unit. Help students organize and extend their thinking by using the vocabulary terms from this unit, such as pattern, next, and core. Set up several stations for students to work individually and in pairs or groups, as described in the Activity Centres below.

You may choose to incorporate the following ideas into the Activity Centres:

- Patterns are not limited to straight lines; they can form shapes, be vertical, be assembled into booklets, hang from the ceiling, cover areas, etc.
- Patterns can be made of anything: pictures, objects, actions, textures, sounds, other patterns, or any combinations of these.
- Patterns can reflect students' knowledge of the world: weekdays and weekends, seasons, times of day, sizes, etc.

Activity Centres

1. Making a Pattern Using Colours

Type: Individual

Preparation: Direct students to AP Book K.1, Unit 4, pp. 125–126, and provide them with three different colours of pencil crayons or crayons.

Instructions: Students complete **Questions 2 and 4** by creating a core, making a pattern based on the core, and then underlining all the cores.

2. Creating a Core and Extending It Using Objects and Pictures

Type: Pairs

Objective: To make a pattern core and extend the pattern using objects and pictures

Preparation: Provide each pair with three equal-sized blocks of different colours (or three blocks of the same colour but different sizes) and three different animal cards from **BLM Animal Cards**.

Instructions: Each student defines an AB core using blocks, animal cards, or a combination of the two and gives it to their partner to extend.

Variations

1. Instead of an AB core, students use cores of the form ABC, AAB, and ABB.
2. Students use either pattern blocks or shapes from **BLM Pattern Blocks** in place of BLM Animal Cards.
3. Students use number cards from **BLM Number Cards (1) to (5)** in place of BLM Animal Cards.
4. Students use plastic letters in place of blocks.

3. Creating a Core and Extending It Using Actions

Type: Groups of three, active

Objective: To repeat an ABC core using actions

Preparation: Provide each group with action cards from **BLM Action Cards**. Have each student choose a different action; for example, Vicky jumps, Luc stands on one foot, and Sharon claps.

Instructions: Each student performs the action on their action card in turn. The group repeats the core several times. Students take turns

starting the pattern and doing the different actions.

Variations

1. Students perform an AAB pattern of actions.
2. Students perform an ABB pattern of actions.
3. Students think of their own simple, single-step actions and use them to perform a pattern.

4. **Creating a Core and Extending It Using Phrases**

Type: Groups of three, creative

Objective: To repeat an ABC core using phrases

Preparation: Have each student decide on a different favourite thing; for example, Ivan says “my favourite colour is __,” Lily says “my favourite food is __,” and Tristan says “my favourite animal is __.”

Instructions: The group repeats the core several times. They take turns starting the pattern and saying the different phrases.

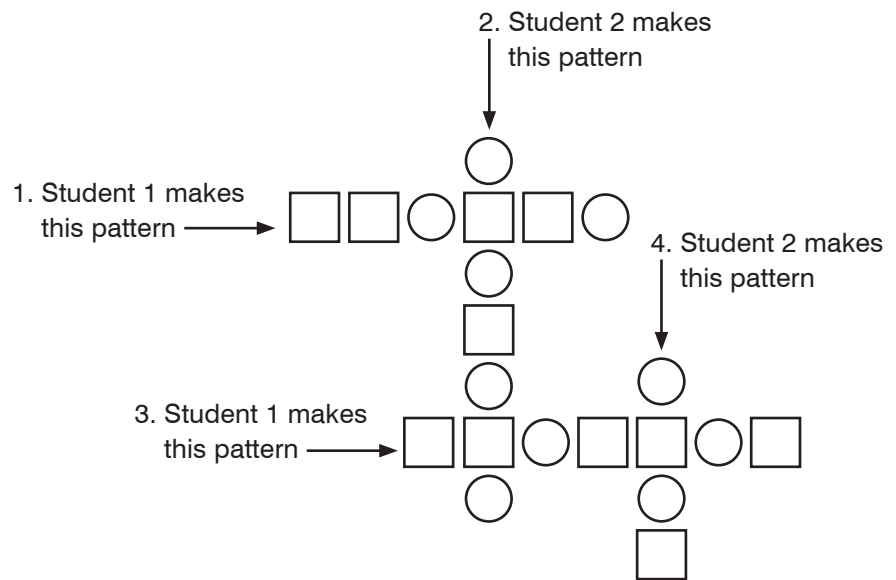
Variations

1. Repeat with each student saying their favourite sport, beverage, or game.
2. Repeat with each student making the noise of their favourite animal.
3. Repeat with each student saying a rhyming word (or sound); for example, book, took, look, or bog, dog, log.
4. Students work in groups of 4 to create a core of the form ABCD, with each student saying “my name starts with the letter __.” More than one student can use the same letter; for example, Lewis and Lela can both use the letter L, as long as the order of the core remains the same.
5. Students work in groups of 4 to create a core of the form ABCD, with each student saying “my name has __ letters.” More than one student can have the same number of letters; for example, Zara and Jake, as long as the order of the core remains the same.

Extensions

1. Have students create AB patterns in their notebooks or on scrap paper. For example, a student might draw a small green circle, large blue circle, small green circle, large blue circle, and so on.
2. Provide students with **BLM Finding Patterns in Patterns** and have them look for the patterns. (horizontal and vertical AB patterns) You may want to make other patterns of the forms used in this unit using two colours on **BLM 2 cm Grid Paper**, and then have students look for multiple patterns as they did with BLM Finding Patterns in Patterns.

3. Provide each pair of students with a large sheet of paper and shapes cut out from **BLM Circles and Squares**. Student 1 makes a pattern, and then Student 2 makes a different pattern starting from or crossing any one element of Student 1's pattern. Student 1 continues their pattern from any one element of Student 2's pattern, and so on. For example:



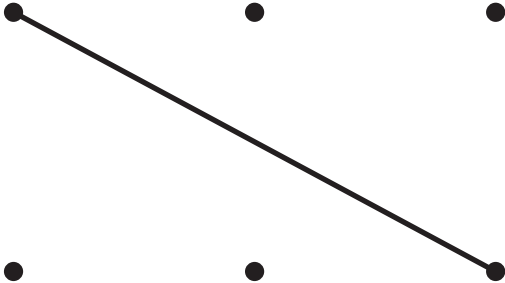
Matching Numbers with Ordinals

1	2	3	4	5
1st	2nd	3rd	4th	5th

☐ Draw lines to match.

1.

1	2	3	4	5
•	•	•	•	•
•	•	•	•	•
3rd	4th	1st	5th	2nd








2.

1	2	3	4	5
•	•	•	•	•
•	•	•	•	•
2nd	3rd	5th	1st	4th

Matching Actions with Ordinals

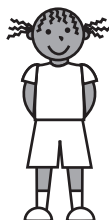




☐ Draw lines to match.

1.

				
•	•	•	•	•
•	•	•	•	•
2nd	1st	4th	5th	3rd

Note: A line is drawn from the first boy (pointing up) to the 1st ordinal.

2.

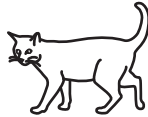
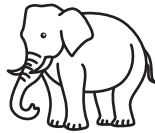
				
•	•	•	•	•
•	•	•	•	•
2nd	5th	4th	3rd	1st

Mistakes in Ordinals

☐ Colour 😊 for no mistake or ☹️ for mistake.

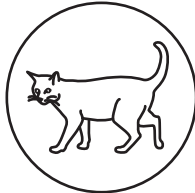
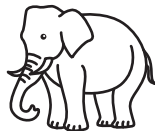
1.

1st



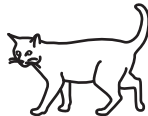
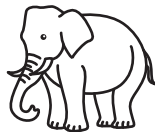
2.

2nd



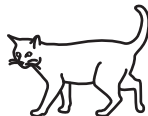
3.

3rd

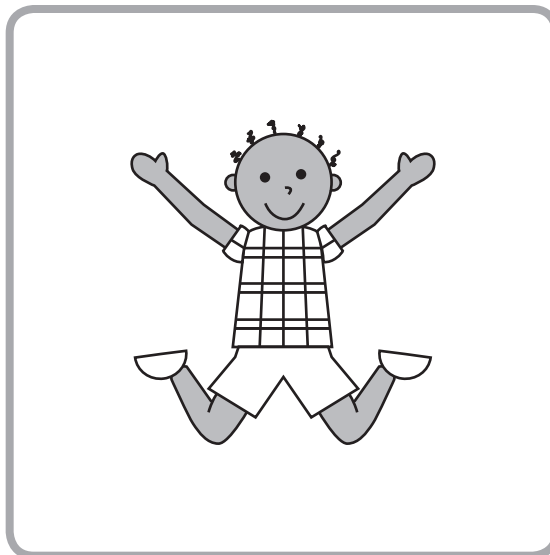
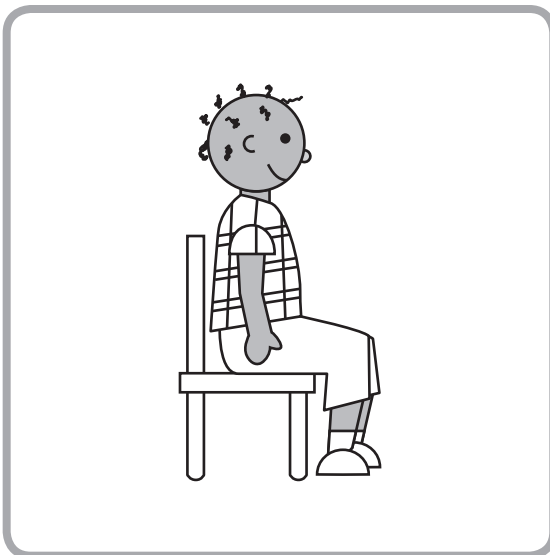
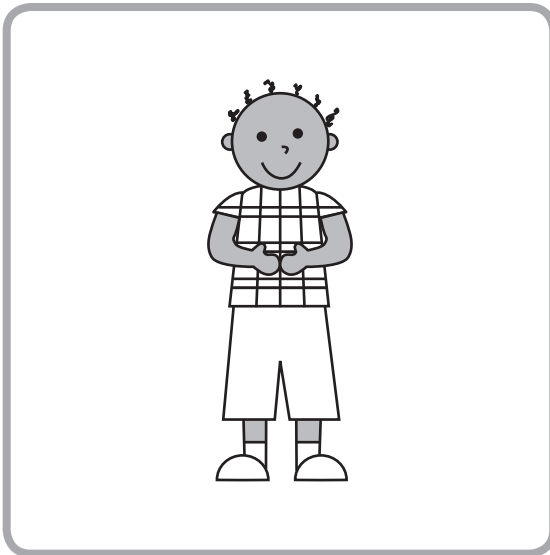
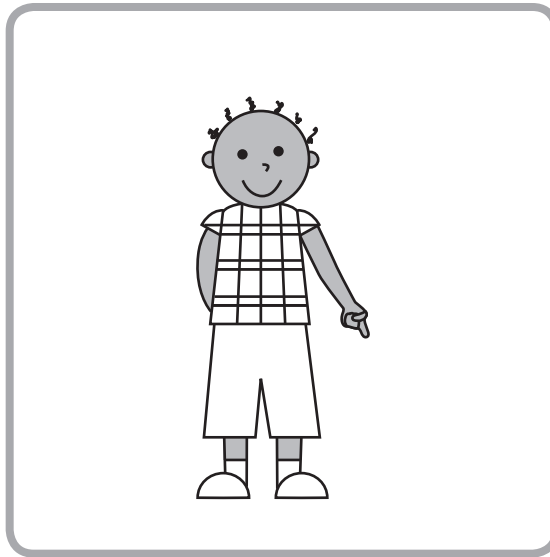
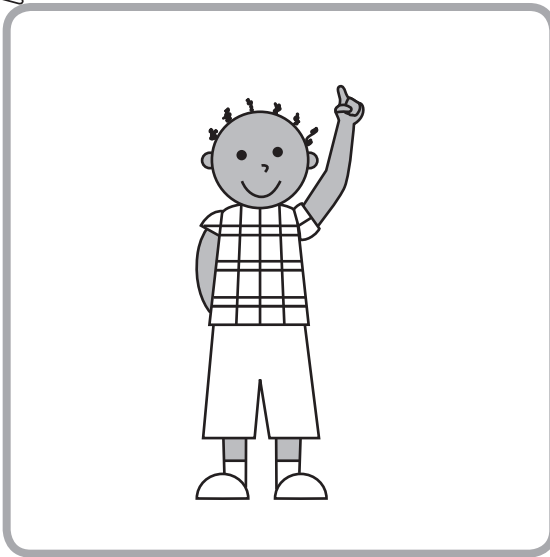


4.

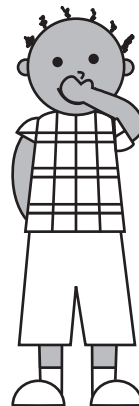
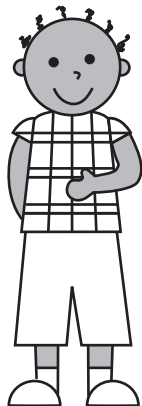
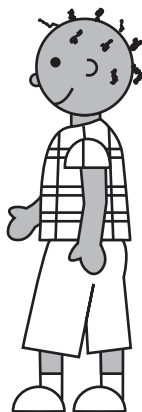
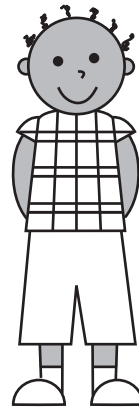
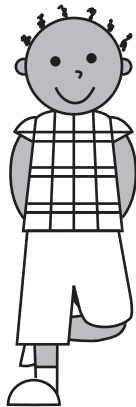
4th



Action Cards (I)



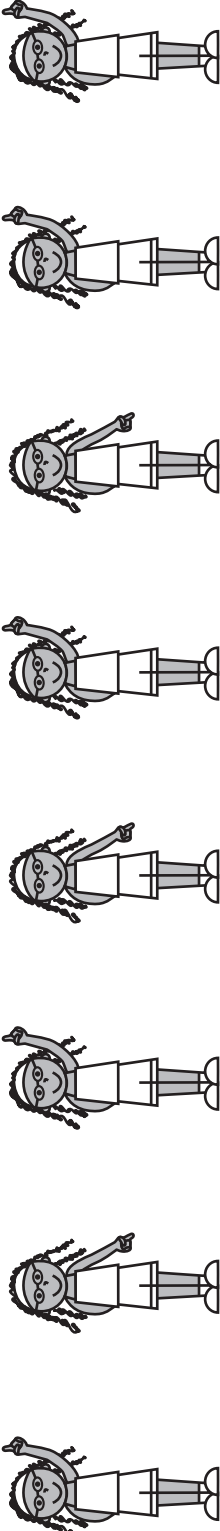
Action Cards (2)



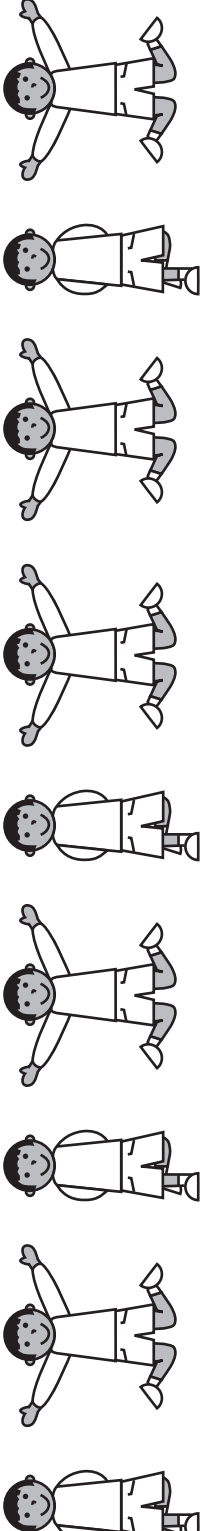
Mistakes in Action Patterns (I)

☐ Circle the mistake.

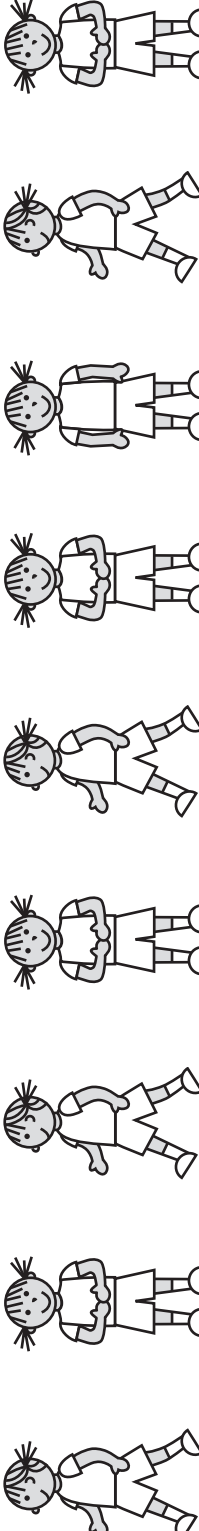
1.



2.



3.



Mistakes in Action Patterns (2)

☐ Circle the mistake.

4.

5.

6.

Codes

☐ Fill in the missing numbers.

1.

A B C A B C A B C

2 1 3

2.

C B C A C B C A C A

1 3 2

3.

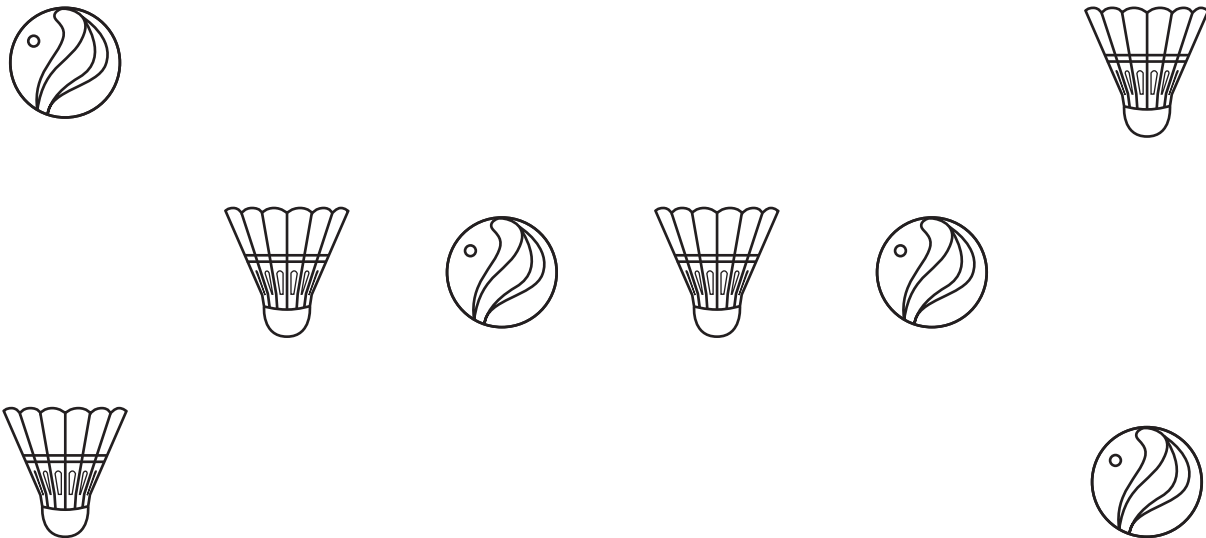
E D C B E D C B E D C B

3 5 4 2

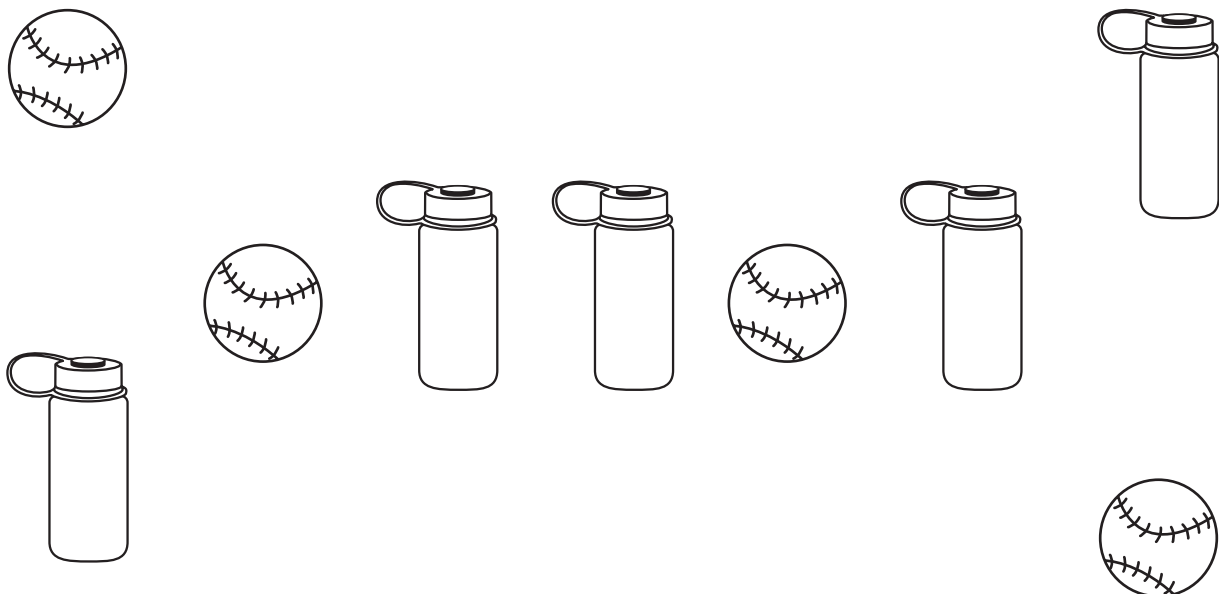
Objects That Come Before and Next

- ☐ Circle the object that comes before in the pattern.
- ☐ Circle the object that comes next in the pattern.

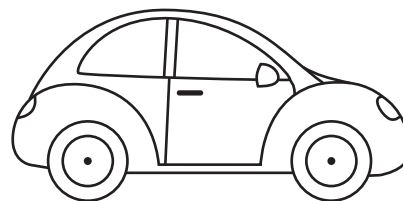
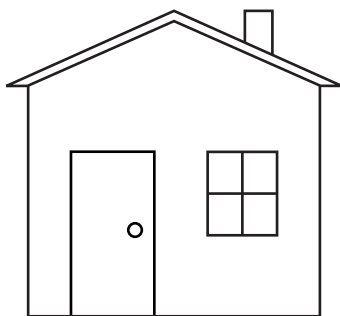
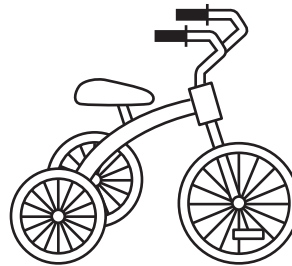
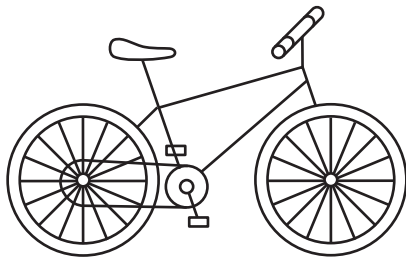
1.



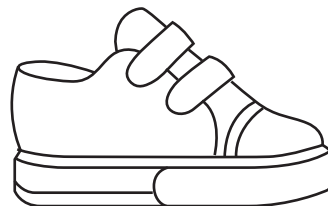
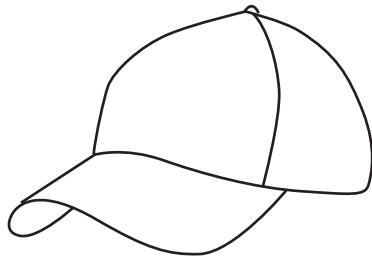
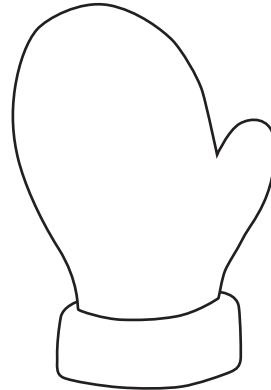
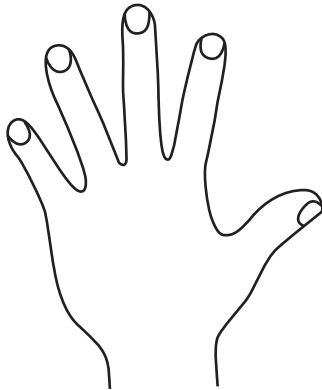
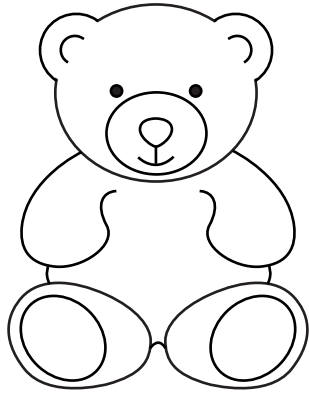
2.



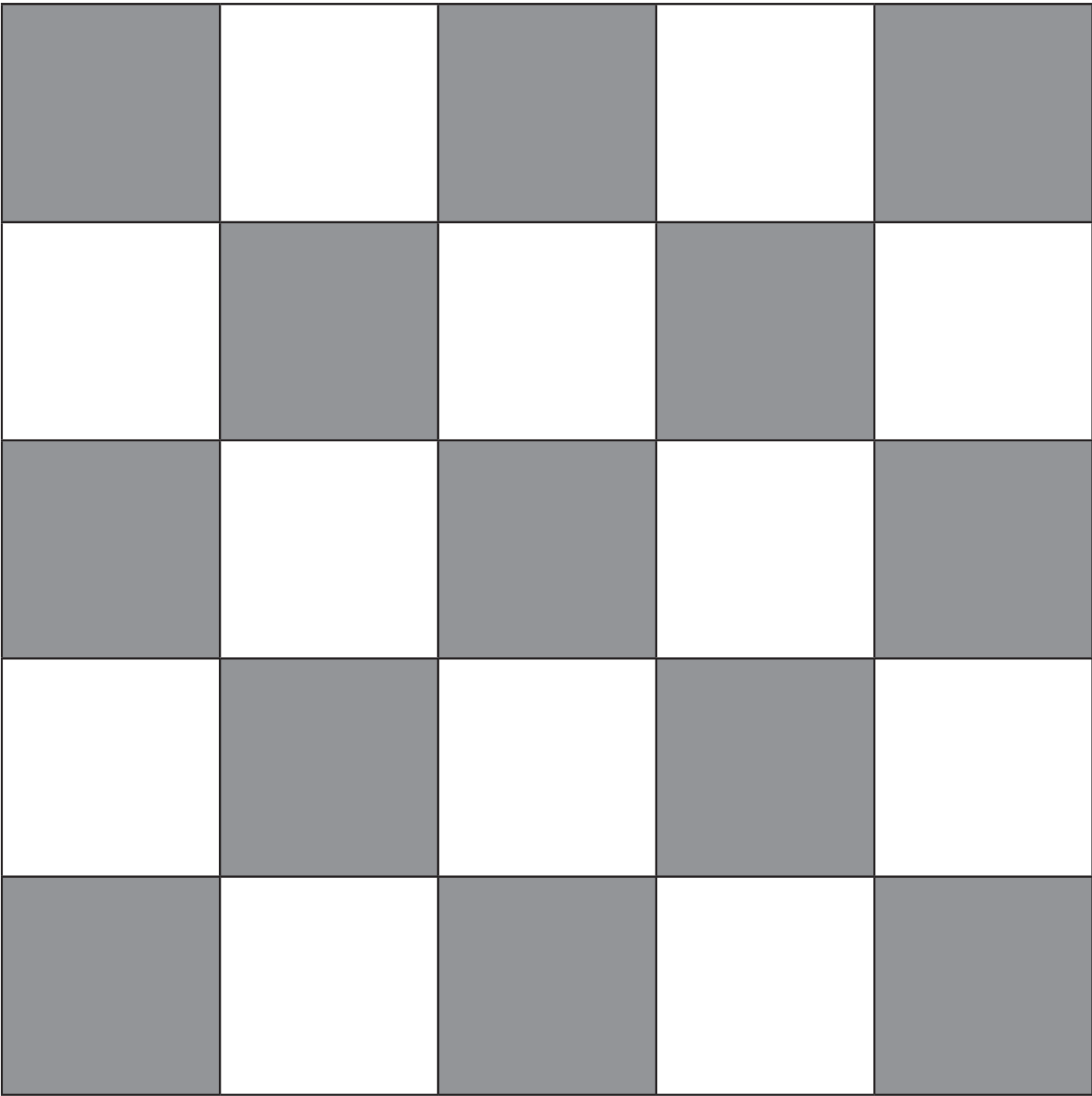
Object Cards (I)



Object Cards (2)

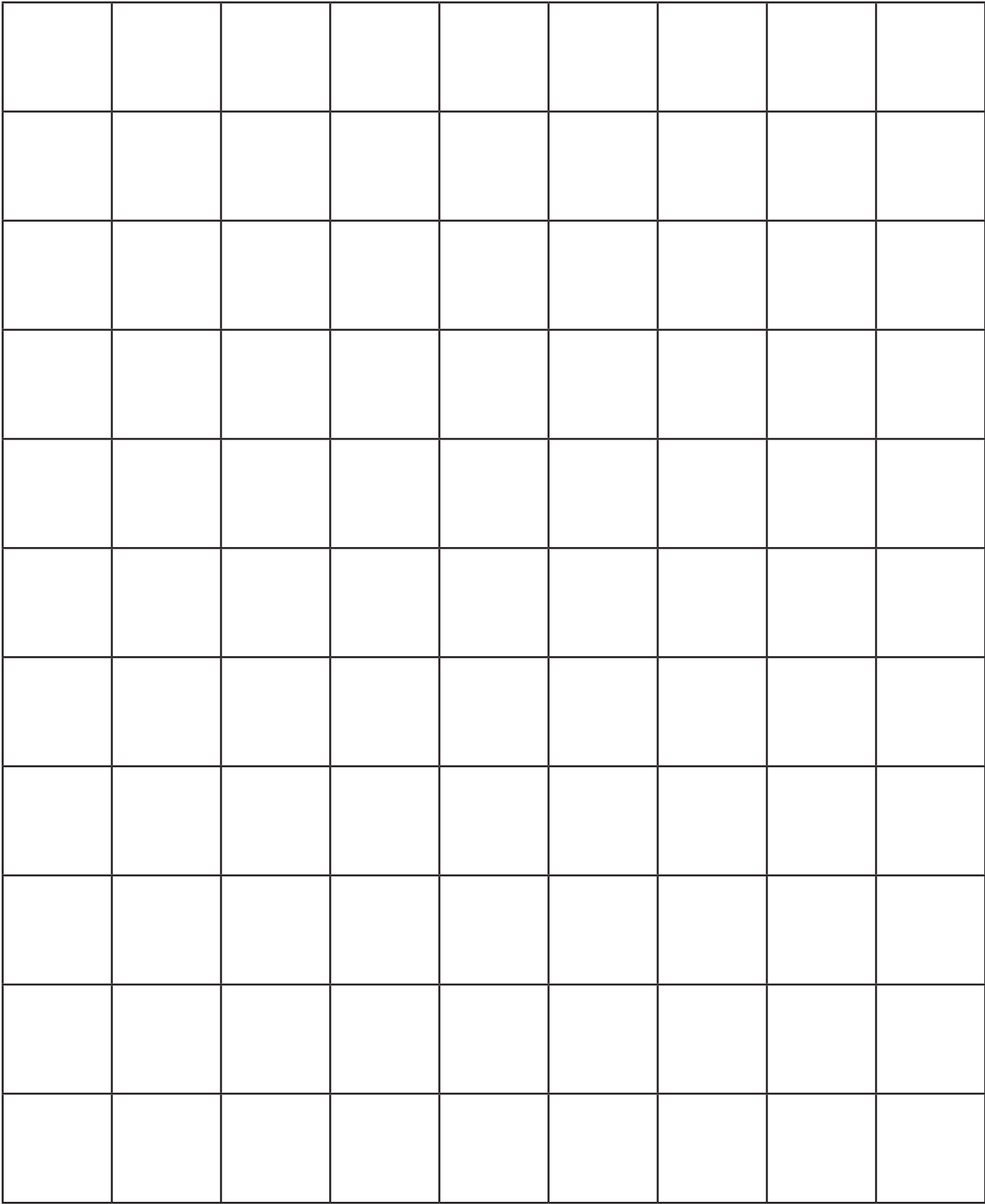


Finding Patterns in Patterns



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2 cm Grid Paper



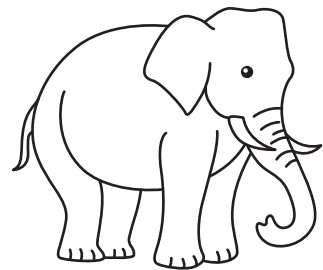
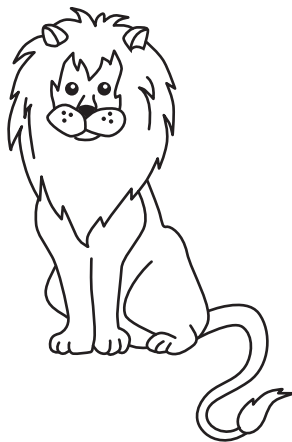
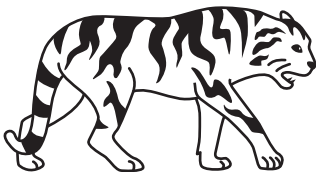
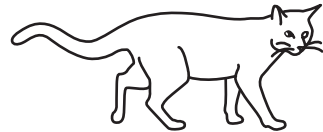
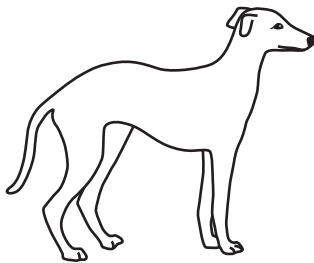
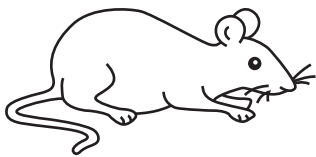
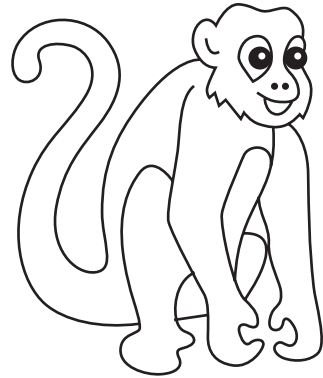
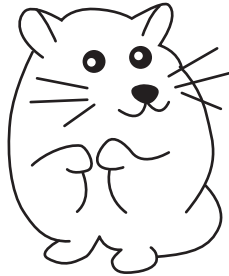
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Circles and Squares

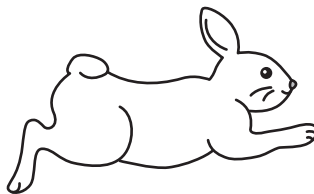
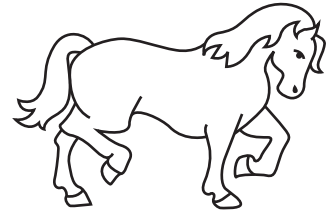
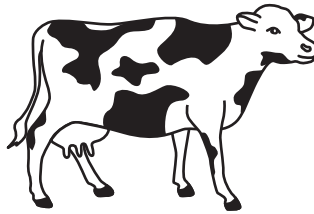
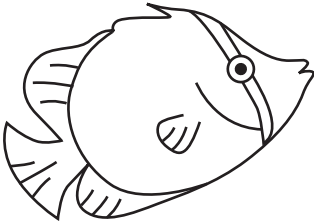
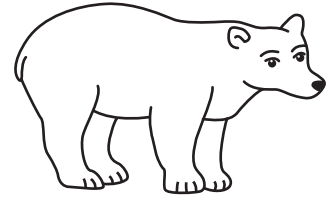
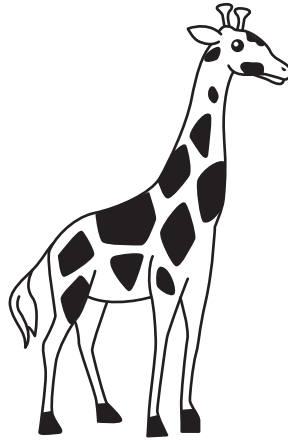
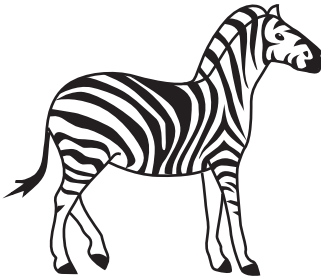


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Animal Cards (I)



Animal Cards (2)



Number Cards (I)



I	I	I	I	I	I
I	I	I	I	I	I
I	I	I	I	I	I
I	I	I	I	I	I
I	I	I	I	I	I
I	I	I	I	I	I
I	I	I	I	I	I

Number Cards (2)



2	2	2	2	2	2
2	2	2	2	2	2
2	2	2	2	2	2
2	2	2	2	2	2
2	2	2	2	2	2
2	2	2	2	2	2
2	2	2	2	2	2

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NAME _____ DATE _____

Number Cards (3)



3	3	3	3	3	3
3	3	3	3	3	3
3	3	3	3	3	3
3	3	3	3	3	3
3	3	3	3	3	3
3	3	3	3	3	3
3	3	3	3	3	3

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Number Cards (4)



4	4	4	4	4	4
4	4	4	4	4	4
4	4	4	4	4	4
4	4	4	4	4	4
4	4	4	4	4	4
4	4	4	4	4	4
4	4	4	4	4	4

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NAME _____ DATE _____

Number Cards (5)



5	5	5	5	5	5
5	5	5	5	5	5
5	5	5	5	5	5
5	5	5	5	5	5
5	5	5	5	5	5
5	5	5	5	5	5
5	5	5	5	5	5

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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

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Pattern Blocks

