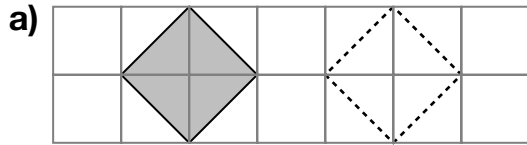# 1 Sliding Shapes
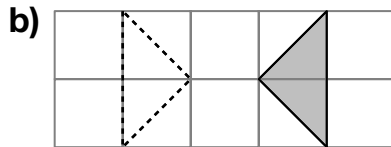
Goal Identify and describe slides.
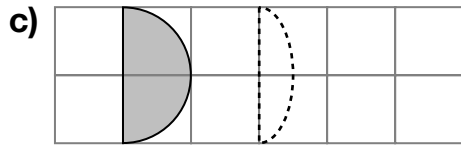
1. Can you slide the white shape to cover all of the grey shape? If not, tell why.

a)
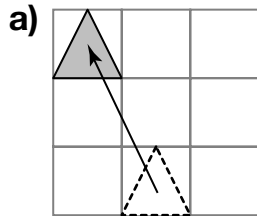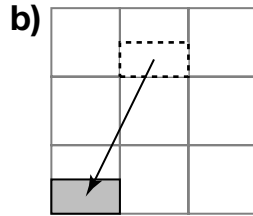
yes

b)

no, needs to be flipped

c)

no, not same shape

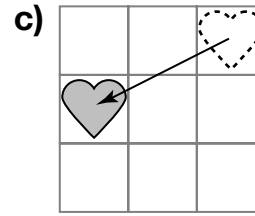**2.** Describe each slide.

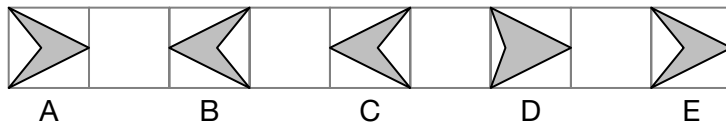**a)**

left 1 and

up 2

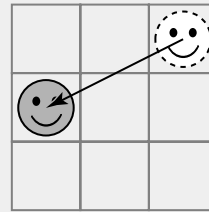**b)**

left 1 and

down 2

c)

left 2 and

down 1

3. Which shapes can you slide to cover another shape? Describe each slide.

A and E; A to E right 8, E to A left 8
B and C; B to C right 2, C to B left 2

A   B   C   D   E

2 Flipping Shapes

Goal **Identify and describe flips.**
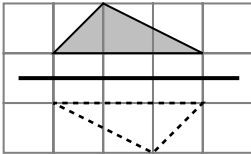
1. Can you flip the white shape to cover all of the grey shape? If not, tell why.

a)

no, it's a slide, not a flip

b)

yes

c)

yes

d)

no, needs to

be turned

e)

no, needs to

be turned

2. Write the letters of the flips in Question 1 that are flips over a horizontal line. _____ c _____

3. Write the letters of the flips in Question 1 that are flips over a vertical line. _____ b _____

4. a) Write the letter of the slide in Question 1. _____ a _____

b) Describe the slide. _____ right 2 _____

Turning Shapes

Goal   **Identify and perform turns.**

1. Describe each turn by the amount ($\frac{1}{2}$, $\frac{1}{4}$, or $\frac{3}{4}$) and the direction (CW or CCW).
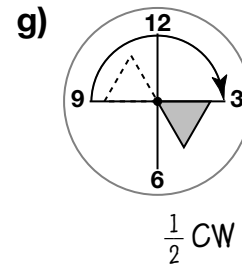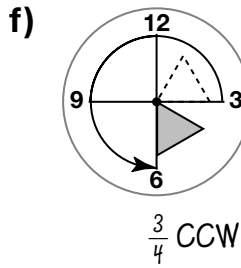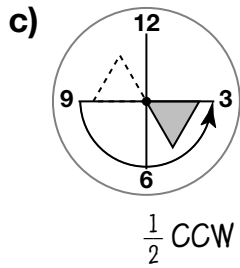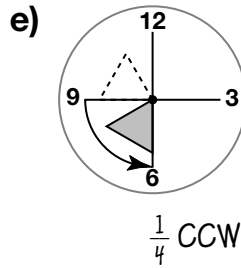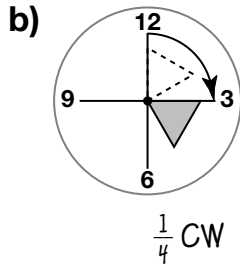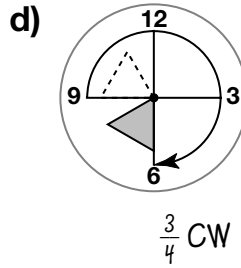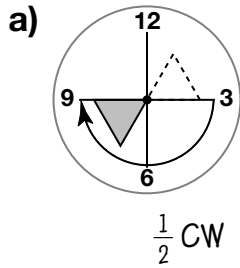
At-Home Help

To **turn** a shape is to move it around a turn centre. The shape does not change size or shape. Turns are clockwise (CW) or counter clockwise (CCW).
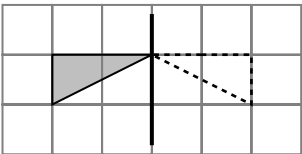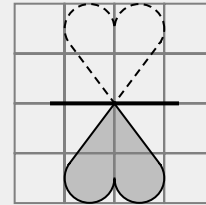
This is $\frac{1}{4}$ turn CW.

a)

$\frac{1}{2}$ CW

b)

$\frac{1}{4}$ CW

c)

$\frac{1}{2}$ CCW

d)

$\frac{3}{4}$ CW

e)

$\frac{1}{4}$ CCW

f)

$\frac{3}{4}$ CCW

g)
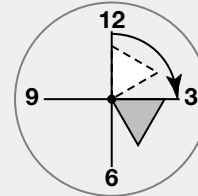
$\frac{1}{2}$ CW

2. a) Write the letter of the turn in Question 1 that has the same start and end positions for the triangles as those in part c). _____g_____

b) What are the descriptions for these 2 turns? _____ $\frac{1}{2}$ CCW and $\frac{1}{2}$ CW _____

3. a) Write the letter of the turn in Question 1 that has the same start and end positions for the triangles as those in part d). _____e_____

b) What are the descriptions for these 2 turns? _____ $\frac{3}{4}$ CW and $\frac{1}{4}$ CCW _____

4 Communicate About Slides, Flips, and Turns

Goal **Explain how to make a picture by sliding, flipping, and turning shapes.**

Use the Communication Checklist.

1. This pattern was made using slides, flips, and turns.

At–Home Help

Communication Checklist
☑ Did you show all the steps?
☑ Did you show the right amount of detail?
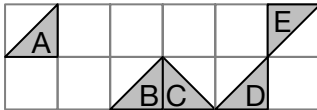☑ Did you use math language?

Describe each move.

a) from A to B _____ right 2 and down 1

b) from B to C _____ flip right in vertical line, or turn $\frac{1}{4}$ CW or $\frac{3}{4}$ CCW

c) from C to D _____ flip right in vertical line

d) from D to E _____ turn $\frac{1}{2}$ CW or $\frac{1}{2}$ CCW

2. Make your own pattern with at least 6 more shapes on this grid. Then describe each move.
For example:
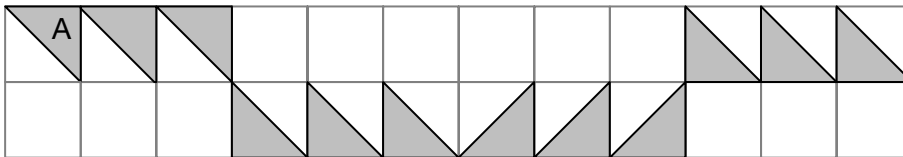
slide right 1, slide right 1, slide right 1, turn $\frac{1}{2}$ CW, slide right 1, slide right 1,

flip right in a vertical line, slide right 1, slide right 1, turn $\frac{1}{2}$ CW, slide right 1, slide right 1

5 Comparing Patterns

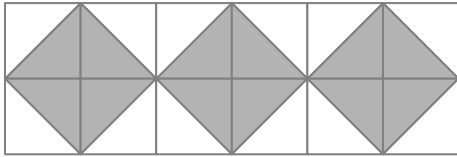**Goal** Compare patterns that use slides, flips, and turns.

1. a) Create a different pattern using the same shape as in the pattern in the At-Home Help box. Have at least 1 attribute that changes. *For example:*

At-Home Help

This pattern has 1 attribute that does not change: shape (triangle). It has 2 attributes that change: colour and position. The colour changes black to grey and then repeats. The position changes by flipping to the right over a vertical line.

An example of a **pattern rule** is: Start with a black triangle, flip it to the right, and colour it grey. Flip that triangle to the right and colour it black. Keep repeating.

b) Which attribute(s) stay the same in your pattern? ___shape___

c) Which attribute(s) change in your pattern? ___position___

d) Write a pattern rule for your pattern. *Start with a triangle flip down in a horizontal line, flip that triangle right in a vertical line, flip that triangle up in a horizontal line, flip that triangle right in a vertical line, repeat.*

2. Compare your pattern with the pattern in the At-Home Help box. *For the example in Question 1:*

a) How are they the same? *The patterns have the same shape. Position changes in both, and the position change is from flipping.*

b) How are they different? *The patterns have different colours. The colour changes in the At-Home Help pattern, but not in mine. The At-Home Help pattern flips only in a vertical line, but my pattern flips in both horizontal and vertical lines.*

Extending Patterns

Goal **Extend patterns that have at least 2 changing attributes.**

1. a) Which attributes are changing in the
pattern below?

> **A.** shape **C.** size
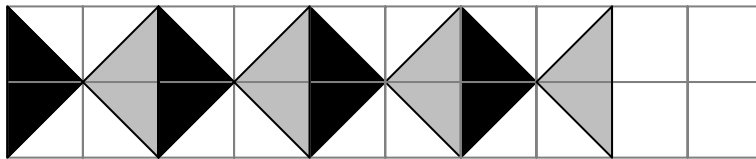>
> (**B.** colour) (**D.** position)

b) For each attribute that changes, describe how it changes.

colour: black, grey, repeat

position: by flipping in a vertical line to the right

c) Extend the pattern by drawing 2 more repeats.

2. a) Which attributes are changing in the pattern below?

(**A.** shape) (**B.** colour) **C.** size (**D.** position)
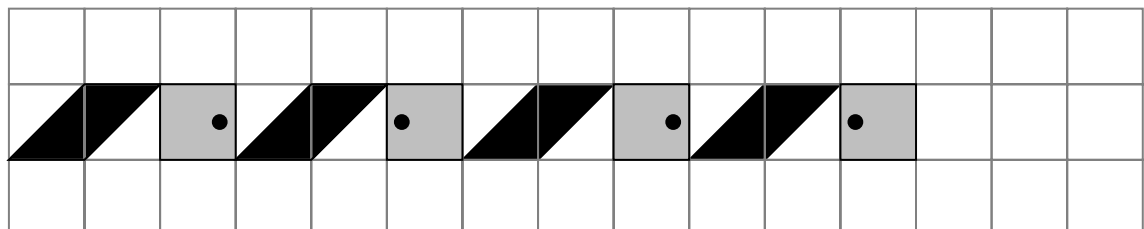
b) For each attribute that changes, describe how it changes.

shape: rhombus, square (with a dot in it), repeat

colour: black, grey, repeat

position: rhombus by sliding right 2 and square by flipping right in a vertical line

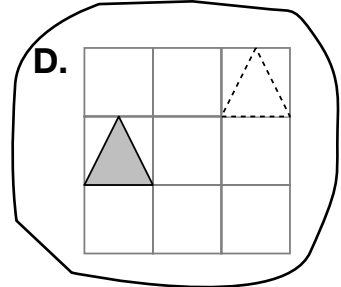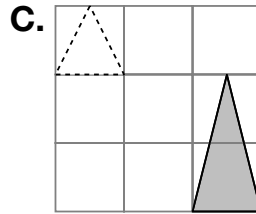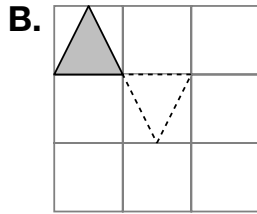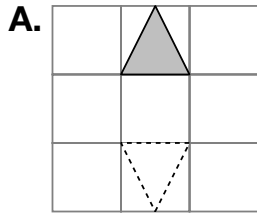**c)** Extend the pattern by drawing 2 more repeats.

Test Yourself Page 1

Circle the correct answer.

1. Which pair of shapes shows a slide?

A.

B.

C.

D.

2. Which pair of shapes in Question 1 shows a flip?

A.　　　　　　**B.**　　　　　　**C.**　　　　　　**D.**

3. Which pair of shapes in Question 1 shows a turn?
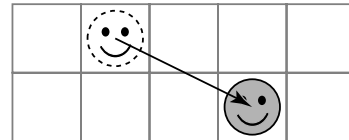
A.　　　　　　**B.**　　　　　　**C.**　　　　　　**D.**

4. How would you describe this slide?

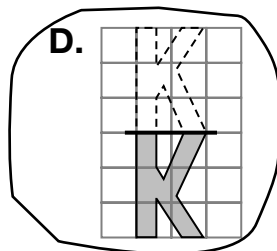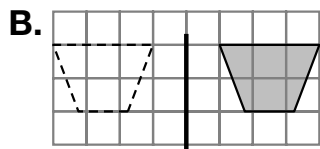**E.** right 2 and down 1　　　　**G.** left 2 and up 1

F. right 1 and down 2　　　　**H.** left 1 and up 2

5. Which pair of shapes shows a flip over a horizontal line?

A.
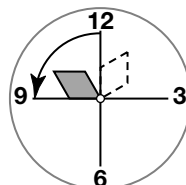
C.

B.

D.
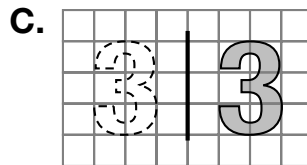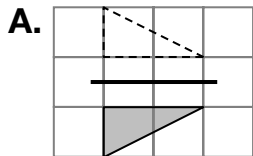
6. How would you describe this turn?

E. $\frac{1}{4}$ CW　　　　**G.** $\frac{3}{4}$ CCW
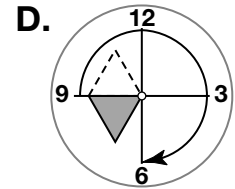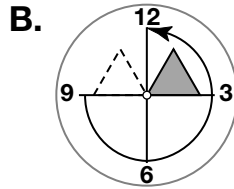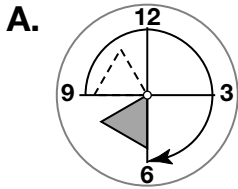
F. $\frac{1}{2}$ CCW　　　　**H.** $\frac{1}{4}$ CCW

Test Yourself Page 2

Circle the correct answer.

7. Which shows a turn of $\frac{3}{4}$ CCW?

A. **B.** **C.** **D.**
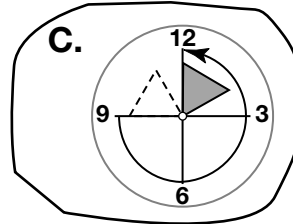
8. Which describes this pattern?

P¶P¶P¶

E. Flip a P in a vertical line, repeat.

F. Flip a black P in a vertical line and colour it white, flip the white P in a vertical line and colour it black, repeat.

G. Flip a black P in a horizontal line and colour it white, flip the white P in a horizontal line and colour it black, repeat.

H. Turn a black P $\frac{1}{2}$ turn CW and colour it white, turn the white P $\frac{1}{2}$ turn CW and colour it black, repeat.
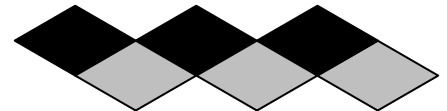
9. Which attributes are changing in this pattern?

A. colour and shape

C. colour and position

B. shape and size

D. position and shape

10. Which shapes extend this pattern?

E.

G.

F.

H.