1)

tile pattern and side pattern

2)

tile pattern and side pattern

3)
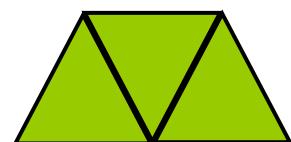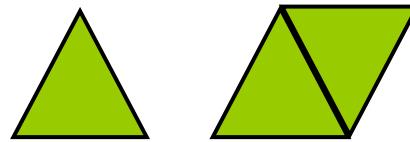
tile pattern and side pattern

4)

tile pattern

5)

tile pattern

6)

stick pattern

7)

tile pattern

8)
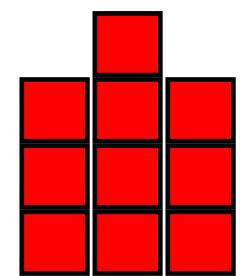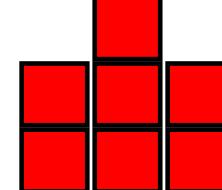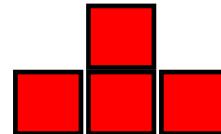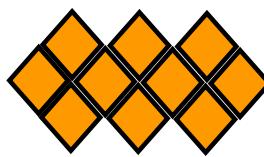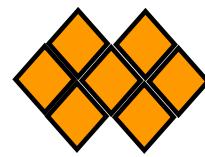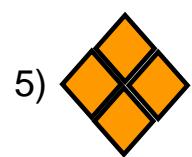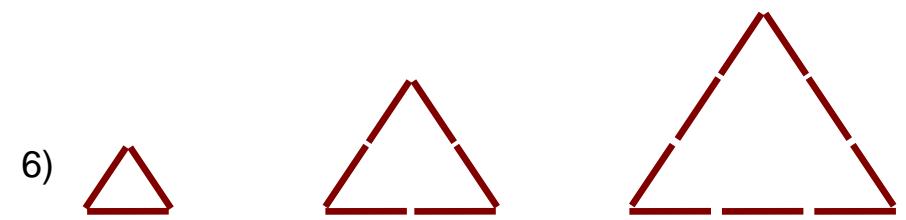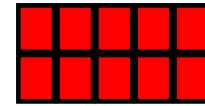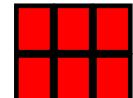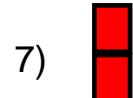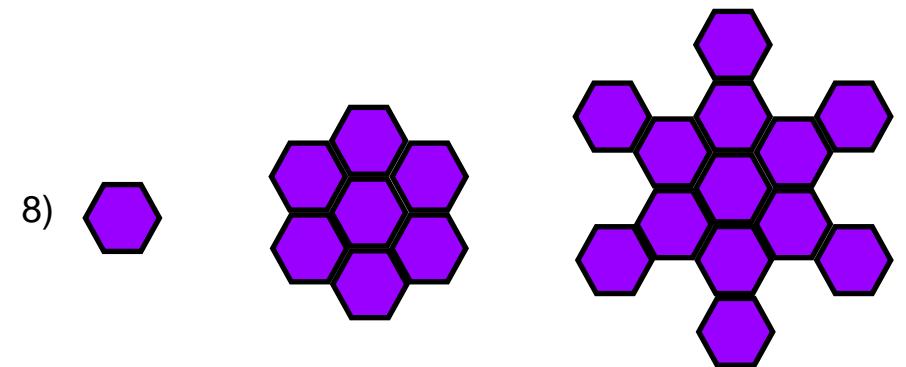
tile pattern

9)
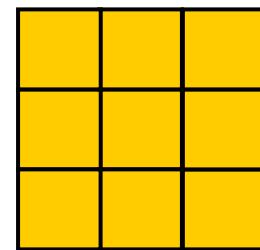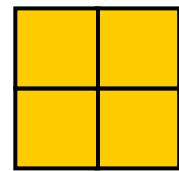
tile pattern

10)
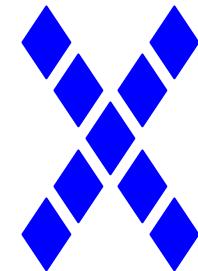
tile pattern

11)
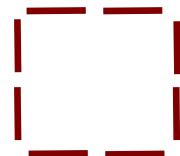
stick pattern

12)

tile pattern

13)

stick pattern

14)

tile pattern

15)

stick pattern

16)
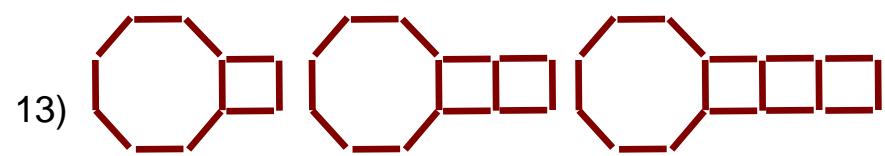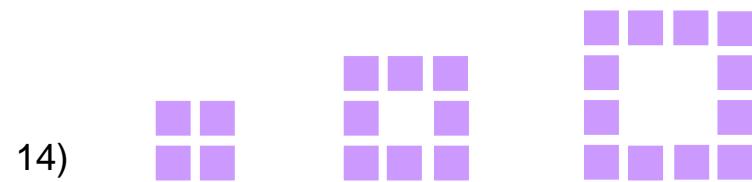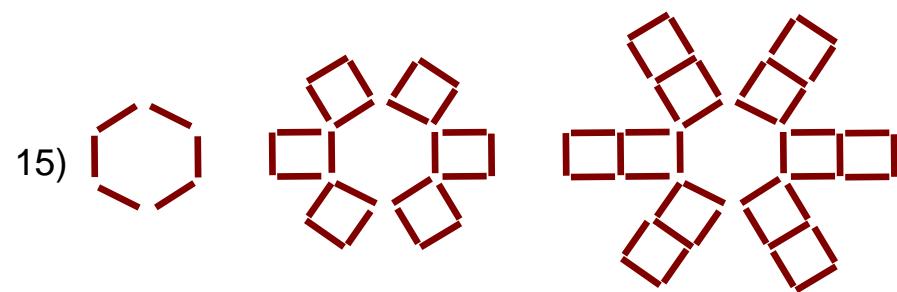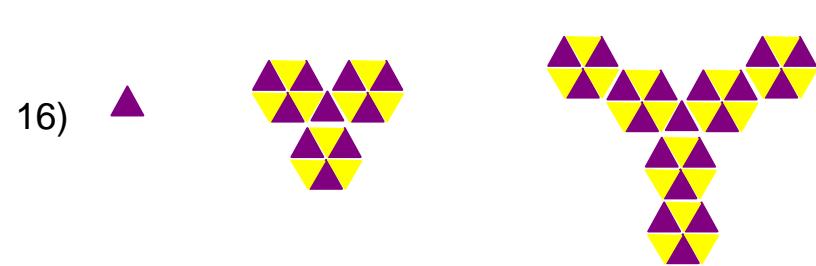
tile pattern

17)
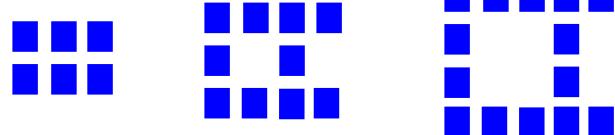
tile pattern

18)

tile pattern

19)

tile pattern

20)

tile pattern
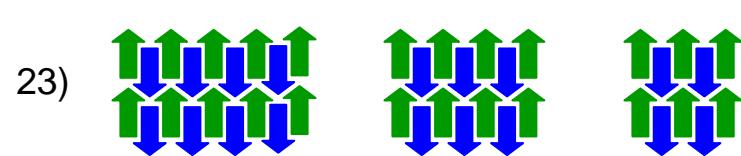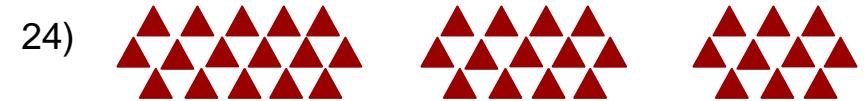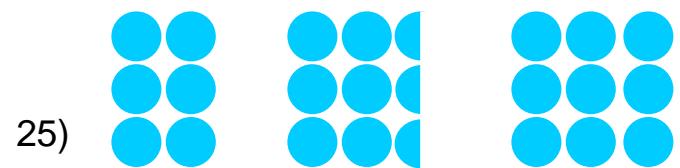
21)

stick pattern

22)

stick pattern

23)

tile pattern

24)

tile pattern

25)

tile pattern

26)

tile pattern

27)

tile pattern

28)

tile pattern

29)

tile pattern

30)

tile pattern

31)

stick pattern

32)

stick pattern

33)

stick pattern

34)

tile pattern

35)

tile pattern

36)
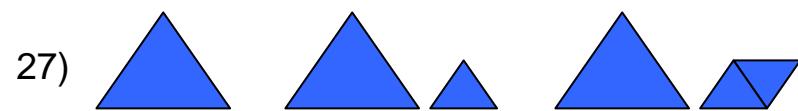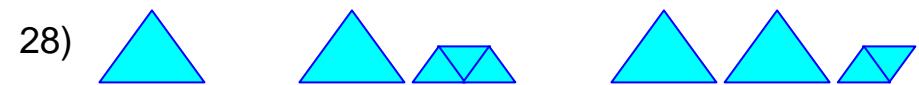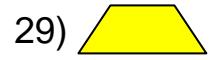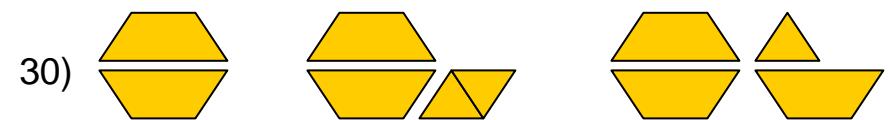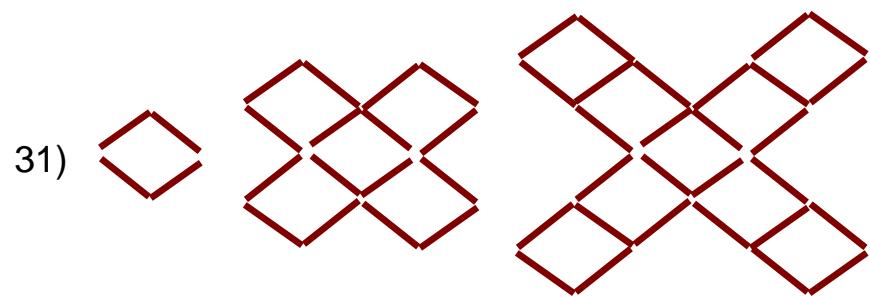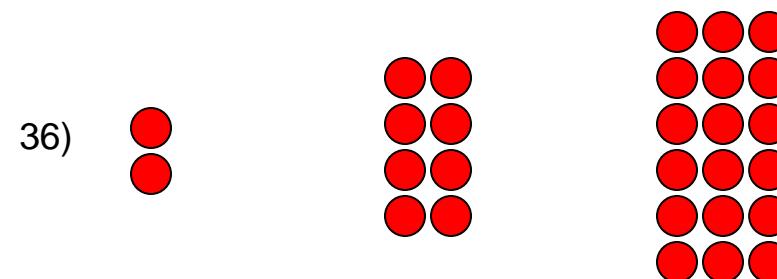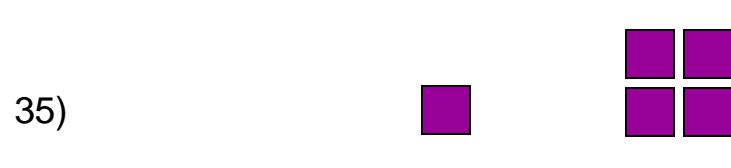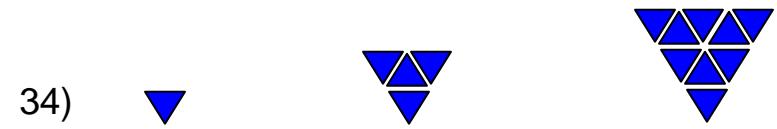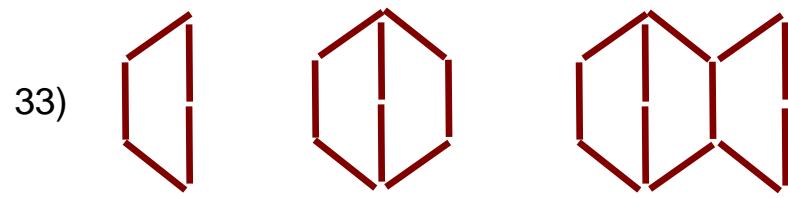
tile pattern

37)

tile pattern

38)
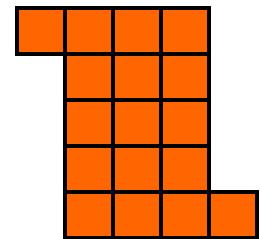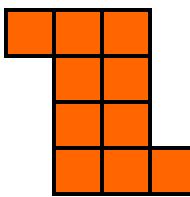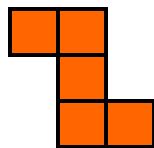
tile pattern

39)
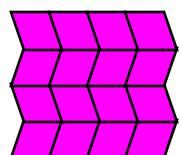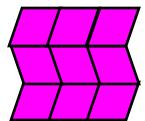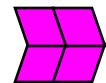
tile pattern

40)
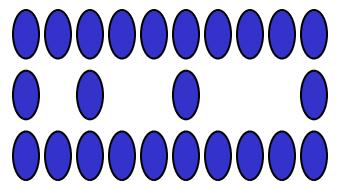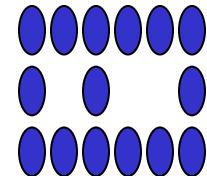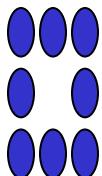
tile pattern

41)
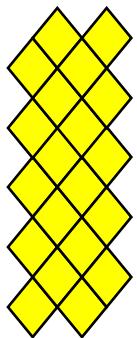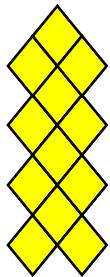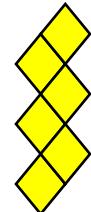
tile pattern

42)
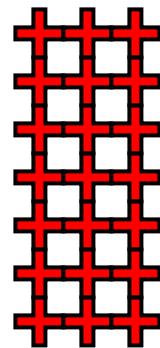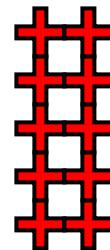
tile pattern

43)

stick pattern

44)

stick pattern

45)

stick pattern

46)

stick pattern

47)

tile pattern

48)
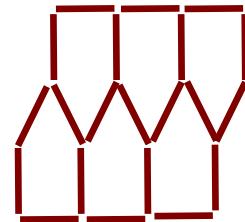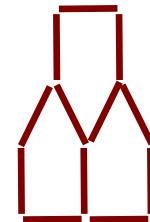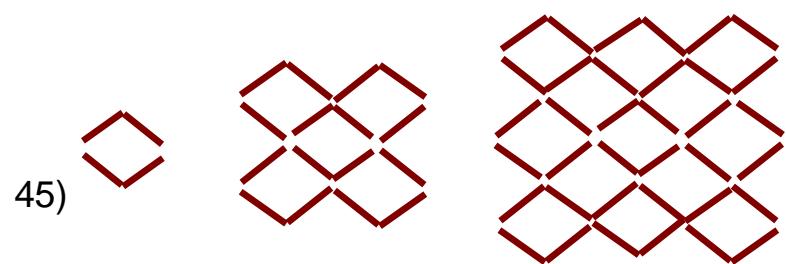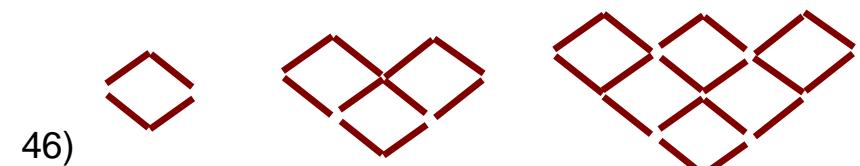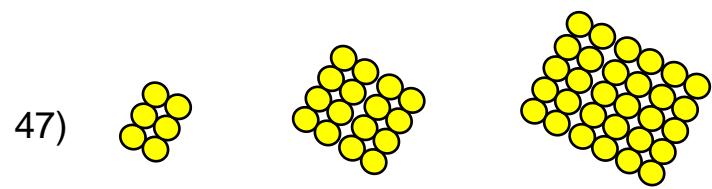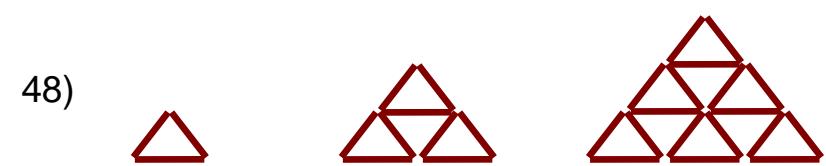
stick pattern

DIRECTIONS

1. Study the pattern and build step 4.
2. Make a sketch of step 4 and step 5. How many units are in each step?
3. Use the information you have (pattern you've discovered) to sketch step 7 and step 10. How many units make up each of these steps?
4. Describe any patterns you have noticed in the numbers.
5. Suggest another way to describe how this pattern grows.

PATTERNS INFORMATION AND ALTERNATIVES

1. Linear tiles f(n) = n
   Linear sides f(n) = 5s + 1

2. Linear tiles   f(n) = n
   Linear sides   f(s) = 4s + 1

3. Linear tiles   f(n) = n
   Linear sides   f(s) = 2s + 1

   Create more polygon patterns similar to the first three. How do the side functions change?

4. Linear tiles   f(n) = 3n + 1

5. Linear tiles   f(n) = 3n + 1

6. Linear sticks   f(n) = 3n

7. Linear tiles   f(n) = 4n – 2

8. Linear tiles   f(n) = 6n – 5
   What if this was made with a triangle, pentagon, etc.? (Quad. used in #10.)

9. Square/Quadratic tiles $f(n) = n^2$

10. Linear tiles   f(n) = 4n – 3

11. Linear sticks   f(n) = 2n + 2

12. Linear tiles   f(n) = 2n + 4
    How would this change if the number of vertical tiles was different?

13. Linear sticks   f(n) = 3n + 3
    What if beginning shape was a triangle? Square? Pentagon? Other polygon?

14. Linear tiles   f(n) = 4n

15. Linear tiles   f(n) = 18n – 12
    What if the center shape was a triangle? Square? Pentagon? Other Polygon?

16. Linear tiles   f(n) = 18n – 17

17. Linear tiles   f(n) = 4n + 2

18. Linear tiles f(n) = 3n

19. Linear tiles f(n) = 5n + 1

20. Linear tiles   f(n) = -3n + 10

21. Linear sticks   f(n) = 7n – 2

22. Linear sticks   f(n) = -4n + 25

23. Linear tiles   f(n) = -4n + 22

24. Linear tiles   f(n) = -3n + 19

25. Linear tiles $f(n) = \frac{3}{2}n + \frac{9}{2}$

26. Linear tiles $f(n) = \frac{5}{2}n + \frac{5}{2}$

27. Linear tiles $f(n) = \frac{1}{3}n + \frac{2}{3}$

28. Linear tiles $f(n) = \frac{3}{4}n + \frac{1}{4}$

29. Linear tiles $f(n) = \frac{1}{3}n + \frac{2}{3}$

30. Linear tiles $f(n) = \frac{2}{3}n + \frac{4}{3}$

31. Linear sticks: $f(n) = 12n - 8$

32. Non-linear sticks
    Odd stages: $f(n) = 2.5n + 0.5$
    Even stages: $f(n) = 2.5n$

33. Non-linear sticks
    Odd stages: $f(n) = 3.5n + 1.5$
    Even stages: $f(n) = 3.5n + 1$

34. Square/Quadratic tiles $f(n) = n^2$

35. Quadratic tiles $f(n) = (n - 1)^2 = n^2 - 2n + 1$
    Note: The Step 1 value is 0.

36. Quadratic tiles $f(n) = 2n^2$

37. Quadratic tiles $f(n) = n^2 + n = n(n + 1)$

38. Quadratic tiles $f(n) = n^2 + 2n + 2$

39. Quadratic tiles $f(n) = (n + 1)^2 = n^2 + 2n + 1$

40. Quadratic tiles $f(n) = n^2 + 4n + 3$

41. Quadratic tiles $f(n) = (n + 1)(n + 2)$
    $ = n^2 + 3n + 2$

42. Quadratic tiles $f(n) = n(2n + 1)$
    $ = 2n^2 + n$

43. Quadratic sticks $f(n) = n(n + 2)$
    $ = n^2 + 2n$

44. Quadratic sticks $f(n) = n(n + 4)$
    $ = n^2 + 4n$

45. Quadratic sticks $f(n) = 4n^2$

46. Quadratic sticks $f(n) = n(n + 3)$
    $ = n^2 + 3n$

47. Quadratic sticks $f(n) = 2n(n + 2)$
    $ = 2n^2 + 4n$

48. Quadratic tiles $f(n) = \dfrac{3}{2}n(n + 1)$

    $$f(n) = \frac{3}{2}n^2 + \frac{3}{2}n \qquad\qquad \frac{3}{2}n + \frac{9}{2}$$