

# LOOK HOW I'M GROWING

## PATTERNS/FUNCTIONS

- Using patterns
- Pattern recognition
- Counting

### Getting Ready

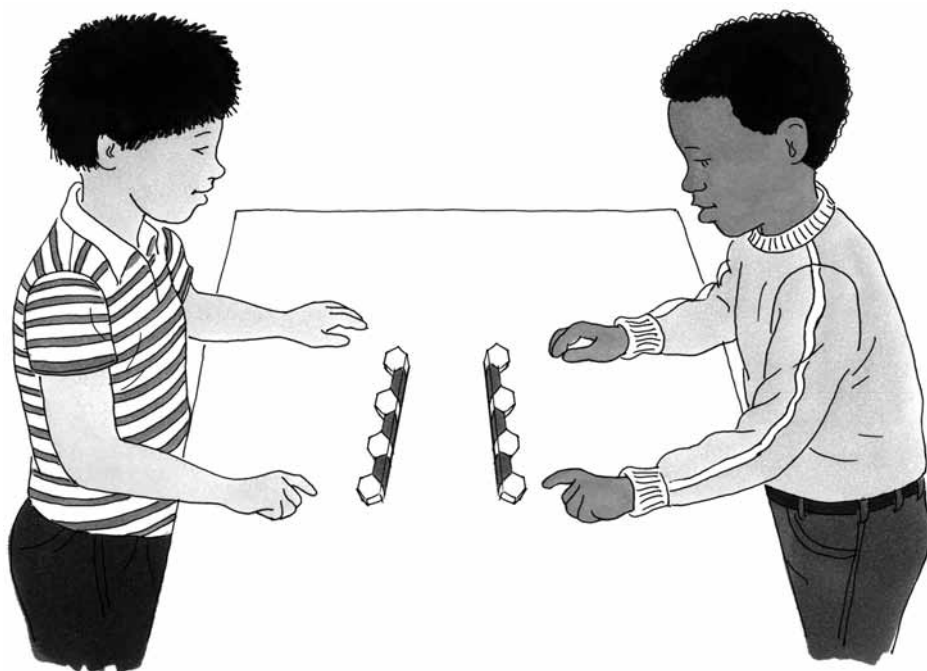
#### What You'll Need

Pattern Blocks, about 20-25 per pair  
Crayons  
Overhead Pattern Blocks (optional)

### Overview

Children build the first two stages of a pattern using Pattern Blocks. Then other children extend the pattern and describe how the shape is growing. In this activity, children have the opportunity to:

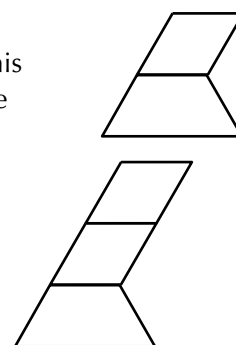
- ◆ create and identify growing patterns
- ◆ use patterns to make predictions
- ◆ describe the patterns they see



### The Activity

#### Introducing

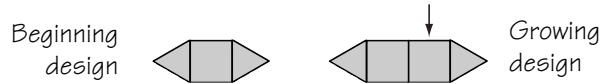
- ◆ Display this Pattern Block design. Explain that this design is your beginning design and that you are going to add blocks to make the design grow.
- ◆ Create the next stage of the design as children watch.
- ◆ Call on volunteers to explain how your *beginning design* and your *growing design* are alike and different.
- ◆ Ask children to use their Pattern Blocks to create the next stage of growth of the design. When they have finished, invite them to share this third stage of the design, or "*grown-up design*."



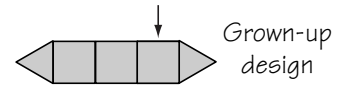
## On Their Own

*Can you create a growing design and challenge your partner to make it grow again?*

- Work with a partner.
- One partner uses Pattern Blocks to create a design. Then that partner builds the design again and adds one or more blocks to any part of the design to make it grow. For example:



- The other partner tries to continue the same growing pattern by adding one or more blocks to the Growing design to make a Grown-Up design. This partner should also describe how the pattern grows.
- Both partners trace the three designs and color the blocks used.
- Now switch roles and repeat the activity.



## The Bigger Picture

### Thinking and Sharing

Invite volunteers to display the three designs of one of their favorite growth patterns. Children can use Pattern Blocks to predict what they think the fourth design (a more grown-up design) would be. The partners who are displaying the original three designs can then circulate and look for the fourth design they had in mind. Repeat this process with a few other children's three-stage designs. You may also wish to have children illustrate their work with blocks on the overhead.

Use prompts like these to promote class discussion:

- ◆ What part of this design was growing? How was it growing?
- ◆ Look at the *beginning design* and the *growing design* of this pattern. Can anyone think of a different *grown-up design*? What is it?
- ◆ What would the fourth and fifth stages of growth look like?
- ◆ Which was harder—making the first two designs or predicting the third design? Why?
- ◆ Did any of the designs have similar growth patterns? Which ones?

## Extending the Activity

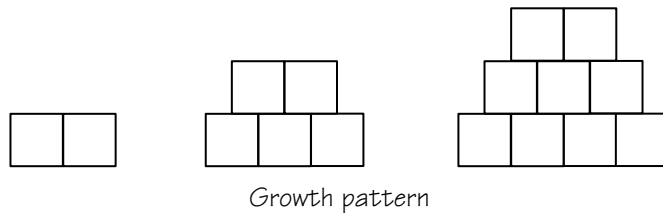
1. Have children build patterns as they did in the lesson, but this time predict the number of blocks used in each other's next design. Encourage children to record the number of blocks used in each of the three stages and then extend that number pattern as far as they can.

## Teacher Talk

### Where's the Mathematics?

Activities such as this help children to look for patterns and to learn to use these patterns to make predictions. Some children can see patterns more easily in the block designs than in the numbers generated by these designs. For other children, the reverse may be true. The aim should be to have children recognize patterns and use them to make predictions about what comes next.

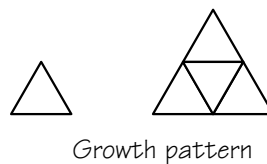
Many children will be able to build the next stage in the pattern but they will not be able to verbalize why they are building it that way. Hearing other children's explanations of how patterns are growing will help these children learn how to articulate what is going on in their heads. For example, a child might look at this pattern and say that, "You keep counting up...2,3,4."



Another child might verbalize the pattern as "adding another row that has one more in it." Their explanations may be sketchy and you may want to ask for clarification. Their ability to put a pattern into words will be a valuable skill in mathematics, especially in algebra.

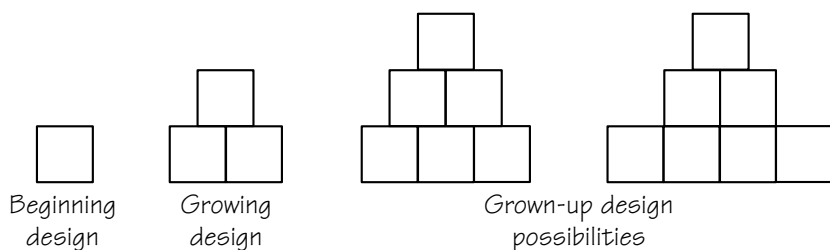
If any children are unable to see a pattern in other children's designs, the children involved might talk about the designs. In some cases, children may come up with designs that don't grow predictably, and you may have to intervene to help children to see the problem in their design and get them started on something that works.

Initially, some children may not understand that a growth pattern means that the design is getting larger. Children may predict that the third stage will be a repetition of the first stage because they confuse earlier work done with "ababab" patterns with growth patterns. It may help to ask them to build the second stage, or "Growing Design," and then add on to it.

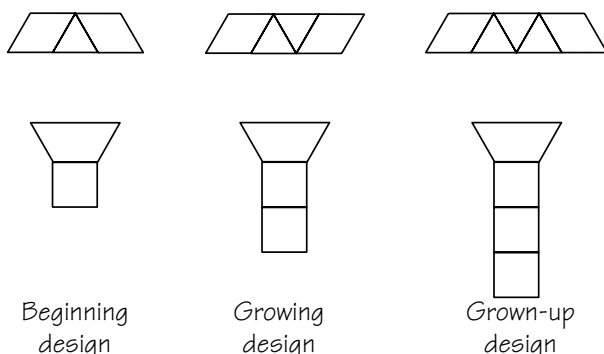


2. Show children the first two stages of a pattern that is “shrinking” because blocks are removed in a predictable way. Ask children to continue and describe the shrinking pattern.

Some children may make growth patterns that have more than one possible answer for the third stage, or “Grown-up Design.” For example, in the pattern below, the third stage could either have three squares in the bottom step and follow the pattern 1, 2, 3, 4,... or it could have 4 squares in the bottom layer and follow the pattern that each new step is a double of the last step, or 1, 2, 4, 8, ...



When asked if any of the designs have similar growth patterns, some children may be so focused on the visual patterns that they will answer “no” because none of the patterns looked identical. Other children may answer “yes” because they have looked at the underlying counting patterns that are the same. These children are demonstrating an ability to generalize when they look at these two patterns. They will say that the patterns below are similar because the first kept adding one more triangle and the second kept adding one more square; or, even though the shapes—triangles and squares—were different, the counting pattern was the same.



Encourage this recognition of the generalization of patterning because good problem solvers are those children who have learned to see what seemingly unrelated problems can have in common. Many of the growth patterns that children design will grow by using the counting numbers so there should be many examples of common growth patterns for children to recognize.