

TRAINS AND TUNNELS

Gather the group together in a circle with a supply of LinkerCubes close at hand. **Does anyone know what a pattern is?** Listen to the students' ideas about patterns.

I'll make a train out of cubes. It's going to have a special pattern. Can you figure out the pattern?

Make a LinkerCube train with an ABABAB pattern. Have the students "read" the train chorally with you, naming the color of each cube as you point to it.

Who knows what color comes next in our pattern train? Push the train around the circle, having each student add the next cube to the train. Read the train together periodically to make sure that the pattern is consistent.

When everyone has had a turn to add a cube to the train, display a cardboard "tunnel" you have made by cutting a cardboard bathroom tissue tube in half lengthwise. **Let's watch the train come through the tunnel and see if we can predict what color will come out of the tunnel next.** Push the train through the tunnel, having the students name the color of cube that comes next, just before the train appears.

Repeat the process with a few other pattern trains. ABCABC and AABBAABB are good beginning patterns. Show the students how to record one of the pattern trains on grid paper strips that are taped together end-to-end.

Read through the student instructions page A.104, with the class and have the students work in pairs to make their own pattern trains and play the trains and tunnels game.

MATERIALS

For each pair

- ◆ 75 LinkerCubes in mixed colors
- ◆ 2-cm grid paper cut into strips, inside back cover page

PREPARATION

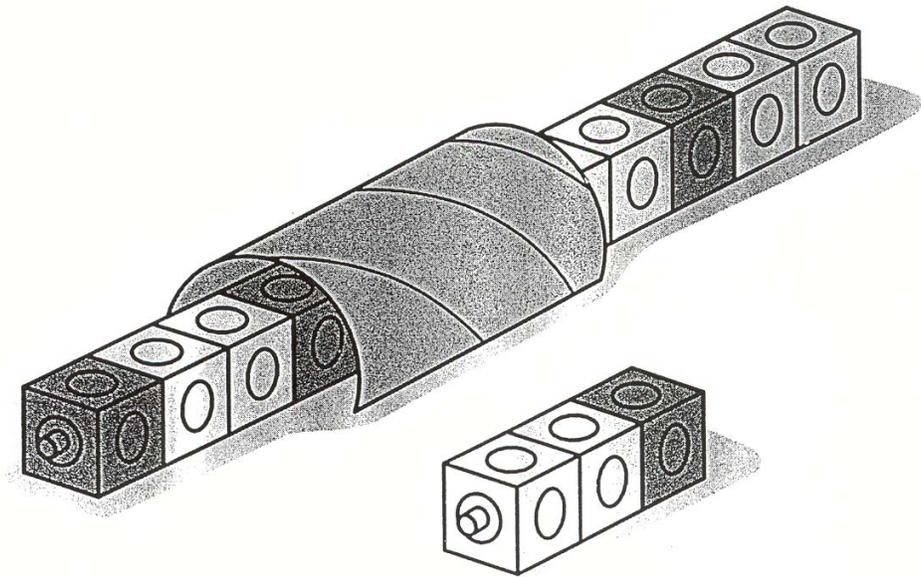
- ◇ Collect bathroom tissue tubes; cut each tube in half lengthwise (each pair will need one half).
- ◇ Set up a clothesline with clothespins. Make 20 or 30 LinkerCube pattern trains with the following pattern structures: ABAB, AABBAABB, ABCABC, AABAAB, and ABBABB.
- ◇ Copy the student instructions, page A.104, for each pair.

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The goal of this large group activity is to give students enough familiarity with the process of this exploration so that they can move to more independent exploration of pattern trains. Let your group be your guide in determining when to move on. If you feel your group is still uncertain as to what a pattern is, try this activity again with several other pattern trains before moving on to more independent work.

[Source: Constructing Ideas About Patterns Grades 1-3, Creative Publications]

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1. Build a pattern train with your partner.
2. One partner uses a cardboard tube tunnel to cover part of the train.
3. The other partner puts together cubes to match the part that is hiding under the tunnel.



[Source: Constructing Ideas About Patterns Grades 1-3, Creative Publications]

A.104

WHILE THE STUDENTS ARE WORKING

Set out the "storehouse" of 20 or 30 different pattern trains (see Preparation, page A.103) for students to begin working with. Each pair should choose from the storehouse one train at a time to work with. After discovering the train's pattern, the pair should extend it using their own supply of loose cubes. When a train reaches a satisfying length, the pair should use it to play the tunnel game. One partner uses a cardboard tube tunnel to cover up a portion of her train, and the other tries to predict what's underneath by building a cube section to match.

After playing the game, the pair should record the pattern train by coloring on grid paper strips with crayons or markers. Strips may be taped together to record especially long trains.

As the recordings are completed, hang them on the clothesline so that other students may see them.

To get a better sense of what the students are thinking, approach pairs while they are building a pattern and ask, **What color cube will you put on next? Tell me how you know.**

REFLECTING TOGETHER

Remove the students' train recordings from the clothesline. Give each student one of the recordings to use. Have a volunteer bring up his paper train and tell the class about it. Help the students "read" the train pattern chorally, then pin it on the clothesline. **Does anyone have a pattern recording that is like this one in some way?** Add to the clothesline other patterns that match, and discuss how they are alike and different.

Continue, finding several matches for the first pattern recording. Read each train and pin the matching trains near each other on the clothesline. Students who have added their recordings to the clothesline can be given other recordings from the class supply.

Now, who has a train recording that has a different kind of pattern? Read the train chorally, then pin it to the clothesline, apart from the first group of trains. **Does anyone have a train like this pattern? How are they alike?** Continue the sorting activity as long as it holds the students' interest, making groups of like patterns.

End by having students tell what they notice about the trains on the clothesline. **Which group has lots of trains? Which only a few? Which patterns are trickiest to build? Which pattern is the easiest to play tunnels with?**

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In these explorations, the teacher is a facilitator of learning. While the students are working independently, you have the opportunity to observe, listen, and make informal assessments. You can spend time with students who need a little extra help or who are ready for a new challenge. Independent work benefits students as well, giving them a sense of pride and responsibility and making them feel more grown-up and in charge.

[Source: Constructing Ideas About Patterns Grades 1-3, Creative Publications]