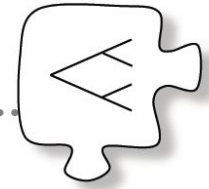# 3.1.3 What model should I use?

Probability Models

3-23 Rock, Paper, Scissors
- Player A gets a point each time all three players match.
- Player B gets a point each time two of the three players match.
- Player C gets a point each time none of the players match.

b) Who do you think will win the game? Why?

c) Now play. The recorder should record the winner of each round on scratch paper. Does this game seem fair?

d) Calculate the *theoretical* probability for each outcome. Show your work for each.
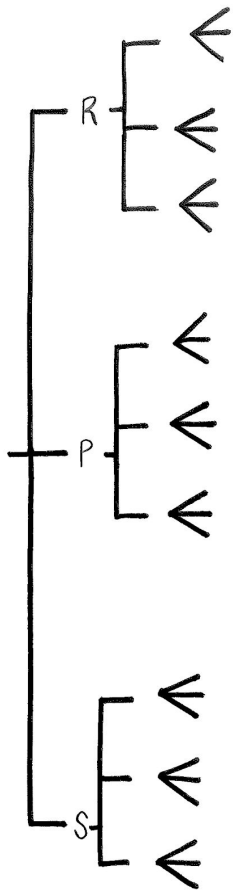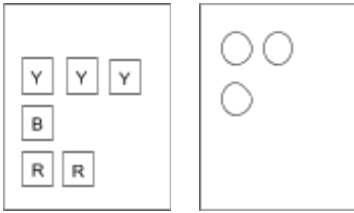

Probability Player A wins

Probability Player B wins

Probability Player C wins

e) Devise a plan that would make this game fair, and be prepared to discuss with the class.

3-24 "Pick a Tile"

a) Do you agree with Geri's answer? Why or why not?

b) Create a tree diagram for this situation in the box below. Remember to take into account duplicate tiles in the bags.

a) What is the probability of a player choosing the winning combination of one blue square and one red circle? Show your work.

b) Should Geri and Marty play this game? Why or why not? Would you play this game?

3-25

a) Create a probability area model for the "Pick a Tile" game, and calculate the probability of each possible color combination.

$$P(R) = \tfrac{2}{3} \quad P(Y) = \tfrac{1}{3}$$

$P(Y) = \tfrac{1}{2}$

$P(R) = \tfrac{1}{3}$
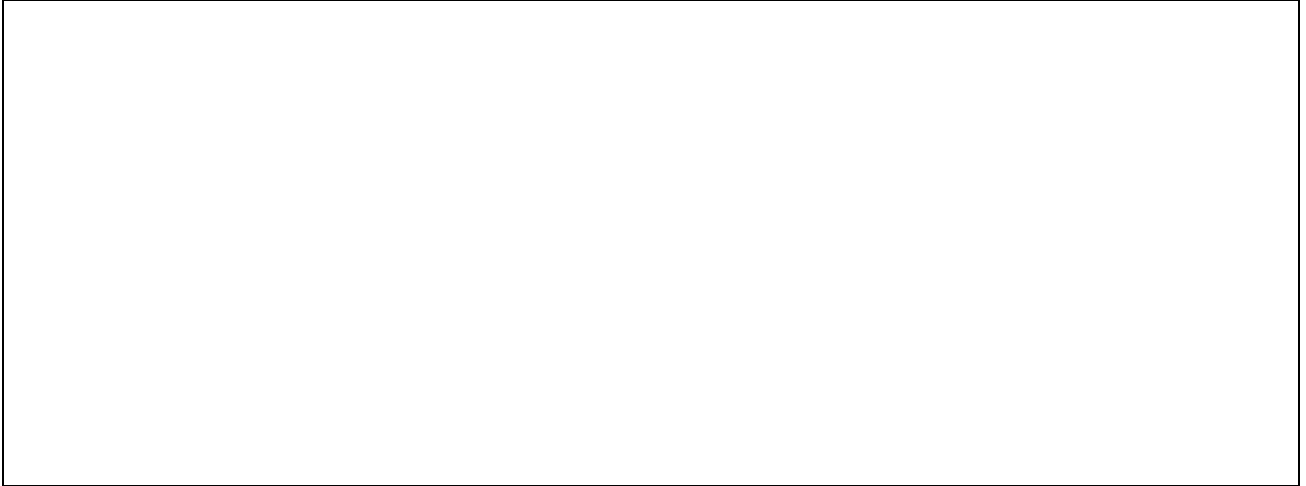
$P(B) = \tfrac{1}{6}$

b) Why is this probability model called an *area model*?

c) Which model does your team prefer? Why?

d) Could you use an area model for the Rock-Paper-Scissors problem? Why or why not?

3-26 Basketball

   a) What is the most likely outcome for Rimshot: 0 points, 1 point, or 2 points? Why?

   b) Draw a tree diagram for this situation.

   c) Which part of the model below represents Rimshot getting 1 point? Highlight it. How can you use this model to help calculate the probability that Rimshot will get exactly 1 point?

2nd Shot

makes (0.7)   misses (0.3)

1st Shot   makes (0.7)   misses (0.3)
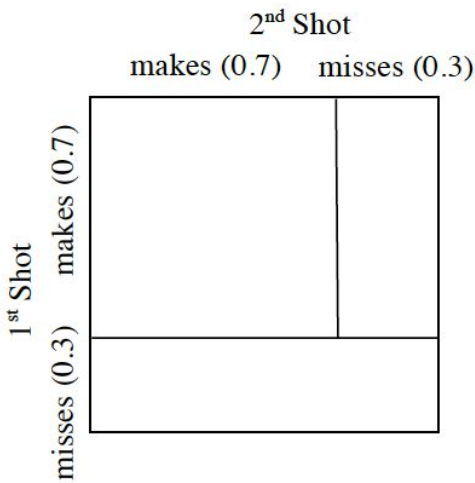
d) Use either your tree diagram or the area model to calculate the probabilities that Rimshot will get either 0 or 2 points.

P(0) = _____

P(1) = _____

P(2) = _____

3-27

   a) What are the dimensions of the large rectangle? Explain why these dimensions make sense.

   b) What is the total area of the model? Express the area as a product of the dimensions and a sum of its parts.

   c) What events and probabilities are represented by the entire area model?