## **Eating Your Own Words**

Activity sheet to support Tenderfoot Unit 5: Theoretical Computers

## Instructions for students

The diagram on the floor is what computer scientists call a finite state machine. This machine has a language of its very own. It's kind of a silly language by our standards. It doesn't



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have sentences, just words, and the only letters it uses to make it's words are a and b.

The language that we speak can't make very many words with just **a** and **b** in them, but the words in the language of this Finite State Machine are different from our **a** and **b** words. Many different combinations of **a**'s and **b**'s are words in the language of the Finite State Machine.

When you come to the machine with a word, the machine can check to see if the word is in it's language. If it's not, the machine isn't really very interested in you. But if you bring the machine a word that *is* in it's language, it accepts that word and you win a prize.

Write down a word made up of only **a**'s and **b**'s. Start with a short word.

When the teacher tells you to start, test to see if your word is in the machine's language. Go to the Start State.

Look at the first letter of your word. Put a line through it, and follow the correct line to the next state.



Note where you end up. Are you in the state where the prize bucket is? That is called the Accepting State .

If you land in the Accepting State when the word is all finished, we know this word is in the machine's language. Help yourself to a sweet.

If it isn't, you don't get a sweet but in either case, you can join the queue and write down a new word to try next time.

If you happen to pass through the Accepting State before getting to the last letter this does not count as having the word accepted. The word is accepted only when you land in the Accepting State after processing the last letter of your word. Record the word in the correct column below

Accepted	Not Accepted

Important .... Important .... Important .... Important .... Im

First, the machine *only* understands words that are made up of the letters **a** and **b**. If you use any other letters, the machine won't understand them for sure.

Secondly, the machine doesn't follow rules that we have about spelling, so a word like **babb** or **baaaabb** might work--even though these don't make much sense as English words.

