

## ABBA

There is a strange tribe that speaks the language ABBA. This tribe has a queen who likes to dance. Here is a description of their language:

**Words:** Every word is a finite sequence of As and Bs, including the empty sequence. For example, AABABAA, BABA, and BAAAA are all ABBA words.

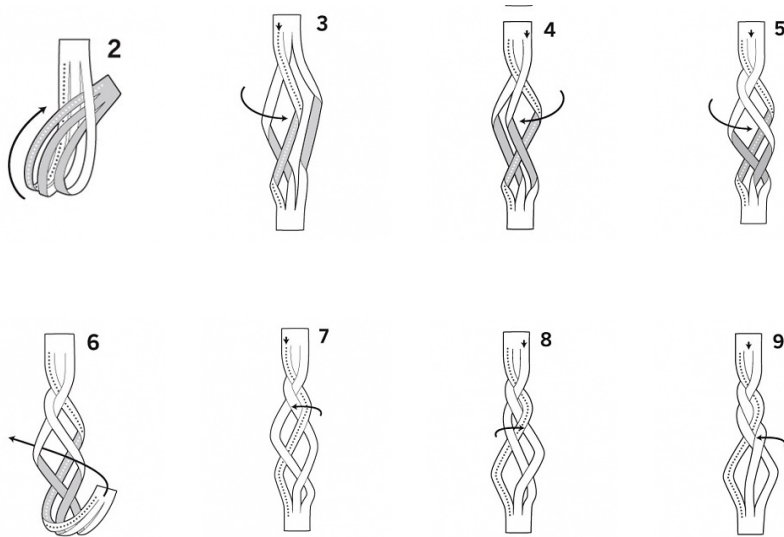
**Word endings:** The sequence AA or the sequence BB or the sequence BAB may be added or removed from **the end** of any word without changing the meaning. For example, BAABBB has the same meaning as BAAB and BAA has the same meaning as BAAAA.

**Triple flip:** The sequence ABA may be changed to BAB and vice versa **anywhere** in a word without changing the meaning. For example, BBBAB means the same thing as BBABA which means the same as BABAA.

1. Find a synonym for ABBA. Find the smallest synonym.
2. Find a couple of synonyms for AB. Find the smallest one.
3. Make a dictionary for the ABBA language, listing the shortest synonym for each word.
4. Tie three 10 ft ropes to a 2.5 ft long stick. Braid the ropes, then tie the ends to a second 2.5 ft stick. When can you unbraid the ropes without untying them?
5. What does this have to do with ABBA?

## Making a Magic Braid

Follow the figures below to make your own magic braid.



1. Explore what is possible with 4, 5, or more strands. Can you make up an associated language? (You should compare the 3-strand rope braid trick with problems 5 and 6 from the Laughter and Insight activity.)
2. Can you make up a language for flat braids?