

## Steps for Doing Phonology Problems

These are the steps you will need to follow in solving a phonology problem. I will first give you a basic list of the steps without any explanation. Then I will explain each of the steps in more detail. **For your homework #2, please disregard the wording of the questions in the book and instead perform the following series of steps for each of the problems, with the exception of questions #24 and #25, for which I have listed some extra steps:**

**#24:** After performing all of the following basic steps, answer the question, “Is the relationship among the sounds the same as in English? Why or why not?”

**#25:** Perform the series of basic steps twice: once for any minimal pairs you can find, and once for the specific sounds listed in part ii. in the book.

### Basic Steps for Solving a Phonology Problem

1. Look for and list any minimal pairs for the sounds you are being asked about.
2. Name the type of distribution those sounds are in: contrastive or complementary.
3. Write down the names of the different phonemes if and only if you have found a contrastive distribution (minimal pairs).
4. Make a chart listing where each of the sounds occurs in the data if and only if you did not find a contrastive distribution.
5. Compare the environments for each sound in your chart and describe in words the difference between the two environments using the form [sound 1] occurs only \_\_\_\_\_, [sound 2] occurs only elsewhere.
6. Decide which of these sounds is the phoneme and write this down.
7. Write a shorthand rule describing the change from the phoneme to the other sound.

### A Detailed Walk-through of the Basic Steps

1. Identify the sounds for which you are being asked to determine the distribution. Figure out whether the problem asks you to look for any minimal pairs at all, or only minimal pairs for a certain set of sounds. Then look for minimal pairs (words with different meanings that differ by only one of the sounds) and list any that you find.

For example, here are some words in German and their meanings:

[wɔlt]	“forest”	[daxshunt]	“dachshund”
[lant]	“land”	[my:də]	“tired”
[hant]	“hand”	[dumkopf]	“dummy”

If the question asked you to look for any minimal pairs, but did not list any specific sounds, you could list the words [lant] and [hant], which differ in meaning but differ only by one sound ([l] versus [h]).

If the question asked you to look specifically for minimal pairs for the sounds [t] and [d], you would not list anything. You would not write down [lant] and [hant], because they do not differ by the sounds [t] and [d], and are thus irrelevant to the question being asked.

2. Name the type of distribution you have found. If you found minimal pairs in step #1, the sounds in question are in **contrastive** distribution. If you did not, the sounds in question are in **complementary** distribution.

Thus, in German, [l] and [h] are in contrastive distribution, but [t] and [d] are in complementary distribution.

3. **If** the sounds are in contrastive distribution, they are different phonemes. Write down the name of each of the phonemes you have discovered inside / / brackets. You are now finished with this problem unless you are asked to look at more than one set of sounds, in which case you should start this process over.

So, if the question had asked you just to look for any minimal pairs, you would write down that /l/ and /h/ are different phonemes in German, and then you would be done answering the question.

4. **If** the sounds are in complementary distribution, you do not know yet which sound is the phoneme and which sound is simply an allophone (variant) of that phoneme that occurs only in a specific environment. To find this out, your next step is to make a chart listing the environments where each sound occurs in the data, for example:

[t]	[d]
l__#	#__a
n__#	y: __ə
n__#	#__u
n__#	

The way to read this chart is as follows:

- Each \_\_\_\_\_ represents the sound at the top of the column.
- A # sign before a \_\_\_\_\_ represents that the sound is at the beginning of a word.
- A # sign after a \_\_\_\_\_ represents that the sound is at the end of a word.
- All other symbols in the chart represent the phonetic symbols for sounds that occur before or after the sound at the top of the column. However, you do not have to write the [ ] brackets around these sounds inside the actual chart.

Thus, for example, in the [t] column above, the first row represents a word in which [t] comes after an [l] and before the end of a word (as in [walt]).

Make sure you look at every word in your data set for each of the sounds you are investigating. Do not stop looking at a word after you have found just one sound in it; it may have both sounds in it (as in [daxshunt]), or the same sound in more than one position.

5. When you have completed your chart, compare the sounds on the left sides of the blanks for each of the columns in the charts. (For example, in the above chart, compare [l] and [n] with # and [y:].) Look for anything in common in the position before the sounds and note what you find. Do the same for the right sides of each of the columns in the charts. Any phonetic feature (such as voicing, place of articulation, manner of articulation, vowel height, vowel frontness, vowel tension, vowel rounding, whether the sound is a consonant or a vowel, or whether the sound always comes at the beginning or end of a word) could be relevant.

Just because you have found something in common in one of the columns does not automatically mean it is the most relevant thing causing one sound to change to the other. To be sure, the feature that is common for one of the sounds **must not occur** in the same position for the other sound.

For example, in the above chart, # and [y:] do not have anything in common. [l] and [n] are both voiced. However, I can not hypothesise that [t] comes only after a voiced sound and [d] never comes after a voiced sound, because [d] comes after [y:], which is also a voiced sound. (Remember that all vowels are voiced, unless they have the voiceless diacritic underneath them). If I move on to the right sides of the blanks, however, I will find that [t] always comes at the end of the word, but [d] never comes at the end of the word.

*(You may be asking yourself right now how I know that it is the end of the word that is relevant, and not the fact that [d] always comes before vowels. This is because I have given you only a small sampling of German. [t] can actually come before vowels too, but showing you this would make it harder to explain the rules to you, and I am just trying to make this easy, so take my word for it right now and I will tell you at the end why I did this the way I did. It is important to keep in mind that even if you know the language you are asked about in a question, you are supposed to pretend that the only things you know are the words given you in the example. Some of the questions have you work out simplified rules just for the sake of learning how to figure out rules, so don't make it harder for yourself by saying things like, "but I speak Spanish and I know an example word that could disprove this rule.")*

Occasionally, one feature alone will not be enough to describe what all the sounds have in common. For example, in some other language, a [t] might come before [i] and [æ], while a [d] might come before [u]. In this case, you might be tempted to say "they both come before vowels, so that can't be relevant." However, if you are more specific, you can say accurately that [t] comes before front vowels, and [d] only comes before back vowels. If you have looked at both the left and right sides and can't come up with a single relevant feature, try looking to see if the sounds have two or more features in common.

More rarely, you might find that this still doesn't work. If so, on occasion, you have to look for what the sounds are **between** to see a pattern; for example, maybe a [t] only comes between consonants and a [d] only comes between vowels in some language.

**When you have figured out what the relevant feature or position is that causes the two sounds to be different, write out that distribution in words.**

For example, to describe the distribution in the chart in step #4, you would write:

[t] comes only at the ends of words.

[d] never comes at the ends of words **OR** [d] comes only elsewhere.

6. Based on the description you have just written down, decide which of the sounds is the phoneme. The sound that comes **elsewhere** will **always** be the phoneme, because it is easier to explain that the elsewhere case changes in just one position (for example, at the ends of words) than to explain that the more specific case changes in many positions (for example, at the beginnings of words and in the middle of words). Write down the name of the phoneme inside / / brackets.

Thus, for the German example, you would write down that /d/ is the phoneme.

7. You now need to write a rule in shorthand that describes how the phoneme changes to the other allophone in this language. The basic format for a phonological rule is:

/phoneme/ → [allophone] / environment

In other words, “the phoneme \_\_\_ changes to the allophone \_\_\_ in the environment \_\_\_.” You are basically writing out in symbols what you have stated in words in step #5. For example, the shorthand for the description in step #5 would be:

/d/ → [t] / \_\_\_\_\_#

You would read this in words as “the phoneme /d/ changes to the allophone [t] at the end of a word.”

In addition to the shorthand symbols discussed in step #4, you can also use a capital C to represent consonants and a capital V to represent vowels. You can write the names of any other relevant features in the rule as well.

For example, the above rule exists in German, but is actually a subset of a rule in which all voiced consonants become voiceless at the end of a word. So, if I wanted to describe this pattern, I could actually say:

/voiced C/ → [voiceless] / \_\_\_\_\_#

*(The truth is that in German, these consonants change at the ends of syllables, not just at the ends of words. That is how I know that [d] coming only before vowels was not relevant, because there are words such as [parti:] (meaning “party”) in which [t] also comes before vowels. I just didn’t want to confuse you because looking at syllable boundaries is slightly more complicated, so we’ll pretend we only know those six words.)*