Tutorial 6
Natural classes, phonemes, and allophones

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Learning Outcomes
By the end of this tutorial, you should be able to:

- Group sounds into natural classes
- Conduct a phonemic analysis

Natural classes

Consider the consonant inventory for Morley Stoney dialect, a Siouan language spoken by a few thousand people in Alberta, Canada. It has the following consonant inventory shown below.

p	b	t	d					k	g			
		s	z	ʃ͡ʃ	ʒ͡ʒ					ħ	ʕ	h
	m		n									
	w					j						

1. List the consonants that are part of the natural classes below. Make sure to put the consonant sounds in square brackets. An example if provided for you.

Natural class	Stoney consonants
pharyngeal sounds	{[ħ], [ʕ]}
voiced sounds	
voiceless sounds	
voiced alveolar sounds	
bilabial sounds	

2. **Challenge (on your own)**: Consider the vowel inventory of a hypothetical language called Darbi. Circle at least 5 natural classes and describe the property (or properties) that they share. An example is provided for you.

high front vowels

i	y	ɯ	u
e	ø		o
	œ	ʌ	ɔ
æ		a	

Phonemic analysis

The data below comes from Maasai (also known as Maa), an Eastern Nilotic language of the Nilo-Saharan family, used in Kenya and Tanzania (data adapted from Tucker & Mpaayei 1955).

[keβer]	'heaven'	[olpurkel]	'dry steppes'	[imbaɣiβak]	'you are restless'
[ijjoːk]	'we'	[endorop]	'bribe him'	[poɣira]	'all'
[imbok]	'you clean'	[eŋgoː]	'advise him'	[eŋoɣi]	'sin'
[olkila]	'garment'	[eŋgila]	'small garment'	[koɣoː]	'grandmother'
[ailap]	'hate'	[emburuo]	'smoke'	[kaɣe]	'but'
[olpul]	'slaughtering place'	[imbala]	'papers'	[indai]	'you (plural)'
[pus]	'light coloured'	[oltuli]	'buttock'	[endaːraða]	'fight each other'
[asip]	'speak truly'	[tasat]	'disabled'	[emaŋaða]	'warrior's village'

Consider the consonant sounds [k], [g], and [ɣ]. Guided by the phonemic analysis workflow discussed in class, determine whether the sounds are allophones of separate phonemes or allophones of the same phoneme.

3. Create an environment table for each sound. An example is provided for you. Then, if possible, simplify the environments using natural classes.

[k]	[g]	[ɣ]
#_e		

4. Based on your work above, determine whether there is contrastive or complementary distribution. If contrastive, explain how you know. If complementary, state generalizations about the environments in which the sounds can occur.

5. As a conclusion, state whether the sounds are allophones of different phonemes or allophones of the same phoneme, and describe the relevant pieces of evidence to support this claim (hint: natural classes). Then organize the sounds into phonemes and allophones, using the diagram we saw in class (remember to use the correct brackets).