A. Phrase Structure Rules as Mini-Trees

It may help to think of phrase structure rules as pieces of trees. For example, the rule

\[ VP \rightarrow V \ (NP) \ (PP) \]

would look like this:

```
  VP
 / \  \
 V   (NP) (PP)
```

This rule says if you see a VP anywhere in your tree it had better look like one of these four:

```
  VP
 / \  \
 V   NP  PP
```
```
  VP
 /  \\
 V   NP
```
```
  VP
 / \  \
 V   PP
```
```
  VP
 /  \\
 V
```

B. An Example Tree

Here is a tree showing how the sentence “They put the spicy mustard in the fridge” is generated by the following phrase structure rules:

\[
\begin{align*}
S & \rightarrow \ NP \ VP \\
VP & \rightarrow V \ (NP) \ (PP) \\
NP & \rightarrow (\text{Det}) \ (A^*) \ N \\
NP & \rightarrow \{ \text{Name} \mid \text{Pro} \} \\
PP & \rightarrow P \ NP
\end{align*}
\]

```
S   VP
 /   /  \
NP  NP  PP
 /  \\
Pro V
 /  \\
they put
```
```
NP
 /  \\
NP
```
```
  VP
 /  \\
 V
```
```
NP
 /  \\
NP
```
```
  PP
 /  \\
P
```
```
NP
 /  \\
Det
```
```
  NP
 /  \\
P
```
```
  NP
 /  \\
Det
```
```
  N
 /  \\
fridge
```

C. Building from the Bottom Up

If you’re trying to tell whether a particular sentence is or isn’t generated by the phrase structure rules, it may be useful to build the tree from the bottom up.

1. First, establish what word class each word belongs to.
2. Next, see what phrases can be built from those pieces, following the phrase structure rules.
3. Keep going up until you reach S, or if that’s impossible, then the sentence isn’t generated.