A manual was prepared for expansion of phrase structure rules and single-base transformations in eighth-grade language curriculum. The manual increased the 28 phrase structure rules previously reported (ED 010 148, ED 010 149, and ED 010 152). Background information and guides for the teacher were presented for units of study on phrase structure rules, double-base transformations, and single-base transformations. Accompanying student exercises were explained with diagrammed solutions. The manual for teachers was keyed to a manual for students (ED 010 153).
OREGON CURRICULUM STUDY CENTER

TEACHER'S MANUAL

for

EXPANSION OF THE

PHRASE STRUCTURE RULES

and

SINGLE BASE

TRANSFORMATIONS

Language Curriculum II

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EXPANSION OF THE PHRASE STRUCTURE RULES

The purpose in the first section of this unit is to add to the Phrase Structure rules in order to account for some of the basic constituents of the English sentence which were not handled in the first 18 rules. The unit contains two different kinds of expansions. The first two sections (those dealing with the place and time adverbials) present new versions of Rule 2, whereas the other two sections deal with new phrase structure rules entirely which, in effect, subdivide two of the five main verb classes.

At this point in the instruction, pupils should review two important facts about phrase structure rules and kernel sentences: 1) Kernel sentences, as we now know them, are produced by applying the eighteen phrase structure rules. 2) Since the original phrase structure rules are not complete (that is, they produce some ungrammatical sentences and they cannot produce some sentences which are truly kernel sentences), we must expand the rules. A complete grammar would produce all the grammatical sentences of English and only grammatical ones. Of course, the complete grammar may never be written, but each year we hope to add rules to account for more and more of the complexities of our language. Without expanding the phrase structure rules, we could not account for such things as time and place adverbials, or the fact that some transitive verbs are followed by more than one NP.

As a teacher you are, of course, very much aware of the differences between phrase structure rules and transformation rules, and the reason for each. All elements which can be most economically accounted for in the phrase structure rules are put there and the result is what we term the kernel sentence. These sentences seem to correspond to what we intuitively feel to be the basic sentences of our language—those which enter into various transformations as units. A phrase structure rule expands a single item at a time. Transformations, on the other hand, operate on a string of elements which have been generated by the phrase structure.

The expansion which we will be writing will be numbered in this way: new versions of old rules will retain the number of the old rule, but they will simply rewrite them in a fuller form. Additional rules which expand a part of a previous rule will be labeled with the number of the previous rule followed by a decimal point and another number (Rules 8.1, or 10.1, for example).

Adverb of Place
The first expansion will deal with the adverb of Place, which is an optional element in kernel sentences. Sentences may have it, but need not. Rule 2 is thus recast as VP —> Aux + Verb (Loc). Since Verb is a symbol which stands for the entire set of English verbs, the new rule states that all English verbs may be followed by a place adverbial. Perhaps you should point out that the place adverbial can be a single word or a phrase. Later we will find that it may also be another embedded kernel.
Adverb of Time
A second expansion will deal with the Time adverbial, which will be added to the phrase structure rules in the same way the Place adverbial was added. Since it can also occur with any English verb, the new element (Tm) is added to Rule 2 after the other optional element (Loc). The newly formed rule is cast as follows: VP $\rightarrow$ Aux + Verb (Loc) (Tm). Thus we see that an adverbial of time can occur in kernel sentences after any English verb and, if a place adverbial is also present in that kernel sentence, the time adverbial will follow it. Like the place adverbial, the time adverbial can be a single word or a phrase.

Active and Static Linking Verbs
An additional rule, not a re-formed rule, is needed for subdividing the class of verbs labeled Vlnk. Within this class of verbs are subclasses which behave quite differently from one another. The addition of a manner adverbial following the Pr serves as a test to differentiate two classes of linking verbs. Those linking verbs which permit the addition of such an adverbial are classified as Vlac. The letters ac in the symbol are a mnemonic device to remind the pupil that it is an active linking verb (e.g., become) that takes the manner adverbial. Those linking verbs which do not take the manner adverbial are labeled Vlst. The letters st indicate that it is a static linking verb (e.g., remain) that does not take the manner adverbial. Pupils may disagree about a few of the static linking verbs, especially verbs of sensation, such as taste, feel, sound, and smell. Some may feel that these verbs can take manner adverbials (e.g., "This pop tastes flat quickly"). The additional rule thus divides linking verbs into two classes:

\[
\text{Rule (8.1)} \quad \text{Vlnk} \rightarrow \begin{cases} 
\text{Vlac (Man)} \\
\text{Vlst}
\end{cases}
\]

Adverb of Direction
Another verb class which can be divided into several subclasses is the one which has been labeled Vlnk. Within this class are verbs which can be followed by adverbials of direction. These adverbials, which have been labeled Dir, follow verbs of movement and answer the question to or toward what location. The directional adverbial, like adverbials of time and place, can be a single word or a phrase. The rule which separates intransitive verbs taking directional adverbials from all other intransitive verbs is written as follows:

\[
\text{#Rule (10.1)} \quad \text{Vlnk} \rightarrow \begin{cases} 
\text{Vi} \\
\text{Vid (Dir)}
\end{cases}
\]

The directional adverb immediately follows the verb. Thus, when the kernel sentence is generated by the new phrase structure rules, it will have a position preceding that of time and manner adverbials if they are also present in the string. For example,

- "He went into the room quickly then." and "They drove to New York slowly in the evening."
**ADVERB OF PLACE**

**Rule (2) VP → Aux + Verb (Loc)**

**Exercise 1: Page 1**

Since these twenty sentences simply offer a comprehensive review of the original Phrase Structure Rules, adept students may not need to do both A and B. Four sentences in A (3, 5, 8, and 9) contain subject NPs, however, which should provoke interesting discussions.

**A, 1.** The train + sing + pres + be + ing + come

\[ \text{The train is coming.} \]

# 2. Ø + Junior + sing + pres + have + en + lose + the + key + sing

\[ \text{Junior has lost the key.} \]

(Students should write the symbol to indicate a missing determiner.)

# 3. Ø + Mr. Jimson + sing + pres + understand + slow + ly

\[ \text{Mr. Jimson understands slowly.} \]

(Titles, such as Mr. in this sentence and Ensign in Sentence 9 may be considered part of the noun.)

4. The wind + sing + pres + be + quiet

\[ \text{The wind is quiet.} \]

# 5. Ø + I + plur + pres + will + be + late.

\[ \text{We will be late.} \]

At this point we derive the plural form of the first person pronoun according to the pattern established in Phrase Structure Rules but actually we is not the plural of I: We doesn't mean "many I's."

6. The movie + sing + pres + cost + a + dollar + sing

\[ \text{The movie costs a dollar.} \]

7. The + catcher + sing + pres + must + have + en + drop +

\[ \text{The catcher must have dropped the ball.} \]
8. The + townspeople + plur + past + have + en + hang + the + rustler + sing

   The townspeople had hanged the rustler.

9. Ø + Ensign Duffle + sing + past + be + ing + plan + the + mutiny + sing

    Ensign Duffle was planning the mutiny.

10. The + butler + sing + past + can + have + en + be + here

    The butler could have been here.

Æ. 1. The + air + sing + past + have + en + become + smoky.

    The air had become smoky.

2. The + Hayworth + plur + pres + be + ing + plan + a + party + sing

    The Hayworths are planning a party.

3. Ø + Leprechaun + plur + pres + must + have + en + be + here

    Leprechauns must have been here.

4. Ø + Everyone + sing + past + shall + have + en + bring + boot + plur

    Everyone should have brought boots.

5. The + dough + sing + pres + will + rise + quick + ly

    The dough will rise quickly.

6. This + drum + sing + pres + can + hold + the + chemical + plur

    This drum can hold the chemicals.

7. Ø + Willie + sing + past + be + angry

    Willie was angry.

8. The + album + sing + past + shall + have + en + have + a + title + sing

    The album should have had a title.

9. 9. The + marshmallow + sing + past + have + en + stay + soft

    The marshmallow had stayed soft.

# 10. Ø + People + plur + past + may + be + ing + grow + impatient

    People might be growing impatient.

(People is an example of a noun which appears only in the plural.)
Exercise 2: Page 2

You will notice the telescoping and the omission of rule numbers in the following diagrams. However, any student who seems confused should be encouraged to include each step of a complete diagram with close attention to an orderly application of each rule.

1. The design was ornate.
#2. Ice melted around the edges.


(Around the edges is a Loc, not yet accounted for by our original Phrase Structure Rules. Sentences 3, 6, and 8 contain similar elements.)
4. The newspaper is upstairs.

5. The story ended abruptly.
#6. You may putter in the basement. (You may be sing or plur.)

7. The fighter weighs 198 pounds.
#8. Mother will make the salad in the kitchen.

#9. Green must be your color. (Your may be regarded as a determiner at this point.)
Exercise 2: Page 2

<table>
<thead>
<tr>
<th>Verb</th>
<th>Kind</th>
<th>Loc</th>
</tr>
</thead>
<tbody>
<tr>
<td>is</td>
<td>Be</td>
<td>at home</td>
</tr>
<tr>
<td>sounds</td>
<td>VLink</td>
<td>here</td>
</tr>
<tr>
<td>have</td>
<td>Vmid</td>
<td>in Kansas</td>
</tr>
<tr>
<td>found</td>
<td>Vtr</td>
<td>at the pool</td>
</tr>
<tr>
<td>exploded</td>
<td>Vin</td>
<td>in the closet</td>
</tr>
<tr>
<td>was sleeping</td>
<td>Vin</td>
<td>on the floor</td>
</tr>
<tr>
<td>gnawed</td>
<td>Vtr</td>
<td>outside</td>
</tr>
<tr>
<td>costs</td>
<td>Vmid</td>
<td>at Sears</td>
</tr>
<tr>
<td>seemed</td>
<td>Vlnk</td>
<td>at school</td>
</tr>
<tr>
<td>is</td>
<td>Be</td>
<td>in his building</td>
</tr>
</tbody>
</table>

Exercise 3: Page 3

You will want to remind your students that besides Log there are other kinds of adverbs.

1. Joan played ball **happily** in the yard.
2. She will live **in the apartment**.
3. The moon is rising **there**.
4. The packages arrived **here**.
5. The poodle sat **perkily outside**.
6. The fog settled **ominously in the harbor**.
7. Harriet will shop **downtown**.
8. The salmon slithered **upstream**.
9. The children ran races **in the meadow**.
10. Roosevelt became ill **in Florida**.

Exercise 4: Page 4

Answers will vary. The following sentences are possible answers. (You may wish to have your students check their sentences by writing the symbol string above each sentence.)

1. I had hit him softly.
2. The ice appeared dangerous in the middle.
3. She had been asleep in class.
4. The faucet is dripping in the bathtub.
5. You had a cold in Chicago.
6. The boys had been playing hard in the gym.
7. A policeman stopped him on the corner.
#8. He was at the movie.
9. It grew dark in the study.
10. He had stopped the travelers quickly on the road.

ADVERB OF TIME

Page 5
By answering the questions here and doing Exercise 2, students should see that because the time adverbial may be an optional element in any kernel sentence we need to rewrite our rules to allow for this. We add _Tm_ to Rule 2 because _Verb_ includes all verbs, thus eliminating the necessity of placing _Tm_ in any subsequent rules.

Exercise 2: Page 5

1. The fish were biting yesterday.
   Be _Tm_

2. Fred has been grumpy this morning.
   Vtr _Tm_

3. Montmorency must have skipped school last week.
   Vtr _Tm_

4. You should check the battery daily.
   Vin _Tm_

5. Mantle will be batting next.
   Vmid _Tm_

6. Miss Forbush has a headache tonight.
   Be _Tm_

7. The cornflakes have been soggy this winter.
   Vlnk _Tm_

8. The Pacific Ocean might have looked rough a week ago.
   Vtr _Tm_

9. Some girls are washing cars before breakfast.
   Vin _Tm_

10. The group will meet tomorrow.

#This is an example of _Loc_ which is a _Pr_. It should provoke some discussion about the optional nature of most Adverbs of location, but the necessity of this one.
Exercise 3: Page 6
A. 1. $\phi + N_{hum} + \text{sing} + \text{past} + V_{tr} + T + N_{in} + \text{sing} + \text{Man} + \text{Tm}$
   He passed the course easily last year.

2. $\phi + N_{hum} + \text{sing} + \text{past} + V_{tr} + T + N_{in} + \text{sing} + \text{Man} + \text{Tm}$
   Joseph did his work carefully last year.

3. $\phi + N_{hum} + \text{sing} + \text{past} + M + \text{have} + \text{en} + V_{in} + \text{Man} + \text{Tm}$
   Mother would have called frantically by then.

4. $\phi + N_{hum} + \text{sing} + \text{past} + V_{in} + \text{Man} + \text{Loc}$
   Huck floated cheerfully down the river.

5. $T + N_{in} + \text{plur} + \text{pres} + \text{be} + \text{ing} + V_{in} + \text{Man} + \text{Tm}$
   The flowers are growing rapidly this spring.

6. $T + N_{in} + \text{sing} + \text{past} + V_{in} + \text{Loc} + \text{Tm}$
   The boat floated down the river last night.

7. $\phi + N_{hum} + \text{sing} + \text{past} + V_{tr} + T + N_{in} + \text{sing} + \text{Loc} + \text{Tm}$
   Ann found the ring in the drain this morning.

8. $\phi + N_{non} + \text{plur} + \text{pres} + V_{in} + \text{Loc} + \text{Tm}$
   Bears sleep in caves in the winter.

B. 1. $T + N_{hum} + \text{sing} + \text{pres} + \text{will} + \text{go} + \text{Loc}$
   The astronaut will go to the moon.

2. $\phi + N_{hum} + \text{sing} + \text{past} + \text{find} + T + N_{in} + \text{sing} + \text{Loc}$
   He found the ball under the fence.

3. $T + N_{hum} + \text{plur} + \text{pres} + \text{have} + \text{en} + \text{be} + \text{ing} + \text{work} + \text{man} + \text{Loc}$
   The men have been working industriously in the field.

4. $\phi + N_{hum} + \text{sing} + \text{pres} + \text{have} + \text{en} + \text{be} + \text{ing} + \text{sit} + \text{Loc} + \text{Tm}$
   Ned has been sitting at the typewriter all night.

5. $T + N_{hum} + \text{sing} + \text{pres} + \text{will} + \text{be} + \text{ing} + \text{speak} + \text{Loc} + \text{Tm}$
   The superintendent will be speaking at our school soon.
6. \( T + \text{Nnon} + \text{sing} + \text{past} + \text{trash} + T + \text{Nm} + \text{sing} + \text{Man} + \text{Loc} \)
   An alligator thrashed the water noisily in the bathtub.

7. \( T + \text{Nin} + \text{sing} + \text{past} + \text{float} + \text{Loc} \)
   The surfboard floated in the trough.

8. \( T + \text{Nin} + \text{sing} + \text{past} + \text{rage} + \text{Loc} + \text{Tm} \)
   The battle raged on the hill all day.

With Rule 2 now recast as \( \text{VP} \rightarrow \text{Aux} + \text{Verb (Loc) (Tm)} \) students should understand why they are permitted to include the optional elements of \( \text{Loc} \) and \( \text{Tm} \) in kernel sentences. The new Rule (2) allows either \( \text{Loc} \) or \( \text{Tm} \), but asserts that when both \( \text{Tm} \) and \( \text{Loc} \) adverbials are present \( \text{Tm} \) usually comes last.

ACTIVE AND STATIC LINKING VERBS

(a.1) \( \text{Vlink} \rightarrow \{ \text{Vlac (Man)} \} \)

This is an optional unit. You should decide whether to use it or not on the bases of your class and its inherent interest in and ability to cope with very fine distinctions. For a class of very bright students it offers many opportunities to discuss the complexities of our language.

Exercise 1: Page 7

A. Vlink  Pr  Kind of Pr

1. seems  happy  adj
2. smell  good  adj
3. appeared  uninterested  adj
4. will remain  the secretary  NP
5. must have gone  mad  adj
6. looked  unclimbable  adj
7. should remain  behind  Loc
8. have been getting  dry  adj
9. tastes  flat  adj
10. has become  his vocation  NP
Vlink which will take the manner adverb are:

- #4. remain (Most people would accept manner adverbs in this sentence—for example, "Miss Fitts remained secretary cheerfully," but not in sentence #7. This should produce some interesting discussion about other restrictions on the Manner adverb.)
- #5. gone (While go is not usually Vlink it qualifies in this sentence because it replaces a verb such as become.)
- 8. get
- 10. become

Vlink which do not take the manner adverb quickly are

1. seems
2. smell
3. remained
4. get
5. grew
6. sounds
7. has appeared
8. felt
9. seemed
10. is going

Be sure that your students do understand the difference between a rule like this (8, 1) and the ones that replaced Rule 2. Perhaps if you remind them that our original rules permitted Man only with transitive and intransitive verbs, they will see the necessity for this sub rule which accounts for the small group of linking verbs that do accept a manner adverb.

Exercise 2: Page 8

A. 1. became - Vlac
2. remained - Vlist
5. taste - Vlist
4. get - Vlac
5. grows - Vlac
6. sounds - Vlist
7. has appeared - Vlist
8. felt - Vlist
9. seemed - Vlist
10. is going - Vlac

B. Because students will find Sentences 7 and 10 very difficult to do you will probably wish to omit them. Answers will vary, but the following are possible answers:

Vlac
1. Roger became happy.
Vlac
2. These pancakes became good.
Vlac
3. Horatio grew unconcerned.
Vlac
4. Miss Fitts will become the secretary.
Vlist
5. The dog must have looked mad.
Vlac
6. The slope grew unclimbable.
The forests have been looking dry.

This cola becomes flat.

C. 1. \( V_{\text{Lac}} \) \{ get, grow, turn, go, become, ... \}
2. \( V_{\text{Lst}} \) \{ appear, look, seem, remain, stay, sound, taste, feel, look, smell, ... \}

THE ADVERB OF DIRECTION

(10.1) \( V_{\text{in}} \) \{ \( V_{\text{id}} \) (Dir) \}

Exercise 1: Page 9.

This is a simple review in identifying adverbs of location.

1. on the coast
2. at home
3. under the eaves
4. in the pool
5. in this cafeteria
6. on the island
7. there
8. here
9. in the plum tree
10. in the broom closet

Exercise 1a: Page 9

A. 1. under the bed
2. on the table
3. around the flowers
4. by
5. in the yard
6. in Rome
7. on the freeway
8. in the ballroom
9. on the back porch
10. in the tropics

B. 1. to St. Ives
2. to New York
3. away
4. to the goal post
5. to the next town
6. into bed
7. onto the floor
8. toward the depot
9. to the top
10. at the bear

The Loc elements in A answer "at what location," those in B answer "to or what location."

Page 10

In helping students understand this distinction, you may need to emphasize that while all verbs may take a Loc adverbial only a special class of intransitive verbs takes the adverb of direction. (Dir). The adverb of direction indicates a change of direction or position and attaches to verbs of movement.

Exercise 2: Page 10

Because answers will vary, students would probably be interested in seeing sentences written by others in the class.

Review Exercise: Pages 10-11

A. 1. The bandits were waiting in the gulch.
2. The delegates will be going to the auditorium.

The delegates will be going to the auditorium.

3. Charles had the measles last week.

Charles had the measles last week.
4. The verdict must have been acceptable.

5. The room has remained empty.
3. Trilby had been singing beautifully.

7. Farmers will be threshing grain tomorrow.
3. The boys are hiking toward Death Valley.

#9. Her coat should be hanging on the clothes line. *(Students may treat her as a determiner at this level.)*
10. Shirley might have glanced through the window.

Students will find challenges in Sentences 1 and 6, which are actually transformations because elements are not in normal word order. You might ask your students to reorder the sentences, according to the normal order set forth in their rules, before diagramming them. Or you may prefer to give your class the reordered sentences if you include them in the assignment.

Because Dir is generated with the verb as part of the subclass of transitive verbs it appears in the kernel immediately following the verb. But normally we move it out beyond the manner adverb.

See following page.
1. The sun was sinking slowly into the river. (Transform)
   The sun was sinking into the river slowly. (Kernel)

2. George has been biting his nails lately.

(This is a transformed sentence since Man has to be moved inside Dir.
The problem would be solved if "into the river" were a Loc.)
3. The lady must have had a headache.

4. Storms could be causing the interference.
5. Water had been trickling into the basement.

3. The airplane bounced on the runway.
7. Her smile will brighten the scene.

The kitchen has become warm gradually. (Transform)

The kitchen has become gradually warm. (Kernel)

#3. Many students will probably find this sentence difficult. It is a transformation, since Man is generated before Pr.}
9. The lecture must have seemed long.

10. Bob tore his shirt at camp yesterday.
FROM PHRASE STRUCTURE TO TRANSFORMATION

This material eases students into the study of transformations by having them reject as kernels all sentences which contain elements not explained by phrase structure rules which we have developed so far. Of course, this should not imply that nothing more can be added to the rules. They will be expanded greatly in later years as more basic elements of the kernel are identified. However, based on the elements the students now recognize they are asked to decide what can not be called a kernel. This in turn leads them to look at a double-base transformation, the result of combining two or more kernel sentences. Then a simple review of two reordering processes used earlier in developing the phrase structure rules introduces the single-base transformation.

Exercise 1: Page 14

A. Students should omit Sentence 3 in this assignment. (It contains an element which will come in later through (10.2), but it is still a kernel sentence.) In order to write the terminal strings it might be a good idea to have your students diagram as many sentences as they are able to. Sentences 1 and 10 are not kernels. Attempts to diagram them should prove this to students.

1. Question transformation.
3. Omit kernel from consideration.

2. The potatoes were becoming mushy.

#3. Although students cannot diagram this, it is not a transformation. Rather it contains an element, the indirect object, which comes in through (10.2) (to be introduced later.)
4. The boys were sitting on the floor.

Sentence

NP

Aux

Aux1

Aux2

Verb + Loc (2)

Sentence

NP

Aux

Aux1

Aux2

Verb + Tm (2)

Sentence

NP

Aux

Aux1

Verb + Tm (2)

Note: The exercise calls for reducing to the terminal symbols. However, we have diagrammed the sentence completely for you here.
A glass fell to the floor noisily.

Diane has been upstairs all morning.
6. The people should have moved to the mountains.

b. Sentences 4, 6, 7, 9, and 10 are transformations. As you will notice, several of the transformations are derived from kernel sentences in the exercises.

4. Passive
6. Question
7. Double base transformation which includes the embedded appositive
   *Kidnapped.*
9. Question
10. Question

1. Snow has been falling.

2. *We* have been having an argument.
3. The salmon swallowed the minnow.

5. Mary opened the envelope excitedly.
8. The captain will give the command.

SINGLE-BASE TRANSFORMATIONS

THE PASSIVE TRANSFORMATION

In the passive transformation, as it is framed in the student version, there is a change in the order of the items and the addition of new items. These new items have their origin in the transformation itself.

The passive transformation can be described by the following rule:

\[ \text{Tpass} : \quad \text{NP}^1 + \text{Aux} + \text{Vtr} + \text{NP}^2 \iff \text{NP}^2 + \text{Aux} + \text{be} + \text{en} + \text{Vtr} + \text{by} + \text{NP}^1 \]

The \text{be} + \text{en} after the \text{Aux} and the \text{by} before \text{NP}^1 are added by the transformation. e.g.

(1) The dog bit the boy
(2) The boy was bitten by the dog.

The \text{be} which combines with the past tense to produce \text{was} in (2) is added by the transformation. So also are the \text{en} of \text{bitten}, and \text{by}.

Note that the \text{Aux} of both (1) and (2) is the past tense. (1) could be represented as

The dog + past + bite + the boy

while (2) could be represented as

The boy + past + be + en + bite + by the dog
This is another instance of the generalization that tense always attaches to the first element of the VP.

Notice that the transformational arrow (→) is different from the phrase structure arrow (→); they are different because they imply different processes of change. The latter is understood to mean 'is rewritten as' and operates on only one term of a string at a time. The transformational arrow means 'becomes through structural change'; it does not operate on individual terms of the string but on the whole string and its associated tree graph or branching diagram, turning it into a new (transformed) string and branching diagram.

If a student should inquire about such structures as (3) The boy was bitten, it should be explained that a transformation can be applied optionally to delete the by + NP phrase from passive transforms. (3) could thus be derived from (2).

Page 16

Only (d) can be made passive. Students should see that three changes occur in the passive: NP1 and NP2 are reversed in position; be + en is inserted between Aux and Vtr; and by is inserted before NP1. Sentence 4 cannot be made passive because the verb is Vink; Sentence 6 has a Be verb, and #9 contains a Vmid.

Exercise 1: Page 17-18

A. This exercise provides an opportunity for students to transform NP1 + Vtr + NP2 to the passive. The emphasis here is on the shift in word order and the insertion of elements rather than on a complete analysis of a kernel.
NP + past + limit + NP^2
1. Fog limited the visibility \(\rightarrow\) The visibility was limited
+ by + NP^1

by fog.

NP^1 + past + have + en + clear + NP^2
NP^2 + past + have

2. Loggers had cleared the land \(\rightarrow\) The land had
+ en + be + en + clear + by + NP^1

been cleared by loggers.

NP^1 + pres + M + accept + NP^2

3. The students must accept the responsibility \(\rightarrow\)

The responsibility must be accepted by the students.

NP^1 + past + spray + NP^2
NP^2 +
4. The waves sprayed the highway \(\rightarrow\) The highway
past + be + en + spray + by + NP^2

was sprayed by the waves.

NP^1 + past + M + refund + NP^2

5. The theatre might refund the money \(\rightarrow\)

The money might be refunded by the theatre.

NP^1 + pres + M + have + en + eat + NP^2

6. Adam must have eaten an apple \(\rightarrow\)
B. Several sentences in this part of the exercise will be too difficult for any but the most perceptive student. A more complete statement of the passive rule would need to allow for the optional elements of Man 1.412 and Tn 1.400. Several elements that are allowed in phrase structure rules to be placed between the subject and lexical verb,
and \( y \) equal the adverbials permitted in post object position (Man, Loc, Tm), a more adequate rule would show

\[
NP^1 + X + V_{tr} + NP^2 + Y \rightarrow NP^2 + X + \text{be} + \text{en} + V_{tr} + \text{by} + NP^1 + Y
\]

This rule then describes what happens to the following string and all strings of the same general nature:

The + man + sing + past + have + en + complete + the + task + sing

\[\text{The man} \quad \text{had} \quad \text{completed the task}\]

\[\text{at home} \quad \rightarrow \quad \text{The task} \quad \text{had} \quad \text{been completed by the man at home}\]

If you do assign the sentences with optional elements get students to see that any change in the passive transformation of the order of Man, Loc, Tm as set up in the phrase structure rules would actually require a second transformation, which is not asked for at this time.

1. \( NP^1 + \text{pres} + M + \text{drink} + NP^2 \rightarrow NP^2 \)

\[
\text{The winners will drink the lemonade} \rightarrow \text{The lemonade will be drunk by the winners}\]

\[NP^1 + \text{past} + \text{drive} + NP^2 + \text{Loc}\]

2. Mother drove the car through the garage \( \rightarrow \)

\[NP^2 + \text{past} + \text{be} + \text{en} + \text{drive} + \text{by} + NP^1 + \text{Loc} \]

\[
\text{The car was driven by mother through the garage.}\]

3. Gregory Peck was telling the story \( \rightarrow \)

\[NP^1 + \text{past} + \text{be} + \text{ing} + \text{tell} + NP^2 \]

\[
\text{The story was being told by Gregory Peck.}\]
4. \[ NP^1 + \text{pres} + \text{do} + \text{NP}^2 + \text{adj} + \text{ly} \]
   \[ \text{He can do the job quietly} \]
   \[ \Rightarrow \text{The job can be done by him quietly} \]

5. \[ NP^1 + \text{past} + \text{ride} + \text{NP}^2 + \text{Loc} + \text{Tm} \]
   \[ \text{The girl rode a stallion in the race yesterday} \]
   \[ \Rightarrow \text{A stallion was ridden by the girl in the race yesterday.} \]

3. \[ NP^1 + \text{pres} + \text{know} + \text{NP}^2 + \text{Man} \]
   \[ \text{An astronomer knows stars well} \]
   \[ \Rightarrow \text{Stars are known by an astronomer well.} \]

(Students will note that an additional transformation is needed here to place \text{Man (well)} before \text{by}.)

7. \[ NP^1 + \text{past} + \text{spill} + \text{NP}^2 + \text{Loc} \]
   \[ \text{Cassie spilled the syrup on the floor} \]
   \[ \Rightarrow \text{The syrup was spilled by Cassie on the floor.} \]

8. Students should omit this sentence because it contains two \text{NP}^2's which will be accounted for later in (10.2).

9. \[ NP^1 + \text{pres} + \text{M} + \text{have} + \text{en} + \text{call} + \text{NP}^2 \]
   \[ \text{The operator must have called the police} \]
   \[ \Rightarrow \text{The police must have been called by the operator} \]
10. Millions will see the fair this year ➞

the fair will be seen by millions this year.
QUESTION TRANSFORMATIONS

The next single-base transformation which is taken up this year is the question transformation. It is at once more complicated than the passive transformation, but also more interesting. At the outset there appear to be many kinds of questions, but examination shows that they are all basically related, and after you have led your students to see the basic process, it should be this relatedness that you emphasize. Question transformations present a beautiful example of how economy and simplicity can reveal some general truths about the seeming complexities of our language--about the order that exists in it.

The first kind of question studied is the yes-or-no question which is the underlying question for all the others. To begin with you can see that kernels with Be as their main verb and with no auxiliary other than tense are converted to yes-or-no questions by a process which can be symbolized as follows:

\[ \text{NP + tns + Be} \rightarrow \text{tns + Be} + \text{NP} \]

where \ldots indicates an irrelevant context. (Only the part symbolized is important to this transformation, in other words.) Thus,

He was here. \rightarrow Was he here?

But, as you can see, the rule can also apply without revision to kernels with be as an auxiliary; (Mother was serving waffles. \rightarrow Was Mother serving waffles?) because what comes after be is not involved in the transformation. Notice here that not all of the be + ing auxiliary is shifted to the initial position in the sentence. The ing stays put.

The rule does not account for such pairs of related sentences as these:

He has gone : Has he gone?
He can go : Can he go?

where Aux₂ consists of have + en on the one hand and M on the other. The rule will have to be changed to:

\[ \text{NP + tns + } \begin{cases} M \\ \text{be} \end{cases} \rightarrow \text{tns + } \begin{cases} M \\ \text{have} \end{cases} + \text{NP} \]

This very general rule (known as 'VQ') does not account for one of the most common pairs of related sentences:

The cat drinks milk : Does the cat drink milk?

If we apply the above rule to sentences like "The cat drinks milk" where the VP consists of tns + Vrb with no Aux₂, we get:

\[ \text{NP + tns + Vrb} \rightarrow \text{tns + NP + Vrb}. \]
But this leaves the noun phrase without a verb to attach itself to. In such situations the grammar of English demands the insertion of do as a dummy to carry the noun phrase. This is known as the do-support transformation. We will not formulate the actual transformation now, because we will find other cases where it will be necessary to add do to produce grammatical English sentences. Therefore we will wait until later to write the rule. At this point it will only be noted.

Questions like the following:

*What* has the mailman brought?
*When* are you going?
*How* did the child behave?
*Where* has the boy gone?

...can all be shown to be derived from the yes-or-no transformation (TQ).
When we take a sentence like

*The mailman has brought the package.*

and apply TQ we get

*Has the mailman brought the package?*

Then by changing the object NP (package) to *whom* or *what* (whom if the NP is *N*um, what if it is not) we get

*Has the mailman brought what?*

This process is called the wh-attachment transformation. It is symbolized by adding wh to the element being questioned. Thus, in the example above wh is added to the object NP.

\[
\text{Tns + have + NP}^1 + \text{en + bring + wh-NP}^2 \\
*\text{Has the mailman brought what?}
\]

This is, of course, ungrammatical, and the wh-NP\(^2\) must be shifted to the front of the sentence in a transformation known as T\(_{wh}\). This gives us:

\[
\text{wh-NP}^2 + \text{tms + have + NP}^1 + \text{en + bring} \\
\text{What has the mailman brought?}
\]

The other questions are derived in exactly the same way: applying the yes-or-no transformation (TQ), attaching wh, bringing the wh element to the front of the sentence string (T\(_{wh}\)). Wh + anything is shifted to the first position in its string. Wh + *Man* \(\rightarrow\) *How.*

Wh + *Loc* \(\rightarrow\) *Where.* Wh + *Tm* \(\rightarrow\). *When.*

Thus:

\[
\text{Tm} \\
\text{You are going tomorrow} \rightarrow \text{Tm} \\
\text{Are you going tomorrow?} \rightarrow
\]
The subject questions need a little further discussion. On the surface it looks as if it would be simpler to formulate a special rule for the subject question, (The mailman has brought the package, \( \rightarrow \) Who has brought the package?) in which the subject is simply replaced by Who or What. But this is a process where simplicity resembles complexity. One should perhaps remember the story of the boy who was relieved of the notion that a straight path is always the shortest way home. To formulate this different rule for the subject question would remove subject questions from the class of related questions and make them somewhat different, when we intuitively feel that they are not different from other questions but very closely related to them. And this relatedness can be demonstrated by applying the rules used to formulate the other questions.

Subject questions first go through \( T_q \) just as all other questions do. To prevent that happening would require an extra rule in the grammar. However, when a sentence has gone through \( T_q \), it no longer has its subject in the place a questioned subject should be.

\[ \text{He should do it, } \rightarrow \text{ Should he do it?} \]

By wh-attachment Should he do it? becomes Should who do it? But there is no *Should who do it? So the completely general rule \( T_{wh} \) applies to put wh-he at the beginning of the sentence.

\[ \text{Who should do it?} \]

All wh questions then, subject questions included, have the same "history" of derivation: first \( T_q \), then wh-attachment, then reordering by \( T_{wh} \). To make an exception based on the superficial similarity of word order between declaratives and subject questions would be to add unnecessary extra rules to the grammar.

Whether you wish to take up the subject question with your class at this point will depend on the general ability of the class. It is a good place to make an important point about the grammar--how general rules can cover a good many different sorts of sentences--and also to illustrate how all questions are related. The question transformation will be treated again, at a more complex level, in later years.
Exercise 1: Page 19
1. Has the child broken the wagon?
2. Was mother serving waffles?
3. Was the baby happy?
4. Will the flowers wilt there?
5. Can you determine the circumference?
6. Had Marcia lost the cake?
7. Have the men radioed an S.O.S.?
8. Could Red taste the poison?
9. Might that be the solution?
10. Should the president have named the committee?

Exercise 2: Page 21

#2. NP + past + be + ing + serve + NP ➞
    Mother ➔ was ➔ serving ➔ waffles ➔
    past + be + NP + ing + serve + NP
    Was ➔ Mother ➔ serving ➔ waffles?

3. NP + past + be + adj ➞
    The baby ➔ was ➔ happy ➔
    past + be + NP + adj
    Was ➔ the baby ➔ happy?

4. NP + pres + M + wilt + Loc ➞
    The flowers ➔ will ➔ wilt ➔ there ➔
    pres + M + NP + wilt + Loc
    Will ➔ the flowers ➔ wilt ➔ there?

5. NP + pres + M + determine + NP ➞
    You ➔ can ➔ determine ➔ the circumference ➔
    pres + M + NP + determine + NP
    Can ➔ you ➔ determine ➔ the circumference?

#Students may use either Verb or the lexical verb in writing strings for question transformations.
The strings of symbols for 2 and 3 would look like this:

2. Sentence → NP + VP
   VP → tense + have + en + verb + Pr
   NP + [pres + have] + en + Be + Pr
   The captain has been mistaken
   [pres + have] + NP + en + Be + Pr
   Has the captain been mistaken?

3. Sentence → NP + VP
   VP → tense + Verb + Pr
   NP + [past + Be] + Pr
   The captain was at home.
   [past + Be] + NP + Pr
   Was the captain at home?

Page 23-25:
It should be pointed out that there are actually 2 steps in forming the yes-or-no question in cases where do must be added. First tense moves to the front of the sentence, then do is added. The two steps are telescoped at this point for the student. Later the sequence will be made more explicit.

Exercise 3: Page 24-25
A. 1. NP + past + wound + NP
   The hunter wounded the cow
   past + do + NP + wound + NP
   Did the hunter wound the cow?

2. NP + pres + border + NP
   The lakes border the park
   pres + do + NP + border + NP
   Do the lakes border the park?

Since we are primarily interested in the shift which takes place in the question transformation it is not necessary to make detailed symbol strings. The NP's need not be broken down for instance. Instead of verb you might have your students give the lexical verb so that the special case for the verb be will be clear.
2. NP + past + be + NP
   A stampede was the result
   past + be + NP + NP
   Was a stampede the result?

3. NP + pres + have + NP
   The puppets have strings
   pres + do + NP + have + NP
   Do the puppets have strings?

4. NP + pres + have + en + see + NP
   They have seen the Potomac
   pres + have + NP + en + see + NP
   Have they seen the Potomac?

5. NP + past + send + NP + adj + ly
   Noah sent a dove hopefully
   past + do + NP + send + NP + adj + ly
   Did Noah send a dove hopefully?

6. NP + pres + become + adj
   This frosting becomes thick
   pres + do + NP + become + adj
   Does this frosting become thick?

7. NP + pres + M + suspect + NP + Tm
   The detective will suspect the hero now
   pres + M + NP + suspect + NP + Tm
   Will the detective suspect the hero now?

8. NP + pres + crumble + adj + ly
   The cookie crumbles easily
   pres + do + NP + crumble + adj + ly
   Does the cookie crumble easily?

Review Exercise: Page 28
1. NP + past + be + ing + trade + NP
   The boys were trading books
Where were the boys trading books?

2. Susan delivers the paper.

3. Does Susan deliver the paper?

4. The milkman could have been ringing.

5. Could the milkman have been ringing?

6. A rider approached the camp cautiously.

7. Does this painting resemble that scene?

8. Had the dog broken the leach?
9. \[ NP \rightarrow \text{[pres + M]} \rightarrow \text{go} \rightarrow \text{[pres + M]} \rightarrow NP \rightarrow \text{go} \]
   \[ \text{You} \rightarrow \text{must} \rightarrow \text{go} \rightarrow \text{Must you go?} \]

10. \[ NP \rightarrow \text{[past + remain + adj]} \rightarrow \text{Mr. Jefferson remained calm} \rightarrow \text{[past + do]} \rightarrow \text{NP + remain + adj} \rightarrow \text{Did Mr. Jefferson remain calm?} \]

Exercise 5: Pages 30-31

A. 1. The rustlers stampeded the cattle
   
   Did the rustlers stampede the cattle
   
   What did the rustlers stampede?

   2. Marcie was chewing her nails
   
   Was Marcie chewing her nails
   
   What was Marcie chewing?
3. George Washington had crossed the Delaware
   Had George Washington crossed the Delaware
   What had George Washington crossed?

4. John is quitting the team immediately
   Is John quitting the team immediately
   What is John quitting immediately?

5. You have a lump on your forehead
   Have you a lump on your forehead
   What have you on your forehead?

6. The policemen must have seen the accident
   Must the policemen have seen the accident
   What must the policemen have seen?

3. The children wrecked the automobile
   Did the children wreck the automobile
   What did the children wreck?

2. Philip was showing his creation
   Was Philip showing his creation
   What was Philip showing?

3. A chipmunk had grabbed the potato chip
   Had a chipmunk grabbed the potato chip
   What had a chipmunk grabbed?

4. The troubadors played their guitars
   Did the troubadors play their guitars
   What did the troubadors play?

5. You have finished the test on time
   Have you finished the test on time
   What have you finished on time?

6. The technician will have completed the report tomorrow
   Will the technician have completed the report tomorrow
   What will the technician have completed tomorrow?
Exercise 6: Page 33

1. yes-or-no transformation (Tο) #
   Did Mrs. Hale design the costumes? →

   Attaching wh
   *Did Mrs. Hale design what? →

   Bringing wh to beginning (T_wh)
   What did Mrs. Hale design?

2. Tο
   Did the girls have a dance →

   Attaching wh
   Did the girls have what →

   T_wh
   What did the girls have?

3. Tο
   Should the heroine have married the villain? →

   wh-attachment
   *Should the heroine have married whom? →

   T_wh
   Whom should the heroine have married?

4. Tο
   Did Patrick kiss the Blarney Stone? →

   wh-attachment
   *Did Patrick kiss what? →

   T_wh
   What did Patrick kiss?

5. Tο
   Did the deer nibble the salt? →

   wh-attachment
   *Did the deer nibble what? →

   T_wh
   What did the deer nibble?

# Allow your students to use Tο and T_wh instead of writing out the names of the transformations if you would like.
6. **TQ**
   Is she reading Robinson Crusoe?  
   
   **wh-attachment**
   *Is she reading what?*  
   
   **Twh**
   What is she reading?

7. **TQ**
   Will we watch the broadcast today?  
   
   **wh-attachment**
   *Will we watch what today?*  
   
   **Twh**
   What will we watch today?

8. **TQ**
   Had Seth eaten the evidence?  
   
   **wh-attachment**
   *Seth had eaten what?*  
   
   **Twh**
   What had Seth eaten?

9. **TQ**
   Should they have asked the principal?  
   
   **wh-attachment**
   *Should they have asked whom?*  
   
   **Twh**
   Whom should they have asked?

10. **TQ**
    Did Johnny Appleseed plant the seeds carefully?  
    
    **wh-attachment**
    *Did Johnny Appleseed plant what carefully?*  
    
    **Twh**
    What did Johnny Appleseed plant carefully?

**Exercise 7: Page 34**

A. 1. **kernel**
    + past + verb + NP
    
    The rustlers stamped the cattle
Yes-or-no

past + do + NP + verb + NP^2

Did the rustlers stampede the cattle

wh-attachment

Past + do + NP + verb + wh-NP^2

*Did the rustlers stampede what?  

T_{wh}

Wh + NP + past + do + NP + verb

What did the rustlers stampede?

2. kernel

NP + past + be + ing + verb + NP^2

Marcie was chewing her nails

wh-attachment

past + be + NP + ing + verb + NP^2

*Was Marcie chewing what? 

T_{wh}

Wh + NP^2 + past + be + NP + ing + verb

What was Marcie chewing?

3. Kernel

NP + past + have + en + verb + NP^2

George Washington had crossed the Delaware

yes-or-no

past + have + NP + en + verb + NP^2

Had George Washington crossed the Delaware

wh-attachment

past + have + NP + en + verb + wh-NP

*Had George Washington crossed what?
4. Kernel NP

John T

What + past + have + NP + en + verb +

George Washington crossed?

pre a

quitting

Yes or no

pres + be + NP + verb + NP + ing + verb + NP +

2

+ Tim 1

John

quitting

the team immediately

rb

4

P

2

+)

the team immediately

wh-attachment

pres + be + NP + verb +

\"...

Jokr

+ in

wh-NP + Tm

quitting

what immediately?

,Twh

Wh + NP + pres + be + NP + ing + verb +

What

do

you have a lump on your forehead?

Do you have what on your forehead?

what

The policemen must have seen the accident

The policemen have a lump on your forehead.

You have a lump on your forehead.

You have what on your forehead?

The policemen must have seen the accident.

George Washington crossed?
2. Kernel

NP + past + be + ing + verb + NP^2

Philip was showing his creation

Yes-or-no

Past + be + NP + ing + verb + NP^2

Was Philip showing his creation

wh-attachment

Past + be + NP + ing + verb + wh-NP^2

*Was Philip showing what?
3. **Kernel**

\[
\text{NP} + \text{past} + \text{have} + \text{en} + \text{verb} + \text{NP}^2
\]

A chipmunk had grabbed the potato chip

\[
\text{yes-or-no} \quad \text{past} + \text{have} + \text{NP} + \text{en} + \text{verb} + \text{NP}^2
\]

Had a chipmunk grabbed the potato chip

\[
\text{wh-attachment} \quad \text{past} + \text{have} + \text{NP} + \text{en} + \text{verb} + \text{wh-NP}^2
\]

*Had a chipmunk grabbed what?*

4. **Kernel**

\[
\text{NP} + \text{past} + \text{verb} + \text{NP}^2
\]

The troubadors played their guitars

\[
\text{yes-or-no} \quad \text{past} + \text{do} + \text{NP} + \text{verb} + \text{NP}^2
\]

Did the troubadors play their guitars

\[
\text{wh-attachment} \quad \text{past} + \text{do} + \text{NP} + \text{verb} + \text{wh-NP}^2
\]

*Did the troubadors play what?*

5. **Kernel**

\[
\text{NP} + \text{pres} + \text{have} + \text{en} + \text{verb} + \text{NP}^2 + \text{Tom}
\]

You have finished the test on time
yes-or-no

\[ \text{past + have + NP + en + verb + NP}^2 + \text{Tm} \]

Have you finished the test on time.

wh-attachment

\[ \text{past + have + NP + en + verb + wh-NP + Tm} \]

*Have you finished what on time?

\[ \text{Wh + NP}^2 + \text{pres + have + NP + en + verb + Tm} \]

What have you finished on time?

8. Kernel

\[ \text{NP + pres + M + have + en + verb + NP}^2 + \text{Tm} \]

The technician will have finished the report tomorrow.

\[ \text{present + M + NP + have + en + verb + NP}^2 + \text{Tm} \]

Will the technician have finished the report tomorrow.

wh-attachment

\[ \text{pres + M + NP + have + en + verb + wh-NP}^2 + \text{Tm} \]

*Will the technician have finished what tomorrow?

\[ \text{Wh + NP}^2 + \text{pres + M + NP + have + en + verb + Tm} \]

What will the technician have finished tomorrow?

Exercise 8: Page 35

The manner adverbials are here:

A. 1. hurriedly
2. reluctantly
3. well
4. carefully
5. heavily
6. lightly
7. right
8. quickly
9. upright
10. soundly

B. 1. noiselessly
2. efficiently
3. quickly
4. generously
5. disgustedly
6. cautiously
7. craftily
8. tightly
9. sneakily
10. thoughtlessly
Exercise 8. Page 35
(In some sentences students may find that the phrase "in what manner" produces a more likely question.)

1. How did Hortense eat the halibut?
2. How did the captain accept the penalty?
3. How did the actors perform?
4. How should students have reviewed?
5. How did it rain yesterday?
6. How must the cake be beaten?
7. How does George do everything?
8. How did the stove heat the room?
9. How did the policeman jerk the intruder?
10. How had the players been trained?

E1. How did the cat spring onto the table?
1. How has the secretary been working?
2. How does ice melt in the summer?
3. How have we been rewarded?
4. How did Otto eye the stew?
5. How had Gary seized the reins?
6. How did he insert the key in the lock?
7. How did Max clamp the edges together?
8. How did the lad cross the backyard?
9. How had the neighbor been playing the radio all night?

Exercise 9: Page 37
(Again students may need to think "in what manner" to see the how replacement in Sentence 1 and 9.)

1. Did the librarian work quietly? *Did the librarian work how? How did the librarian work?

2. Will Clarice construct the diagram carefully? *Will Clarice construct the diagram how? How will Clarice construct the diagram?

3. Has the gardener pruned the roses severely? *Has the gardener pruned the roses how? How has the gardener pruned the roses?


5. Should you speak politely? *Should you speak how? How should you speak?

6. Had Minerva approached the spider cautiously? *Had Minerva approached the spider how? How had Minerva approached the spider?

7. Did Linus surrender the blanket sorrowfully? *Did Linus surrender the blanket how? How did Linus surrender the blanket?
8. Did the balloon burst noisily? ——> Did the balloon burst how? ——> How did the balloon burst?

9. Was the child neglected carelessly? ——> Was the child neglected how? ——> How was the child neglected?

10. Was the runner gaining steadily? ——> Was the runner gaining how? ——> How was the runner gaining?

Exercise 10: Page 37

1. NP + past + verb + Man
   The letter arrived promptly ——>
   past + do + NP + verb + Man
   Did the letter arrive promptly ——>
   past + do + NP + verb + wh-Man
   *Did the letter arrive how? ——>
   Wh + Man + past + do + NP + verb
   How did the letter arrive?

2. NP + pres + M + verb + NP^2 + Man
   Clarice will construct the diagram carefully ——>
   pres + M + NP + verb + NP^2 + Man
   Will Clarice construct the diagram carefully ——>
   pres + M + NP + verb + NP^2 + wh-Man
   *Will Clarice construct the diagram how? ——>
   Wh + Man + pres + M + NP + verb + NP^2
   How will Clarice construct the diagram?

3. NP + pres + have + en + verb + NP^2 + Man
   The gardener has pruned the roses severely ——>
   pres + have + NP + en + verb + NP^2 + Man
   Has the gardener pruned the roses severely ——>
*Has the gardener pruned the roses how?

Wh + Man + pres + have + NP + en + verb + NP²

How has the gardener pruned the roses?

4. NP + pres + verb + Man

Paul tries hard

pres + do + NP + verb + Man

Does Paul try hard

pres + do + NP + verb + wh-Man

*Does Paul try how?

Wh + Man + pres + do + NP + verb

How does Paul try?

5. NP + past + M + verb + Man

You should speak politely

past + M + NP + verb + Man

Should you speak politely

past + M + NP + verb + wh-Man

*Should you speak how?

Wh + Man + past + M + NP + verb

How should you speak?

6. NP + past + have + en + verb + NP² + Man

Minerva had approached the spider cautiously

past + have + NP + en + verb + NP² + Man

Had Minerva approached the spider cautiously

past + have + NP + en + verb + NP² + wh-Man

*Had Minerva approached the spider how?
Wh. + Man + past + have + NP + en + verb + NP²
How had Minerva approached the spider?

7. NP + past + verb + NP² + Man

Linus surrendered the blanket sorrowfully

past + do + NP + verb + NP² + Man
Did Linus surrender the blanket sorrowfully

past + do + NP + verb + NP² + wh-Man
*Did Linus surrender the blanket how?

Wh + Man + past + do + NP + verb + NP²
How did Linus surrender the blanket?

8. NP + past + verb + Man

The balloon burst noisily

past + do + NP + verb + Man
Did the balloon burst noisily

past + do + NP + verb + wh-Man
*Did the balloon burst how?

Wh + Man + past + do + NP + verb
How did the balloon burst?

9. (This is a passive construction.)

NP + past + be + en + verb + Man

The child was neglected carelessly

past + be + NP + en + verb + Man
Was the child neglected carelessly

past + be + NP + en + verb + wh-Man
*Was the child neglected how?

Wh + Man + past + be + NP + en + verb
How was the child neglected?
Exercise 11: Page 38

Answers will vary.

Exercise 12: Page 39

A. 1. Where has the doctor been?
   2. Where might she have been yesterday?
   3. Where did Jack stay?
   4. Where was the principal?
   5. Where can he remain?
   6. Where must the fire have been?
   7. Where did he build a fire?
   8. Where did he run quickly?
   9. Where does Jack sing?
   10. Where did we take our books?

B. Answers will vary but might be similar to these:
   1. We went to Australia for a vacation.
   2. The puppy is happiest in the mud.
   3. William goes to the University of Oregon.
   4. Joan is going to Portland.
   5. Ken is in the stable.

Exercise 13: Page 40

A. 1. NP + pres + have + en + verb + Loc
   The doctor has been here
   pres + have + NP + en + verb + Loc
   Has the doctor been here
   pres + have + NP + en + verb + wh-Loc
   *Has the doctor been where?
Where has the doctor been?

2. She might have been away yesterday

Might she have been away yesterday

*Might she have been where yesterday?

Wh might she have been yesterday?

3. Jack stayed upstairs

Did Jack stay upstairs

*Did Jack stay where?

Where did Jack stay?

4. The principal was out

Was the principal out

*Was the principal where?

Where was the principal?
Exercise 13: Page 40
The Loc element may vary in students' answers.

B. 1. Have you put the bucket there?
   You have put the bucket there. (or someplace)

2. Does the water go uphill?
   The water goes uphill. (or someplace)

3. Were the doughnuts here?
   The doughnuts were here. (or someplace)

4. Are the fish biting in the lake?
   The fish are biting in the lake. (or someplace)

5. Did the rainbow appear in the sky? (or someplace)
   The rainbow appeared in the sky.
Exercise 14: Page 41

1. When will we meet?
2. When do the students issue the school paper?
3. When did Dolly withdraw her name?
4. When will they be vacationing abroad?
5. When did Kern become captain?
6. When should you do it?
7. When must the plane have vanished?

Exercise 15: Page 42

A. 1. NP + past + verb + NP + Tm
   Davie ran a mile last night
   past + do + NP + verb + NP + Tm
   Did Davie run a mile last night

   past + do + NP + verb + NP + wh-Tm
   *Did Davie run a mile when?

   Wh + Tm + past + do + NP + verb + NP
   When did Davie run a mile?

2. NP + pres + M + verb + NP + Tm
   We will finish the work in the morning
   pres + M + NP + verb + NP + Tm
   Will we finish the work in the morning

   pres + M + NP + verb + NP + wh-Tm
   *Will we finish the work when?

   wh + Tm + pres + M + NP + verb + NP
   When will we finish the work?

3. NP + past + verb + NP + Tm
   Skidmore caught thirty mice last month
   past + do + NP + verb + NP + Tm
   Did Skidmore catch thirty mice last month
past + do + NP + verb + NP + wh-Tm

*Did Skidmore catch thirty mice when?

Wh + Tm + past + do + NP + verb + NP

When did Skidmore catch thirty mice?

4. NP + pres + have + en + be + ing + verb + NP + Tm

Philip has been picking beans all day

pres + have + NP + en + be + ing + verb + NP + Tm

Has Philip been picking beans all day

pres + have + NP + en + be + ing + verb + NP + wh-Tm

*Has Philip been picking beans when?

Wh + Tm + pres + have + NP + en + be + ing + verb + NP

When has Philip been picking beans?

5. NP + pres + be + ing + verb + NP + Tm

The captain is meeting us at three o'clock

pres + be + NP + ing + verb + NP + Tm

Is the captain meeting us at three o'clock

pres + be + NP + ing + verb + NP + wh-Tm

*Is the captain meeting us when?

Wh + Tm + pres + be + NP + ing + verb + NP

When is the captain meeting us?

R. Because students must add a time adverbial their answers will obviously vary.

1. Will Steve return tomorrow? Steve will return tomorrow.
2. Did you see Mary yesterday? You saw Mary yesterday.
3. Were the Kimballs coming at noon?
The Kimballs were coming at noon.
4. Are you finishing the course now? You are finishing the course now.
5. Has he called his mother today? He has called his mother today.
The subject replacement involves the ordering of the transformation. In other words, in the formation of this question the order in which the transformations are applied becomes especially important. The do-support must not be added immediately after the yes-or-no transformation as we have done before, because in the case of the subject question alone it ceases to be necessary. Thus:

\[
\text{Yes-or-no} + \text{NP} + \text{hit} + \text{NP} \\
\text{wh-attachment} + \text{NP} + \text{hit} + \text{NP} \\
\text{Twh} + \text{NP} + \text{hit} + \text{NP} \\
\text{Who} + \text{hit} + \text{the ball}
\]

Some students may find this difficult at this point and you will want to decide whether to teach the subject replacement at this time or leave it until later.

**Page 44: Class Exercise**

You will want to use these questions as a basis for class discussion.

1. The first question is a yes-or-no question

2. 1) The class is holding the dance in the auditorium.
   2) The team will arrive on time.
   3) The girl has made the refreshments.
   4) Joe answered the questions honestly.

3. Yes. The second question in each group is built on the first.

4. 1) Where
   2) When
   3) What
   4) How

5. 1) Where replaces in the auditorium.
   2) When replaces on time.
   3) What replaces the refreshments.
   4) How replaces honestly.
6. We call it wh-attachment.
7. The question word is the first word in the sentence.

Page 45:
If you use this section be sure to discuss carefully in class the paragraph at the top of page 45, trying to get your students to see for themselves the relation between the subject replacement and the other kinds.

Exercise 16: Page 49

1. Kernel

\[
\begin{array}{c}
\text{NP} + \text{past} + \text{witness} + \text{NP}^2 \\
\text{Mr. Trask witnessed the accident}
\end{array}
\]

\[
\begin{array}{c}
\text{past + wh-NP + witness + NP}^2 \\
\text{Mr. Trask witnessed the accident}
\end{array}
\]

\[
\begin{array}{c}
\text{past + who witnessed the accident} \\
*\text{past + who witnessed the accident}
\end{array}
\]

2. Kernel

\[
\begin{array}{c}
\text{NP} + \text{past} + \text{hit} + \text{NP}^2 \\
\text{The ball hit the child}
\end{array}
\]

\[
\begin{array}{c}
\text{past + wh-NP + hit + NP}^2 \\
\text{the ball hit the child?}
\end{array}
\]

\[
\begin{array}{c}
*\text{past + what hit the child?} \\
\end{array}
\]

\[
\begin{array}{c}
\text{Wh + NP + past + hit + NP} \\
\text{What hit the child?}
\end{array}
\]
3. Kernel

\[ \text{The puppy} \quad \text{mutilated} \quad \text{the pie} \]  \[ \implies \]

\[ \text{past + ____ NP + mutilate + NP}^2 \]
\[ \text{past + ____ the puppy mutilate the pie?} \]

wh-attachment

\[ \text{past + wh-NP + mutilate + NP} \]
\[ \ast \text{past + ____ what + mutilate the pie} \]

\[ \text{Wh + NP. + past + mutilate + NP} \]
\[ \text{What mutilated the pie?} \]

4. Kernel

\[ \text{The president} \quad \text{should have named the committee} \]  \[ \implies \]

\[ \text{past + M + NP + have + en + name + NP}^2 \]
\[ \text{Should the president have named the committee?} \]

wh-attachment

\[ \text{past + M + wh-NP + have + en + name + NP}^2 \]
\[ \ast \text{should who have named the committee} \]

\[ \text{Wh + NF + past + M + have + en + name + NP} \]
\[ \text{Who should have named the committee?} \]

5. Kernel

\[ \text{The teacher} \quad \text{will dictate the questions} \]  \[ \implies \]

\[ \text{pres + M + NP + dictate + NP}^2 \]
\[ \text{Will the teacher dictate the questions?} \]
wh-attachment
\[ \text{pres} + M + \text{wh-NP} + \text{dictate} + \text{NP}^2 \]
\[ \Rightarrow \]
*Will who dictate the questions?

\[ \text{wh} \]
\[ \text{Wh} + \text{NP} + \text{pres} + M + \text{dictate} + \text{NP}^2 \]
\[ \Rightarrow \]
Who will dictate the questions?

6. Kernel
\[ \text{NP} + \text{pres} + \text{be} + \text{ing} + \text{block} + \text{NP}^2 \]
\[ \Rightarrow \]
A piano is blocking the doorway

\[ \text{TQ} \]
\[ \text{pres} + \text{be} + \text{NP} + \text{ing} + \text{block} + \text{NP}^2 \]
\[ \Rightarrow \]
Is a piano blocking the doorway?

wh-attachment
\[ \text{pres} + \text{be} + \text{wh-NP} + \text{ing} + \text{block} + \text{NP}^2 \]
\[ \Rightarrow \]
*Is what blocking the doorway?

\[ \text{wh} \]
\[ \text{Wh} + \text{NP} + \text{pres} + \text{be} + \text{ing} + \text{block} + \text{NP}^2 \]
\[ \Rightarrow \]
What is blocking the doorway?

7. Kernel
\[ \text{NP} + \text{pres} + M + \text{be} + \text{adj} \]
\[ \Rightarrow \]
Dictators must be careful

\[ \text{TQ} \]
\[ \text{pres} + M + \text{NP} + \text{be} + \text{adj} \]
\[ \Rightarrow \]
Must dictators be careful?

wh-attachment
\[ \text{pres} + M + \text{wh-NP} + \text{be} + \text{adj} \]
\[ \Rightarrow \]
*Must who be careful?

\[ \text{wh} \]
\[ \text{Wh} + \text{NP} + \text{pres} + M + \text{be} + \text{adj} \]
\[ \Rightarrow \]
Who must be careful?
3. **Kernel**

\[ NP + \text{pres} + \text{have} + \text{en} + \text{be} + \text{ing} + \text{sweep} + \text{NP}^2 \]

\[ \text{Melissa has been sweeping the kitchen} \]

\[ T_Q \]

\[ \text{pres} + \text{have} + \text{NP} + \text{en} + \text{be} + \text{ing} + \text{sweep} + \text{NP}^2 \]

\[ \text{Has Melissa been sweeping the kitchen?} \]

**wh-attachment**

\[ \text{pres} + \text{have} + \text{wh-NP} + \text{en} + \text{be} + \text{ing} + \text{sweep} + \text{NP}^2 \]

\[ *\text{Has who been sweeping the kitchen}? \]

\[ T_{wh} \]

\[ \text{Wh + NP. + pres} + \text{have} + \text{en} + \text{be} + \text{ing} + \text{sweep} + \text{NP} \]

\[ \text{Who has been sweeping the kitchen?} \]

9. **NP + pres + be + ing + get + adj**

\[ \text{The room is getting noisy} \]

\[ T_Q \]

\[ \text{pres} + \text{be} + \text{NP} + \text{ing} + \text{get} + \text{adj} \]

\[ \text{Is the room getting noisy?} \]

**wh-attachment**

\[ \text{pres} + \text{be} + \text{wh-NP} + \text{ing} + \text{get} + \text{adj} \]

\[ *\text{Is what getting noisy?} \]

\[ T_{wh} \]

\[ \text{Wh + NP. + pres} + \text{be} + \text{ing} + \text{get} + \text{adj} \]

\[ \text{What is getting noisy?} \]

10. **NP + past + win + NP**

\[ \text{The Robert E. Lee won the race} \]

\[ T_Q \]

\[ \text{past} + \text{NP} + \text{win} + \text{NP}^2 \]

\[ \text{past + The Robert E. Lee win the race} \]

**wh-attachment**

\[ \text{past + wh-NP} + \text{win} + \text{NP}^2 \]

\[ *\text{past + what win the race} \]
Page 50: Questions for review

1. Question transformations operate on basic kernel strings to form various kinds of questions.

2. This transformation is called T_Q. In it tense and either M, have, or be—or simply tense alone—change places with the subject NP. If tense alone changes places, it then becomes necessary to add do for it to attach to. (Tns + have John caught the fish? Tns + do John catch the fish?)

3. If the verb is Be, Tns + Be moves to the front. The verb Be has the quality of simple inversion.

4. If there is neither M, have, be or the verb Be, do must be added.

5. The three transformations which produce the object replacement are T_O (yes-or-no), wh-attachment, and T_wh (which moves the question word to the front of the sentence).

6. Wh-attachment simply means attaching wh to the underlying symbol of an element in the sentence. This element then becomes a question word.

7. Wh means the word it is attached to is going to become a question word. Wh-NP —> {who(m) | or that (what)
wh-Man —> how; wh-Loc —> where;
wh-Tm —> when.

8. The T_wh transformation brings the element with wh attached to the front of its string.

9. The how question is formed by applying T_Q, then wh-attachment and finally T_wh. All other questions are formed in the same way. In the how question wh is attached to the manner adverbial. In the time question wh is attached to Tm. In the place question, it is attached to Loc? In the subject replacement it is attached to the subject NP.

10. All questions are related by going first through the yes-or-no transformation.
Exercise for review. Page 50
Answers will vary but might be similar to these examples:

1. Wh + Tm + tan + do + NP + Vtr + NP3
   When did Jane bring the flowers?

2. Wh + Loc + tan + be + NP
   Where is Joe?

3. Tns + M + NP + have + en + Vmid + NP2
   Would Jennie have had the measles?

4. Wh + Man + tan + do + NP + Vtr + NP2
   How does Janet like ice cream?

5. Wh + NP + tan + Vin + Man
   Who reacted suddenly?

6. Wh + NP2 + tan + M + NP + Vtr
   Whom should Joan love?

7. Tns + be + NP + Pr
   Is Stella pretty?

B.
1. Wh + Tm + tan + M + NP + Vlnk + Pr
   When must a story ring true?

2. Wh + NP + tan + be + Pr
   Who is Sylvia?

3. Tns + do + NP + Vmid + NP2
   Does Bill have a cold?

4. Tns + be + NP + ing + Vtr + NP2
   Is Joan eating an apple?

5. Tns + have + NP + en + Vtr + NP3
   Has Jack eaten the apple?
6. Wh + NP + tens + have + en + Vtr + NP²
   Who has eaten the apple?

Exercise for review: Pages 51-52

A.
1. NP + past + be + ing + verb + NP²
   Beatrice was wearing jeans

   TQ (yes-or-no)
   past + be + NP + ing + verb + NP²
   Was Beatrice wearing jeans?

2. NP + past + have + en + verb + NP² + Tm
   The professor had returned the exams yesterday.

   TQ (yes-or-no)
   past + have + NP + en + verb + NP² + Tm
   Had the professor returned the exams yesterday?

3. NP + past + verb + Loc
   The children stayed indoors

   TQ
   past + do + NP + verb + Loc
   Did the children stay indoors

   wh-attachment
   past + do + NP + verb + wh-Loc
   *Did the children stay where?

   T-wh
   Wh + Loc + past + do + NP + verb
   Where did the children stay?

4. NP + past + verb + NP²
   The pygmy bought a toothbrush

   →
**Tq (yes-or-no)**
past + do + NP + verb + NP²

Did the pygmy buy a toothbrush

**wh-attachment**
past + do + NP + verb + wh-NP²

*Did the pygmy buy what?

**Wh**
Wh + NP² + past + do + NP + verb

What did the pygmy buy?

5. NP + past + verb + NP + Man

The inmate ate the soup noisily

**Tq (yes-or-no)**
past + do + NP + verb + NP² + Man

Did the inmate eat the soup noisily

**wh-attachment**
past + do + NP + verb + NP² + wh-Man

*Did the inmate eat the soup how?

**Wh**
Wh + Man + past + do + NP + verb + NP²

How did the inmate eat the soup?

6. NP + pres + M + verb + Man

The choir can sing beautifully

**Tq (yes-or-no)**
pres + M + NP + verb + Man

Can the choir sing beautifully

**wh-attachment**
pres + M + NP + verb + wh-Man

*Can the choir sing how?
7. **NP + pres + M + verb + Loc + Tm**

The boys will ride to the coast next week

T_q (yes-or-no)

pres + M + NP + verb + Loc + Tm

Will the boys ride to the coast next week

wh-attachment

pres + M + NP + verb + Loc + wh-Tm

*Will the boys ride to the coast when?

T_wh

Wh + Tm + pres + M + NP + verb + Loc

When will the boys ride to the coast?

8. **NP + past + M + verb + NP^2**

Mother should join the PTA

T_q (yes-or-no)

past + M + NP + verb + NP^2

Should mother join the PTA

wh-attachment

past + M + NP + verb + wh-NP^2

*Should Mother join what?

T_wh

Wh + NP^2 + past + M + NP + verb

What should mother join?

9. **NP + past + have + en + be + ing + verb + Man**

The lambs had been gamboling happily

T_q 3(yes-or-no)

past + have + NP + en + be + ing + verb + Man

Had the lambs been gamboling happily
wh-attachment

\[
\text{past + have + NP + en + be + ing + verb + wh-Man}
\]

*Had the lambs been gamboling how? \[\rightarrow\]

\[T_{\text{wh}}\]

\[
\text{Wh + Man + past + have + NP + en + be + ing + verb}
\]

\[
\text{How had the lambs been gamboling?}
\]

10. NP + pres + have + en + be + ing + verb + Man

\[
\text{The lawn has been drying badly}
\]

\[T_Q (\text{yes-or-no})\]

\[
\text{pres + have + NP + en + be + ing + verb + Man}
\]

\[
\text{Has the lawn been drying badly?}
\]

11. NP + pres + verb + NP + Man

\[
\text{Frankie speaks French fluently}
\]

\[T_Q (\text{yes-or-no})\]

\[
\text{pres + do + NP + verb + NP + Man}
\]

\[
\text{Does Frankie speak French fluently?}
\]

\[
\text{wh-attachment}
\]

\[
\text{pres + do + NP + verb + NP + wh-Man}
\]

\[
\text{Does Frankie speak French how?}
\]

\[T_{\text{wh}}\]

\[
\text{Wh + Man + pres + do + NP + verb + NP}
\]

\[
\text{How does Frankie speak French?}
\]
12. NP + pres + Be + Loc
   The basket is there

   \[ \text{TQ (yes-or-no)} \]
   \[ \text{pres + Be + NP + Loc} \]
   \[ \text{Is the basket there} \]

   wh-attachment
   \[ \text{pres + be + NP + wh-loc} \]
   *Is the basket where?

   Twh
   \[ \text{Wh + Loc + pres + Be + NP} \]
   \[ \text{Where is the basket?} \]

B. 1. NP + past + be + ing + verb + NP
   Katy was drinking her milk

   \[ \text{TQ} \]
   \[ \text{past + be + NP + ing + verb + NP} \]
   \[ \text{Was Katy drinking her milk} \]

   wh-attachment
   \[ \text{past + be + wh-NP + ing + verb + NP} \]
   \[ \text{Was who drinking her milk?} \]

   Twh
   \[ \text{Wh + NP + past + be + ing + verb + NP} \]
   \[ \text{Who was drinking her milk?} \]

2. NP + past + verb + Loc
   The children stayed indoors

   \[ \text{TQ} \]
   \[ \text{past + NP + verb + Loc} \]
   \[ \text{past + the children stay indoors} \]
1. **wh-attachment**
   - past + _____ wh-NP + verb + Loc
     - Who stay indoors

2. **Past + Loc**
   - Who stayed indoors

3. **NP + past + verb + NP² + Man**
   - The boomerang hit the tree forcefully
     - past + do + NP + verb + NP² + Man

4. **NP + past + verb + Loc**
   - Prudence appeared on the stage
     - past + do + NP + verb + Loc

5. **NP + past + verb + Tm**
   - Chaucer lived in the fourteenth century
     - past + do + NP + verb + Tm

---

**Past + Loc**
- Did the boomerang hit the tree forcefully?
- What did the boomerang hit forcefully?

**Past + wh-TM**
- Did Prudence appear where?
- Where did Prudence appear?

**Past + wh-TM**
- Did Chaucer live in the fourteenth century?
- When did Chaucer live?
6. \( \text{past + M + have + en + verb + Loc} \)
   Grandfather could have remained outside

\[ \text{past + M + NP + have + en + verb + Loc} \]
Could grandfather have remained outside

\[ \text{wh-attachment} \]
\[ \text{past + M + NP + have + en + verb + wh-Loc} \]
Could grandfather have remained where?

\[ \text{Wh + Loc + past + M + NP + have + en + verb} \]
Where could grandfather have remained?

7. \( \text{NP + pres + M + verb + NP^2 + for the billfold} \)
   (This is a prespositional phrase of reason. You may want to let
   your students put "Reason" in the symbol string,
   or you may let them simply write "for the billfold, " since
   we haven't yet pre-sented this kind of adverb.)

\[ \text{Will Peter give money for the billfold} \]

\[ \text{wh-attachment} \]
\[ \text{pres + M + NP + verb + NP^2 + Reason} \]
Will Peter give what for the billfold

\[ \text{Wh + NP^2 + pres + M + NP + verb + Reason} \]

\[ \text{What will Peter give for the billfold} \]

8. \( \text{NP + pres + M + verb + NP + Loc} \)
   Helen will have dinner in the Spaceneedle

\[ \text{Wh + NF + pres + M + verb + NP + Loc} \]

\[ \text{Who will have dinner in the Spaceneedle?} \]
9. NP + past + verb + Man + Loc

The strikers paced steadily up and down

\[
\text{past + do + NP + verb + Man + Loc} \quad \Rightarrow \quad \text{Did the strikers pace steadily up and down}
\]

\[
\text{past + do + NP + verb + wh-Man + Loc} \quad \Rightarrow \quad \text{Did strikers pace how: up and down}
\]

\[
\text{Wh + Man + past + do + NP + verb + Loc} \quad \Rightarrow \quad \text{How did the strikers pace up and down}
\]