# Changes to 13.2.1 (“Let and Const Declarations”)

**Syntax**

*BindingIdentifier* :

*Identifier*

**default**

**Static Semantics: Early Errors**

*BindingIdentifier* : **default**

* It is a Syntax Error if the innermost *Declaration* or *VariableStatement* containing this production is not immediately contained in an *ExportDeclaration*.

# Changes to 15.1 (“Script”)

**Syntax**

*Script* :

*ScriptBodyopt*

*ScriptBody* :

*ScriptOuterItemList*

*ScriptOuterItemList* :

*ScriptOuterItem*

*ScriptOuterItemList* *ScriptOuterItem*

*ScriptOuterItem* :

*ModuleDeclaration*

*ImportDeclaration*

*StatementListItem*

# Changes to 15.3 (“Modules”)

**Syntax**

*Module* :

*ModuleBodyopt*

*ModuleBody* :

*ModuleOuterItemList*

*ModuleOuterItemList* :

*ModuleOuterItem*

*ModuleOuterItemList* *ModuleOuterItem*

*ModuleOuterItem* :

*ModuleDeclaration*

*ImportDeclaration*

*ExportDeclaration*

*StatementListItem*

*ModuleDeclaration* :

**module** [no *LineTerminator* here] *Identifier* **from** *ModuleSpecifier* **;**

*ModuleSpecifier* :

*StringLiteral*

*ImportDeclaration* :

**import** *ImportSpecifierSet* **from** *ModuleSpecifier* ;

**import** *ModuleSpecifier* **;**

*ImportSpecifierSet* :

*Identifier*

**{** **}**

**{** *ImportSpecifierList* **}**

**{** *ImportSpecifierList* **,** **}**

*ImportSpecifierList* :

*ImportSpecifier*

*ImportSpecifierList* **,** *ImportSpecifier*

*ImportSpecifier* :

*Identifier*

*Identifier* **as** *Identifier*

*ReservedWord* **as** *Identifier*

*ExportDeclaration* :

**export** *ExportSpecifierSet* **;**

**export** *ExportSpecifierSet* **from** *ModuleSpecifier* **;**

**export** *VariableStatement* **;**

**export** *Declaration* **;**

**export** *BindingList* **;**

*ExportSpecifierSet* :

*ExplictExportSpecifierSet*

**\***

*ExplicitExportSpecifierSet* :

**{** **}**

**{** *ExportSpecifierList* **}**

**{** *ExportSpecifierList* **,** **}**

*ExportSpecifierList* :

*ExportSpecifier*

*ExportSpecifierList* **,** *ExportSpecifier*

*ExportSpecifier* :

*Identifier*

*Identifier* **as** *IdentifierName*

**Static Semantics: Early Errors**

*Script* : *ScriptBodyopt*

* It is a Syntax Error if the ImportedNames of *ScriptBodyopt* contains any duplicate elements.

*Module* : *ModuleBodyopt*

* It is a Syntax Error if the ImportedNames of *ModuleBodyopt* contains any duplicate elements.

*ImportDeclaration* : **import** *ImportSpecifierSet* **from** *ModuleSpecifier* **;**

* It is a Syntax Error if the BoundNames of *ImportSpecifierSet* contains the string “**eval**” or the string “**arguments**”.

**Static Semantics: BoundNames**

*ImportDeclaration* : **import** *ImportSpecifierSet* **from** *ModuleSpecifier* **;**

1. Let *names* be the ImportedNames of *ImportSpecifierSet*.
2. Return *names*.

*ImportDeclaration* : **import** *ModuleSpecifier* **;**

1. Return a new empty List.

*ExportDeclaration* : **export** *VariableStatement* **;**

1. Let *names* be the BoundNames of *VariableStatement*.
2. Return *names*.

*ExportDeclaration* : **export** *Declaration* **;**

1. Let *names* be the BoundNames of *Declaration*.
2. Return *names*.

*ExportDeclaration* : **export** *BindingList* **;**

1. Let *names* be the BoundNames of *BindingList*.
2. Return *names*.

*ModuleDeclaration* : **module** [no *LineTerminator* here] *Identifier* **from** *ModuleSpecifier* **;**

1. Let *names* be a new List containing *Identifier*.
2. Return *names*.

**Static Semantics: ImportedNames**

*ImportDeclaration* : **import** *ImportSpecifierSet* **from** *ModuleSpecifier* **;**

1. Return the ImportedNames of *ImportSpecifierSet*.

*ImportSpecifierSet* : *Identifier*

1. Return a new List containing *Identifier*.

*ImportSpecifierSet* : **{** **}**

1. Return a new empty List.

*ImportSpecifierSet* : **{** *ImportSpecifierList* **}**

*ImportSpecifierSet* : **{** *ImportSpecifierList* **,** **}**

1. Return the ImportedNames of *ImportSpecifierList*.

*ImportSpecifierList* : *ImportSpecifier*

1. Return the ImportedNames of *ImportSpecifier*.

*ImportSpecifierList* : *ImportSpecifierList* **,** *ImportSpecifier*

1. Let *names* be the ImportedNames of *ImportSpecifierList*.
2. Append to *names* the elements of the ImportedNames of *ImportSpecifier*.
3. Return *names*.

*ImportSpecifier* : *Identifier*

1. Return a new List containing *Identifier*.

*ImportSpecifier* : *Identifier* **as** *Identifier*

1. Return a new List containing the second *Identifier*.

*ImportSpecifier* : *ReservedWord* **as** *Identifier*

1. Return a new List containing *Identifier*.

*ImportDeclaration* : **import** *ModuleSpecifier* **;**

1. Return a new empty List.

**Static Semantics: KnownExportNames**

*ExportDeclaration* : **export** **\*;**

1. Return a new List containing the record {[[Name]]: **all**, [[Kind]]: **local**}.

*ExportDeclaration* : **export** *ExplicitExportSpecifierSet* **;**

1. Let *exports* be a new empty List.
2. Let *pairs* be the ExportPairs of *ExplicitExportSpecifierSet*.
3. For each *pair* in *pairs*, do:
   1. Let *e* be the record {[[Name]]: *pair*.[[External]], [[Kind]]: **local**}.
   2. Add *e* to *exports*.
4. Return *exports*.

*ExportDeclaration* : **export** *ExplicitExportSpecifierSet* **from** *ModuleSpecifier* **;**

1. Let *pairs* be the ExportPairs of *ExportSpecifierSet*.
2. Let *exports* be a new empty List.
3. For each *pair* in *pairs*, do:
   1. Let *e* be *pair*.[[External]].
   2. Add the record {[[Name]]: *e*, [[Kind]]: **reexport**} to *exports*.
4. Return *exports*.

*ExportDeclaration* : **export** *VariableStatement* **;**

1. Let *names* be the BoundNames of *VariableStatement*.
2. Let *exports* be a new empty List.
3. For each *name* in *names*, do:
   1. Add the record {[[Name]]: *name*, [[Kind]]: **local**} to *exports*.
4. Return *exports*.

*ExportDeclaration* : **export** *Declaration* **;**

1. Let *names* be the BoundNames of *Declaration*.
2. Let *exports* be a new empty List.
3. For each *name* in *names*, do:
   1. Add the record {[[Name]]: *name*, [[Kind]]: **local**} to *exports*.
4. Return *exports*.

*ExportDeclaration* : **export** *BindingList* **;**

1. Let *names* be the BoundNames of *BindingList*.
2. Let *exports* be a new empty List.
3. For each *name* in *names*, do:
   1. Add the record {[[Name]]: *name*, [[Kind]]: **local**} to *exports*.
4. Return *exports*.

**Static Semantics: ExportPairs**

*ExplicitExportSpecifierSet* : **{** **}**

1. Return a new empty List.

*ExplicitExportSpecifierSet* : **{** *ExportSpecifierList* **}**

*ExplicitExportSpecifierSet* : **{** *ExportSpecifierList* **,** **}**

1. Let *pairs* be the ExportPairs of *ExportSpecifierList*.
2. Return *pairs.*

*ExportSpecifierList* : *ExportSpecifier*

1. Let *pairs* be the ExportPairs of *ExportSpecifier*.
2. Return *pairs*.

*ExportSpecifierList* : *ExportSpecifierList* **,** *ExportSpecifier*

1. Let *pairs* be the ExportPairs of *ExportSpecifierList*.
2. Append the ExportPairs of *ExportSpecifier* to *pairs*.
3. Return *pairs*.

*ExportSpecifier* : *Identifier*

1. Let *pairs* be a new List containing the record {[[Internal]]: *Identifier*, [[External]]: *Identifier*}.
2. Return *pairs*.

*ExportSpecifier* : *Identifier* **as** *IdentifierName*

1. Let *pairs* be a new List containing the record {[[Internal]]: *Identifier*, [[External]]: *IdentifierName*}.
2. Return *pairs*.

**Static Semantics: UnknownExportNames**

*ExportDeclaration* : **export** **\*****from** *ModuleSpecifier* **;**

1. Return a new List containing *ModuleSpecifier*.

**Static Semantics: ModuleExportNames**

*Module* : *ModuleBodyopt*

1. If *ModuleBodyopt* is not present, return a new empty List.
2. Let *boundNames* be the BoundNames of *ModuleBodyopt*.
3. Let *importedNames* be the ImportedNames of *ModuleBodyopt*.
4. Let *localNames* be the set difference of *boundNames* and *importedNames*.
5. Let *exports* be a new empty List.
6. For each *known* in the KnownExportNames of *ModuleBodyopt*, do
   1. If *known*.[[Name]] is **all**, append *localNames* to *exports*.
   2. Otherwise if *known*.[[Kind]] is **reexport**, add *known*.[[Name]] to *exports*.
   3. Otherwise *known*.[[Kind]] is **local** and the following steps are taken.
      1. Let *name* be *known*.[[Name]].
      2. If *name* is not in *boundNames*, then
         1. Let *error* be a new ReferenceError.
         2. Add {[[Error]]: *error*} to *exports*.
      3. Otherwise, add *name* to *exports*.
7. Let *unknown* be the UnknownExportNames of *ModuleBodyopt*.
8. For each *module* in *unknown*, do
   1. Add {[[Unknown]]: *module*} to *exports*.
9. Return *exports*.

**Static Semantics: LinkageConstraints**

*ModuleDeclaration* : **module** [no *LineTerminator* here] *Identifier* **from** *ModuleSpecifier* **;**

1. Return a new List containing the record {[[Module]]: *ModuleSpecifier*, [[ImportName]]: **module**, [[LocalName]]: *Identifier*, [[ExportName]]: **null**, [[Implicit]]: **false**}.

*ImportDeclaration* : **import** *ModuleSpecifier* **;**

1. Return a new List containing the record {[[Module]]: *ModuleSpecifier*, [[ImportName]]: **module**, [[LocalName]]: **null**, [[ExportName]]: **null**, [[Implicit]]: **false**}.

*ImportDeclaration* : **import** *ImportSpecifierSet* **from** *ModuleSpecifier* **;**

1. Let *constraints* be a new List containing the record {[[Module]]: *ModuleSpecifier*, [[ImportName]]: **module**, [[LocalName]]: **null**, [[ExportName]]: **null**, [[Implicit]]: **false** }.
2. Let *pairs* be the ImportPairs of *ImportSpecifierSet*.
3. For each *pair* of *pairs*, do
   1. Add the record {[[Module]]: *ModuleSpecifier*, [[ImportName]]: *pair*.[[External]], [[LocalName]]: *pair*.[[Internal]], [[ExportName]]: **null**, [[Implicit]]: **false**} to *constraints*.
4. Return *constraints*.

*ExportDeclaration* : **export** **\*;**

1. Return a new List containing the record {[[Module]]: **null**, [[ImportName]]: **null**, [[LocalName]]: **all**, [[ExportName]]: **all**, [[Implicit]]: **false**}.

*ExportDeclaration* : **export** *ExplicitExportSpecifierSet* **;**

1. Let *constraints* be a new empty List.
2. Let *pairs* be the ExportPairs of *ExplicitExportSpecifierSet*.
3. For each *pair* in *pairs*, do
   1. Add the record {[[Module]]: **null**, [[ImportName]]: **null**, [[LocalName]]: *pair*.[[Internal]], [[ExportName]]: *pair*.[[External]], [[Implicit]]: **false**} to *constraints*.
4. Return *constraints*.

*ExportDeclaration* : **export** *ExplicitExportSpecifierSet* **from** *ModuleSpecifier* **;**

1. Let *constraints* be a new empty List.
2. Let *pairs* be the ExportPairs of *ExplicitExportSpecifierSet*.
3. For each *pair* in *pairs*, do
   1. Add the record {[[Module]]: *ModuleSpecifier*, [[ImportName]]: **null**, [[LocalName]]: *pair*.[[Internal]], [[ExportName]]: *pair*.[[External]], [[Implicit]]: **false**} to *constraints*.
4. Return *constraints*.

*ExportDeclaration* : **export** *VariableStatement* **;**

1. Let *constraints* be a new empty List.
2. Let *names* be the BoundNames of *VariableStatement*.
3. For each *name* in *names*, do
   1. Add the record {[[Module]]: **null**, [[ImportName]]: **null**, [[LocalName]]: *name*, [[ExportName]]: *name*, [[Implicit]]: **false**} to *constraints*.
4. Return *constraints*.

*ExportDeclaration* : **export** *Declaration* **;**

1. Let *constraints* be a new empty List.
2. Let *names* be the BoundNames of *Declaration*.
3. For each *name* in *names*, do
   1. Add the record {[[Module]]: **null**, [[ImportName]]: **null**, [[LocalName]]: *name*, [[ExportName]]: *name*, [[Implicit]]: **false**} to *constraints*.
4. Return *constraints*.

*ExportDeclaration* : **export** *BindingList* **;**

1. Let *constraints* be a new empty List.
2. Let *names* be the BoundNames of *BindingList*.
3. For each *name* in *names*, do
   1. Add the record {[[Module]]: **null**, [[ImportName]]: **null**, [[LocalName]]: *name*, [[ExportName]]: *name*, [[Implicit]]: **false**} to *constraints*.
4. Return *constraints*.

*ExportDeclaration* : **export** **\*****from** *ModuleSpecifier* **;**

1. Return a new List containing the record {[[Module]]: *ModuleSpecifier*, [[ImportName]]: **all**, [[LocalName]]: **null**, [[ExportName]]: **all**, [[Implicit]]: **false**}.

**Static Semantics: ImportPairs**

*ImportSpecifierSet* : *Identifier*

1. Return a new List containing the record {[[Internal]]: *Identifier*, [[External]]: “**default**”}.

*ImportSpecifierSet* : **{** **}**

1. Return a new empty List.

*ImportSpecifierSet* : **{** *ImportSpecifierList* **}**

*ImportSpecifierSet* : **{** *ImportSpecifierList* **,** **}**

1. Return the ImportPairs of *ImportSpecifierList*.

*ImportSpecifierList* : *ImportSpecifier*

1. Let *pairs* be the ImportPairs of *ImportSpecifier*.
2. Return *pairs*.

*ImportSpecifierList* : *ImportSpecifierList* **,** *ImportSpecifier*

1. Let *pairs* be the ImportPairs of *ImportSpecifierList*.
2. Append the ImportPairs of *ImportSpecifier* to *pairs*.
3. Return *pairs*.

*ImportSpecifier* : *Identifier*

1. Return a new List containing the record {[[Internal]]: *Identifier*, [[External]]: *Identifier*}.

*ImportSpecifier* : *IdentifierName* **as** *Identifier*

1. Return a new List containing the record {[[Internal]]: *Identifier*, [[External]]: *IdentifierName*}.

**Static Semantics: ModuleLinkageConstraints**

*Module* : *ModuleBodyopt*

1. If *ModuleBodyopt* is not present, return a new empty List.
2. Let *boundNames* be the BoundNames of *ModuleBodyopt*.
3. Let *importedNames* be the ImportedNames of *ModuleBodyopt*.
4. Let *localNames* be the set difference of *boundNames* and *importedNames*.
5. Let *constraints* be a new empty List.
6. For each *constraint* in the LinkageConstraints of *ModuleBodyopt*, do
   1. If *constraint*.[[Module]] is **null** and *constraint*.[[ExportName]] is **all**, then the following steps are taken:
      1. For each *localName* in *localNames*, do
         1. Add the record {[[Module]]: **null**, [[ImportName]]: **null**, [[LocalName]]: *localName*, [[ExportName]]: *localName*, [[Implicit]]: **true**} to *constraints*.
   2. Otherwise, add *constraint* to *constraints*.
7. Return *constraints*.

## New section: Modules and Module Loaders

**ModuleInstanceExportNames ( M, visited )**

When the abstract operation ModuleInstanceExportNames is called with arguments *M* and *visited*, the following steps are taken:

1. If *M*.[[ExportedNames]].[[Resolved]] is **true**, then return *M*.[[ExportedNames]].[[Value]].
2. Let *exports* be a new empty List.
3. For each *export* in *M*.[[ExportedNames]].[[Value]], do
   1. If *export* is a string or a record with an [[Error]] field, add *export* to *exports*.
   2. Otherwise *export* is a record with an [[Unknown]] field, and the following steps are taken:
      1. Let *modSpec* be *export*.[[Unknown]].
      2. Let *otherMod* be the result of calling the abstract operation LookupModuleDependency with arguments *M* and *modSpec*.
      3. Let *otherMod* be *r*.[[Module]].
      4. If *otherMod* is in *visited*, then
         1. Let *error* be a new SyntaxError.
         2. Add the record {[[Error]]: *error*} to *exports*.
      5. Otherwise, the following steps are taken:
         1. Add *otherMod* to *visited*.
         2. Let *otherExports* be the result of calling the ModuleInstanceExportNames abstract operation with arguments *otherMod* and *visited*.
         3. Append *otherExports* to *exports*.
4. Set *M*.[[ExportedNames]] to the record {[[Resolved]]: **true**, [[Value]]: *exports*}.
5. Return *exports*.

**ModuleInstanceLinkageConstraints ( M )**

When the abstract operation ModuleInstanceLinkageConstraints is called with argument *M*, the following steps are taken:

1. If *M*.[[LinkageConstraints]].[[Resolved]] is **true**, then return *M*.[[LinkageConstraints]].[[Value]].
2. Let *constraints* be a new empty List.
3. For each *constraint* in *M*.[[LinkageConstraints]].[[Value]], do
   1. Let *modSpec* be *constraint*.[[Module]].
   2. If *modSpec* is **null**, then add the record {[[Module]]: *M*, [[ImportName]]: *constraint*.[[ImportName]], [[LocalName]]: *constraint*.[[LocalName]], [[ExportName]]: *constraint*.[[ExportName]], [[Implicit]]: *constraint*.[[Implicit]]} to *constraints*.
   3. Otherwise, the following steps are taken:
      1. Let *otherMod* be the result of calling the LookupModuleDependency abstract operation with arguments *M* and *modSpec*.
      2. If *constraint*.[[ExportName]] is **all**, then the following steps are taken:
         1. Let *visited* be a new empty List.
         2. Let *names* be the result of calling the ModuleInstanceExportNames abstract operation with arguments *otherMod* and *visited*.
         3. For each *name* in *names*, do
            1. Add the record {[[Module]]: *otherMod*, [[ImportName]]: *name*, [[LocalName]]: **null**, [[ExportName]]: *name*, [[Implicit]]: **true**} to *constraints*.
      3. Otherwise, add the record {[[Module]]: *otherMod*, [[ImportName]]: *constraint*.[[ImportName]], [[LocalName]]: *constraint*.[[LocalName]], [[ExportName]]: *constraint*.[[ExportName]], [[Implicit]]: *constraint*.[[Implicit]]} to *constraints*.
4. Set *M*.[[LinkageConstraints]] to the record {[[Resolved]]: **true**, [[Value]]: *constraints*}.
5. Return *constraints*.

**DefineBuiltinProperties ( O )**

When the abstract operation DefineBuiltinProperties is called with object *O*, the following steps are taken:

1. For each name *P* of the standard properties of the global object (see 18), in alphabetical order, do:
   1. Let *V* be the value of the standard built-in property *P* for the current realm.
   2. Let *W* be the value of the [[Writable]] attribute of the standard built-in property *P*.
   3. Let *E* be the value of the [[Enumerable]] attribute of the standard built-in property *P*.
   4. Let *C* be the value of the [[Configurable]] attribute of the standard built-in property *P*.
   5. Let *newDesc* be the Property Descriptor {[[Value]]: *V*, [[Writable]]: *W*, [[Enumerable]]: *E*, [[Configurable]]: *C*}.
   6. Let *status* be the result of calling the [[DefineOwnProperty]] internal method of *O* passing *P* and *newDesc* as arguments.
   7. ReturnIfAbrupt(*status*).
2. Return *O*.

# Changes to 15.1.2 (“Script Evaluation”)

**Runtime Semantics: Script Evaluation**

*Script* : *ScriptBodyopt*

With arguments *realm*, *deletableBindings*, and *moduleDependencies*.

(before the existing step 1)

1. For each *mod* in *moduleDependencies*, do:
   1. Let *status* be the result of performing Module Evaluation of *mod* using *realm*, *deletableBindings*, and *mod*.[[Dependencies]] as arguments.
   2. ReturnIfAbrupt(*status*).