The 2-letter word MO can be extended by one letter at a time up to the 9-letter MODERNEST, with all combinations being allowable words in international Scrabble:

MO, MOD, MODE, MODER, MODERN, MODERNE, MODERNES, MODERNEST

Seven of these are found in the *Official Scrabble Players Dictionary*, 4th Edition, 2006. The exception is MODER, a layer of humus intermediate between mor and mull. (*Chambers Dictionary*, 1998)

Using a larger reference it is possible to extend the record to 12 letters. All the following words are listed in the OED:

BI, BIT, BITT, BITTE, BITTER, BITTERN, BITTERNE, BITTERNES, BITTERNESS, BITTERNESSE, BITTERNESSES

The obsolete forms BITTERNE and BITTERNESSE are early variants of 'bittern' and 'bitterness' recorded in OED citations.

Is it possible to further extend the concept using open sources? My best effort to date has 13 letters, with all but two of the terms found in dictionaries. Note that this progression starts from a single letter as every letter of the alphabet is listed as a word in Web3.

*S* something shaped like the letter S. (Web3)

**SH** hush! be quiet!

**SHE** a female person or animal.

**SHEP** a shepherd (dialect); obsolete for 'sheep' or 'ship'.

**SHEPH** surname listed 12x in U.S. TDs.

**SHEPHE** surname listed 5x in U.S. TDs, and 25x on U.S. Social Security Death Index. (Net)

**SHEPHER** a biblical place-name. (*Funk & Wagnall's New Standard Dictionary*, 1942)

**SHEPHERD** a man who tends sheep.

**SHEPHERDE** early form of 'shepherd'.

**SHEPHERDES** early plural of 'shepherd/e'. (MED)

**SHEPHERDESS** a female shepherd.

**SHEPHERDSE** a female shepherd; also, a shepherd's wife. (MED)

**SHEPHERDESSES** female shepherds.

[From OED unless otherwise specified.]

References

MED Middle English Dictionary, 2001

Net Internet, using Google search program


TD telephone directory

Web3 Webster's Third New International Dictionary, 1976