Polyatomic Ions Worksheet (includes answers)

Resources:
www.youtube.com/watch?v=oSWCbrzxInI
www.somethingcalledscience.com/post/polyatomic-ions

Section 1: Multiple Choice

1. What are polyatomic ions?

   A) Ions consisting of only one atom

   B) Ions consisting of two or more atoms bonded together

   C) Ions that do not carry a charge

   D) Ions that are always positively charged

2. Which of the following is a common polyatomic ion?

   A) Sodium (Na^+)

   B) Chloride (Cl^-)

   C) Nitrate (NO_3^-)

   D) Calcium (Ca^{2+})

Section 2: Fill in the Blanks

3. A polyatomic ion carries a charge due to the difference between the total number of _____ and _____ in the ion.

4. The suffix “-ate” is used for polyatomic ions with a _____ number of oxygen atoms compared to those with the suffix “-ite.”

Section 3: Short Answer

5. Explain how the overall charge of a polyatomic ion is determined.
6. Describe the significance of phosphate (PO_4^{3-}) in biological processes.

Section 4: Matching

Match the polyatomic ion with its correct formula:

POLYATOMIC ION	FORMULA
A) Ammonium	1) SO_4^{2-}
B) Nitrate	2) NH_4^+
C) Sulfate	3) NO_3^-
D) Phosphate	4) PO_4^{3-}

Section 5: True or False

7. _____ The prefix "per-" indicates one less oxygen atom than the "-ate" ion.
8. _____ Polyatomic ions can only be negatively charged.

Section 6: Application

9. Write the formula for the following polyatomic ions:

   a) Perchlorate: _____

   b) Hypochlorite: _____

Polyatomic Ions Worksheet Answers

Section 1: Multiple Choice

1. **B)** Ions consisting of two or more atoms bonded together
2. **C)** Nitrate (NO_3^-)

Section 2: Fill in the Blanks

3. A polyatomic ion carries a charge due to the difference between the total number of **protons** and **electrons** in the ion.
4. The suffix “-ate” is used for polyatomic ions with a **higher** number of oxygen atoms compared to those with the suffix “-ite.”

Section 3: Short Answer

5. The overall charge of a polyatomic ion is determined by the difference between the total number of protons (positively charged) and the total number of electrons (negatively charged) in the ion. If there are more protons than electrons, the ion has a positive charge; if there are more electrons than protons, it has a negative charge.
6. Phosphate (PO_4^{3-}) is significant in biological processes as it is a key component of DNA and RNA, playing a crucial role in genetic information storage and transfer. It is also involved in energy transfer through ATP (adenosine triphosphate).

Section 4: Matching

POLYATOMIC ION	FORMULA
A) Ammonium	2) NH_4^+
B) Nitrate	3) NO_3^-
C) Sulfate	1) SO_4^{2-}
D) Phosphate	4) PO_4^{3-}

Section 5: True or False

7. **False** - The prefix "per-" indicates one more oxygen atom than the "-ate" ion.
8. **False** - Polyatomic ions can be either positively or negatively charged.

Section 6: Application

9. Write the formula for the following polyatomic ions:

a) Perchlorate: **ClO_4^-**

b) Hypochlorite: **ClO^-**