

# CHEMISTRY CLUE

## MIT TRIAL EVENT

### 1. DESCRIPTION:

In this event, a team's knowledge of chemistry related items and/or concepts will be tested by means of a set of 5 clues which become increasingly obvious. Earlier clues require a more advanced and diverse knowledge of chemistry, and the team members should give the correct answer on the earliest clue possible.

**PARTICIPANTS:** a team of up to 2 students      **APPROXIMATE TIME:** 50 minutes

**2. EVENT PARAMETERS:** Supervisors may **not** provide periodic tables at any point during the competition. Atomic orbital ionization energies may be provided, however.

### 3. THE COMPETITION:

- The event will consist of 25 items, each of which the students must guess through a set of 5 clues.
- The student(s) will receive a slip numbered 1 through 5 for each item or concept presented.
- A clue will only be read one time. Students have 15 seconds to discuss and record their response, if they are ready, besides the number of the clue that was just read. After each clue, proctors will collect answer sheets from students who have answered that item and check that the answer is by the right number.
- This event tests the competitors' understanding of chemistry. Items will either target the competitors' knowledge of chemical trivia, or their understanding of chemical principles and reactivity.
- There will be 5 questions each from 5 fields of chemistry: general and analytical chemistry, organic chemistry, inorganic chemistry, physical chemistry, and biochemistry.
- The level of difficulty and distribution of difficulty across the chemistry fields is up to the supervisors' discretion, but questions must be within the scope of Olympiad knowledge.
- Clues can be obscure or advanced, but they must be specific to the item. While each clue can build off the previous clues, it must not be ambiguous and vague.

### 4. SCORING:

1 point will be given for an answer on the first clue, 2 if on the second, and so forth. An incorrect answer or no answer after Clue 5 results in 6 points being awarded. Thus, the team with the lowest score wins, with 25 being the best possible score. Proctors will check, after every turned in slip, that the answer is written beside the correct number or a **10 point penalty** will be given.

Ties are broken by determining the team with the greatest number of questions answered on the lowest clue numbers (1 to 5, as needed). In the event that two teams get the same distribution of answers, specific questions will be chosen as tiebreakers to the supervisors' discretion, where the team with the lowest scores on those questions is ranked higher.

### 5. SAMPLE QUESTIONS:

Example 1 (general/analytical chemistry):

Clue 1: The decay of a radioactive isotope of this element produces most of the argon-40 in the atmosphere today.

Clue 2: A salt of this metal was used in Death Row injections.

Clue 3: Salts of this soft, silvery representative metal burn with a violet flame.

Clue 4: This alkali metal element is a key nutrient in bananas.

Clue 5: This alkali metal appears under sodium in the periodic table.

(Answer: Potassium)

Example 2 (physical chemistry):

Clue 1: This fundamental particle consists of two up quarks and one down quark.

Clue 2: This subatomic particle was discovered by Ernest Rutherford through the gold foil experiment.

Clue 3: This item may also be defined as a hydrogen ion in much of chemistry.

Clue 4: The number of these particles an atom of an element contains determines the identity of the element.

Clue 5: This subatomic particle, found in the nucleus of an atom, has a positive charge.

(Answer: Proton)

Example 3 (organic chemistry):

Clue 1: Gasoline with low amounts of a compound of this functional group may lead to engine knocking.

Clue 2: Another name for this functional group is paraffins.

Clue 3: Cracking is used to break these completely nonpolar, saturated substances into smaller hydrocarbons.

Clue 4: This organic functional group, often cited as the simplest functional group, is the basis for naming most organic compounds.

Clue 5: This hydrocarbon contains only single bonds.

(Answer: alkane)

Example 4 (inorganic chemistry):

Clue 1: This diatomic molecule is a toxic pseudohalogen that inhibits the electron transport chain.

Clue 2: This molecule is the main feature of the nitrile functional group in organic chemistry.

Clue 3: Prussian blue consists of this item bound to an iron ion as a strong field ligand.

Clue 4: Wild almonds and many fruit seeds contain amounts of this toxic chemical.

Clue 5: This molecule consists of a triple bond between carbon and nitrogen.

(Answer: cyanide)

Example 5 (biochemistry):

Clue 1: This amino acid is a key component of gelatin, and makes up 1/3<sup>rd</sup> of collagen.

Clue 2: This item is the second most common amino acid in the human body.

Clue 3: The Dayhoff code of this amino acid is G.

Clue 4: It is the only achiral amino acid.

Clue 5: As the simplest amino acid, this item has a lone hydrogen atom as its side chain.

(Answer: glycine)