Intermolecular Forces

Activity 1: Paragraph Completion
Question Group 1
Question 1
Fill in the blanks to complete the following paragraph about **dipole-dipole interactions**. Tap a blank to toggle through answer options.

Dipole-dipole intermolecular forces are experienced by _____ molecules. Such molecules possess _____, known as a **dipole**. Molecules in such substance will align themselves such that _____. This alignment results in an intermolecular force that is stronger than _____. Dipole-dipole forces would be observed in a substance such as _____ because it consists of _____. To determine if a substance experiences dipole-dipole interactions, first determine if it posseses _____; then consider molecular shape to insure that _____.

Question Group 2
Question 2
Fill in the blanks to complete the following paragraph about **London dispersion forces**. Tap a blank to toggle through answer options.

London disperson forces are the _____ of all intermolecular forces (IMFs). All substances experience such IMFs, but it is the only IMF that a _____ substance experiences. Electrons in particles are in constant motion. London dispersion forces occur because at any given time, the electrons could _____, resulting in _____. This in turn would _____ and result in _____. Dispersion forces are _____. They would be the most dominant IMF in a substance such as _____ because it is _____. London dispersion forces are strongest in molecules that are _____ because their electron clouds _____.

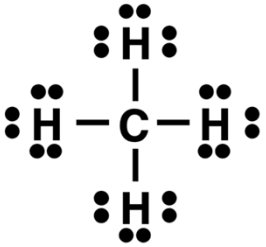
Question Group 3
Question 3
Fill in the blanks to complete the following paragraph about **hydrogen bonding**. Tap a blank to toggle through answer options.

Hydrogen bonding is an intermolecular force (IMF) observed in substances with _____. Hydrogen bonding is _____ London dispersion forces and _____ dipole-dipole interactions. Hydrogen bonding is observed in _____. It is the result of the H atom _____. This occurs because _____. To determine if a substance experiences hydrogen bonding, _____.

Activity 2: Force Identification
Question Group 4
Question 4

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of CH_4

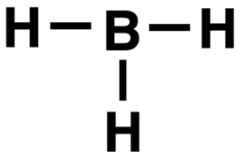


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 5

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of BH_3

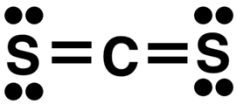


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 6

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of CS_2

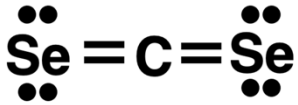


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 7

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of CSe_2



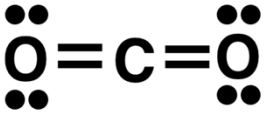
Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question Group 5 was removed on 12/5/2024. The questions are found at the bottom of this document.

Question Group 6
Question 12

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of CO_2

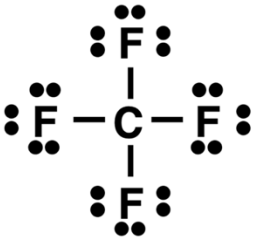


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 13

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of CF_4

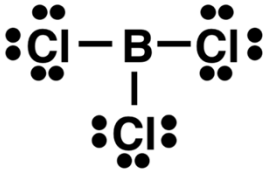


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 14

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of BCl_3

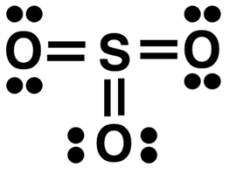


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 15

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of SO_3

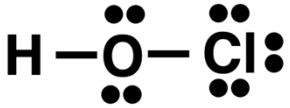


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question Group 7
Question 16

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of HOCl



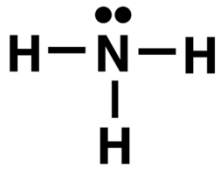
Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):

London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 17

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of NH_3

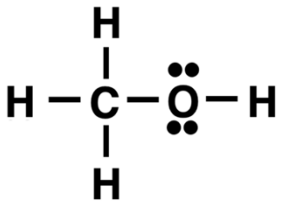


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 18

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of CH_3OH



Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 19

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of HF

Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):

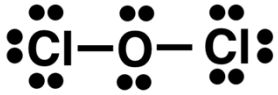
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question Group 8

Question 20

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of OCl_2

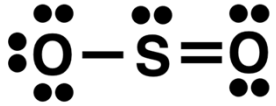


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 21

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of SO_2

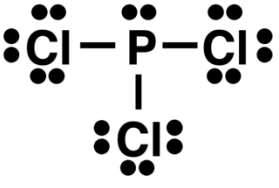


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 22

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of PCl_3

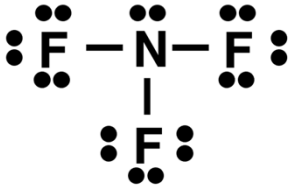


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 23

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of NF_3



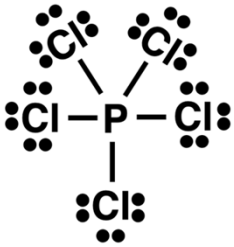
Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question Group 9

Question 24

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of PCl_5

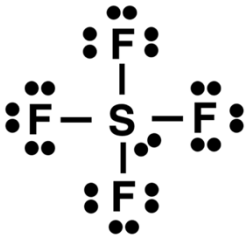


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 25

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of SF_4

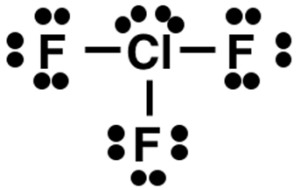


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 26

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of ClF_3

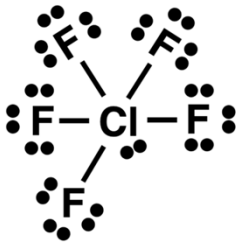


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 27

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of ClF_5



Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Activity 3: Ranking Tasks
Question Group 10
Question 28
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
NH_3
PH_3
AsH_3

Question 29
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
AsH_3
NH_3
PH_3

Question 30
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
PH_3
AsH_3
NH_3

Question Group 11
Question 31
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
CH_4
C_4H_{10}
$C_{25}H_{52}$

Question 32

For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
$C_{25}H_{52}$
CH_4
C_4H_{10}

Question 33
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
C_4H_{10}
$C_{25}H_{52}$
CH_4

Question Group 12
Question 34
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
F_2
Br_2
I_2

Question 35
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
I_2
F_2
Br_2

Question 36
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
Br_2
I_2

F_2

Question Group 13
Question 37
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
CH_4
NH_3
H_2O

Question 38
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
H_2O
CH_4
NH_3

Question 39
For the following substances, consider the types of intermolecular forces and their relative strength. Then rank the substances in terms of the overall strength of the intermolecular forces.
NH_3
H_2O
CH_4

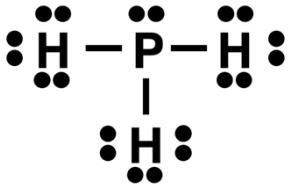
Question Group 5 was removed from the Concept Builder on 12/5/2024

Question Group 5

Question 8

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of PH_3

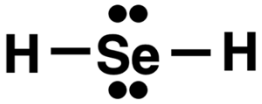


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 9

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of H_2Se

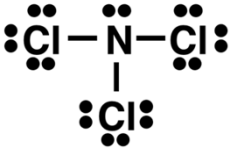


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 10

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of NCl_3

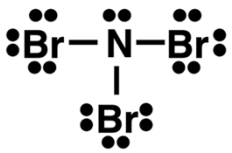


Polar Bonds? Yes No
Polar Molecule? Yes No
Types of Intermolecular Forces (circle all that apply):
London dispersion forces Dipole-dipole interactions Hydrogen bonding

Question 11

A formula and Lewis Structure for a substance is shown. Identify whether it has polar bonds. Identify whether the molecule is a polar molecule. And identify all the types of intermolecular forces (IMFs) that the substance would experience.

Lewis Structure of NBr_3



Polar Bonds? Yes No

Polar Molecule? Yes No

Types of Intermolecular Forces (circle all that apply):

London dispersion forces Dipole-dipole interactions Hydrogen bonding