

ICATS SCIENCE CONTEST



2022 QUESTION BOOKLET

**GRADE 7 & 8
JUVENILES**

Time Allowed: 90 Mins.
Maximum Marks: 90



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CATS CONTESTS

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ICATS SCIENCE CONTEST 2022

JUVENILES (GRADE 7 & 8)

TIME ALLOWED : 90 MINUTES, MAXIMUM MARKS : 90

TOTAL QUESTIONS : 30 MCQS

INSTRUCTIONS

1. DON'T START ATTEMPTING THE PAPER UNTIL INSTRUCTED BY THE INVIGILATORS.
2. INSTRUCTIONS FROM THE EXAMINATION INVIGILATORS MUST BE CARRIED OUT PROMPTLY.
3. CAREFULLY RECHECK YOUR NAME, FATHER NAME, SCHOOL NAME, ADDRESS ETC AT THE BUBBLE SHEET / ANSWER SHEET.
4. RECORD ALL ANSWERS ON THE BUBBLE SHEET ONLY. SELECT BEST ANSWER FROM THE FOUR GIVEN OPTIONS AND MARK ONLY ONE OPTION IN EACH QUESTION.
5. USE BLUE / BLACK INK TO FILL UP THE CIRCLES FOR YOUR ANSWERS ON THE BUBBLE SHEET. USE OF LEAD PENCIL IS NOT ALLOWED.
6. USE OF ANY HELPING MATERIAL INCLUDING CELL PHONES AND ELECTRONIC DEVICES IS STRICTLY PROHIBITED.
7. EVERY CORRECT ANSWER EARNS THREE POINTS. THERE WOULD BE NEGATIVE MARKING. ONE POINT WOULD BE DEDUCTED FOR EVERY INCORRECT ANSWER.
8. CANDIDATES MAY NOT LEAVE THE EXAMINATION ROOM UNESCORTED FOR ANY REASON, AND THIS INCLUDES USING THE WASHROOM.
9. NO MATERIALS OR ELECTRONIC DEVICES SHALL BE BROUGHT INTO THE ROOM.
10. THERE ARE FIVE CATEGORIES OF THE CONTEST AS UNDER:
 - A. TODDLERS (GRADE 1 & 2)
 - B. KIDS (GRADE 3 & 4)
 - C. JUNIORS (GRADE 5 & 6)
 - D. JUVENILES (GRADE 7 & 8)
 - E. ADOLESCENTS (GRADE 9 & 10 / O-LEVELS)
11. REGISTERED STUDENTS CAN PARTICIPATE IN THE CONTEST.
12. NO CANDIDATE SHALL TAKE OUT OF THE HALL ANY ANSWER BOOK(S) OR PART OF AN ANSWER BOOK, WHETHER USED OR UNUSED, OR OTHER SUPPLIED MATERIAL.
13. IF A PARTICIPANT DOES NOT UNDERSTAND A WORD OR PHRASE ON THE EXAM PAPER, NEITHER EXAMINER NOR INVIGILATOR IS PERMITTED TO ANSWER.
14. FOR INFORMATION ABOUT UPCOMING CONTESTS OR PROVIDING VALUABLE FEEDBACK, PLEASE VISIT WWW.CATSCONTESTS.ORG
15. ANY ACADEMIC MISCONDUCT OR MALPRACTICE MUST BE REPORTED TO INTERNATIONAL CATS CONTESTS AT INFO@CATSCONTESTS.ORG

Use the information below to answer questions 1 and 2.

As some students are planting flowers, they notice several earthworms in the soil. One student wonders if earthworms are beneficial to the growth of plants. The student decides to test this by performing an investigation. The student plants identical flowering plants in two containers with potting soil. The treatment for the plants is the same, except that six earthworms are added to one container. Figure 1 shows the plants after 65 days of growth.

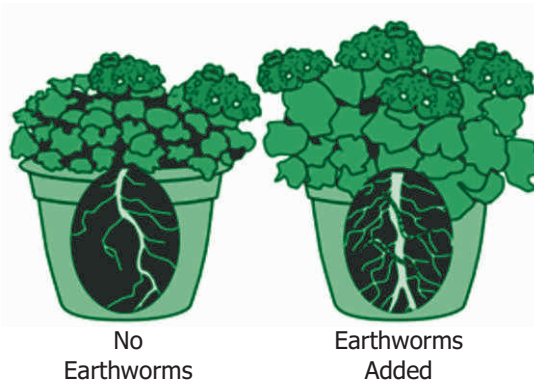


Figure 1. Plants after 65 Days

The plant in the pot with earthworms appears to be healthier. The student describes it as having larger leaves, a thicker stem, a more upright stem, more root hairs, and longer roots than the plant in the container without the earthworms

Q1. Based on the investigation, the student group decides to add a large number of earthworms to their flower garden. Which statement best explains whether these data are being applied correctly?

- A** The garden is a less stable system, and the results can be easily duplicated.
- B** The garden is a more stable system, and the results cannot be easily duplicated.
- C** The variables are similar, and you can expect the same results in the potted plant and the flower garden without collecting more data.
- D** The variables are different, so you cannot expect the same results in the potted plant and the flower garden without collecting more data.

Q2. Based on the observations regarding matter and energy flow in the containers, the student describes the role of the earthworm in the ecosystem created in the investigation. Which description best explains the role of earthworms in the ecosystem?

- A** consumers, because they eat organisms that would compete with plants for beneficial nutrients
- B** producers, because they use energy from the Sun to produce nutrients that are needed by plants
- C** decomposers, because they break down substances in the soil that provide nutrients for plants
- D** scavengers, because they can survive in soils that have very few nutrients and still remain healthy



Use the information below to answer questions 3 through 7.

Bat activity can be affected by artificial lighting. Because bats often rest during the day and hunt at night, they use their sense of hearing to help locate prey in the dark. A hunting bat emits high-pitched sound waves that reflect off insects. The external structure of the bat's ear, which is composed of cartilage, funnels the reflected sound waves to the inner ear. The bat's brain then identifies the location of an insect based on the amount of time it takes for the reflected sound waves to reach the bat's ears.

A group of researchers set up a study using white, green, and red lights in an otherwise dark natural habitat. The researchers measured the activity of two types of bats by recording the number of times a bat passed by. The researchers took measurements for five days in both early summer and late summer for four years. Their results are shown in the graph.

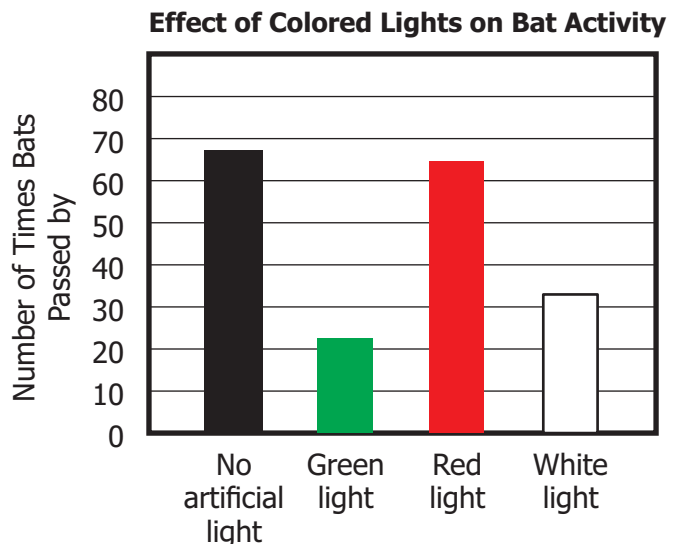


Figure 1.

Based on the information about bats, two students construct claims about the body systems a bat uses when it hunts.

Student 1: A bat's nervous system tells the bat where its prey is located. Then the bat's muscular system allows the bat to fly and catch the prey.

Student 2: A bat uses its respiratory system to produce sounds. Then the bat's nervous system tells the bat where the prey is located.

Q3. Which question can best be answered by analyzing the data in Figure 1?

- A** Why are bats not attracted by green light?
- B** Can bats distinguish a green grasshopper from a red ant at night?
- C** Are bats likely to be affected by green lights and red lights shining together?
- D** What color light should be used to observe bat activity without affecting their behavior?



Q4. The independent variable in this investigation is _____ .

- A** Type of bat
- B** Observed activity
- C** Color of light
- D** None of these.



Q5. The investigation provided evidence that the bats' _____ is reacting to a stimulus and affecting the behavior of the bats.

- A** Muscular system
- B** Nervous system
- C** Circulatory system
- D** All of these.

Q6. Which statement best compares the claims of the two students?

- A** Student 2's claim explains how ears send information to the brain, and Student 1's claim explains how the brain sends messages to the muscles for immediate action.
- B** Student 2's claim explains how the brain is not needed to process information, and Student 1's claim explains how muscle memory is used to capture prey.
- C** Student 1's claim explains how the brain stores memories, and Student 2's claim explains how these memories are used to locate prey.
- D** Student 1's claim explains how the brain reacts to sounds, and Student 2's claim explains how these sounds are stored as memories.



Q7. Which of the following is not an example of an irreversible change?

- A** A log of wood has been burned on the fire.
- B** A fruit smoothie has been frozen to make lollies.
- C** A mixture of flour, water and yeast has been baked into bread.
- D** A bicycle left out in the rain begins to rust.



Q8. Which star is nearest to Earth?

- A** Pole star **B** Orion **C** Cassiopeia **D** Sun


Q9. If I am 13 years old, I have gone round the sun ____ times.

A Never gone round the sun

C 26

B 13

D Shall go round the sun when I shall be 15



Q10. If Saturn is thrown into an ocean,

A it will float.

C it will dissolve.

B it will sink.

D it will soak all water.



Q11. Where is the lightning rod attached to protect the building from lightning?

A On the top of the building

C In the middle of the building

B On the bottom of the building

D Anywhere



Q12. Tsunami means

A earthquake

C earthquake under the sea

B floods

D eruption of volcano in a sea

Q13. The type of pollution which is likely to affect Taj Mahal in Agra to a greater extent is

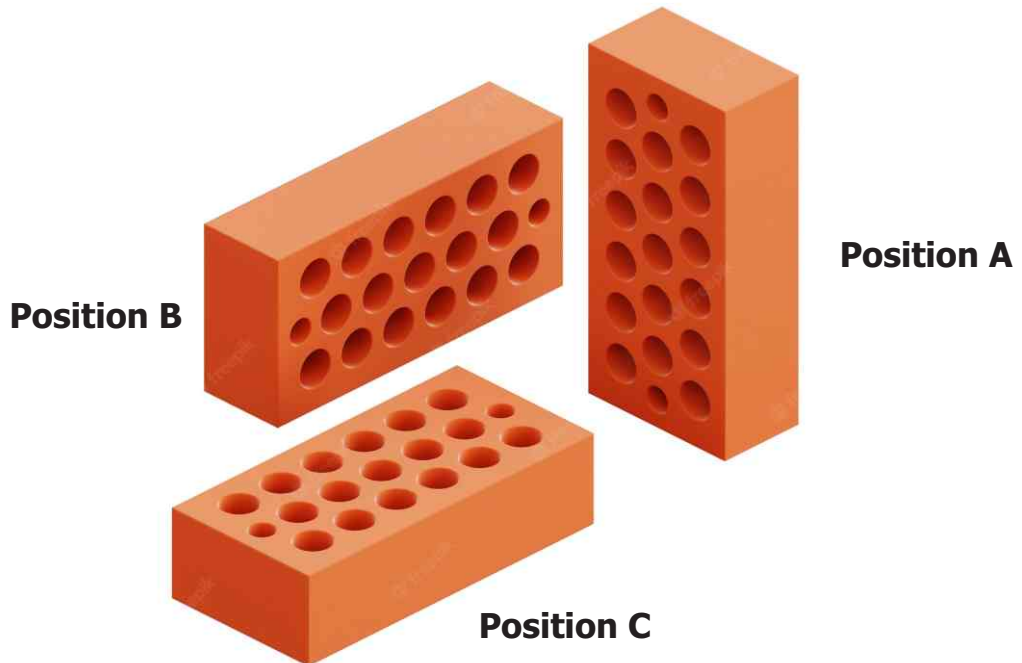
A Air pollution

B Soil pollution

C Water pollution

D Noise pollution

Q14. A brick is kept in three different ways on a table as shown in given figure.



The pressure exerted by the brick on the table will be

A Maximum in position A

B Maximum in position C

C Maximum in position B

D Equal in all cases

Use the information below to answer questions 15 and 16.
Figure 1 shows embryo development for four organisms.

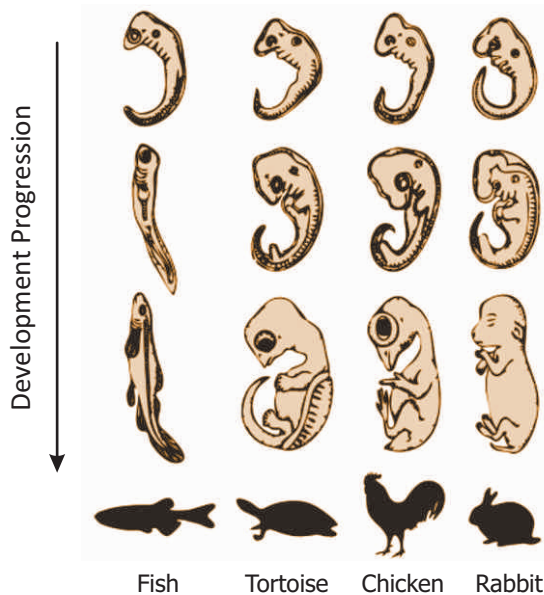


Figure 1. Embryo Development

Q15. Which statement can best be supported by Figure 1?

- A** Chickens are more closely related to tortoises than rabbits are.
- B** Rabbits, chickens, tortoises, and fish are equally related to each other.
- C** Fish do not share a common ancestor with other vertebrates.
- D** Fish and chickens are the least closely related.



Q16. Which question can best be answered by the data in Figure 1?

- A** How long does it take different organisms to develop into adults?
- B** Do diverse organisms follow a similar progression of development?
- C** Do modern organisms follow the same development progression as ancient organisms?
- D** Which characteristics at each developmental stage increase an organism's chance of survival?

Q17. Some researchers are developing a new fertilizer designed to improve the growth of plants in hot, dry climates. The fertilizer was applied to one hundred desert plants in a greenhouse. The average daytime temperature in the greenhouse was 90°F, and the humidity levels were low. Which is best for the researchers to do next?

A Compare plants that received fertilizer to similar plants that received none.

B Begin selling the fertilizer to gardeners living in hot, dry climates.

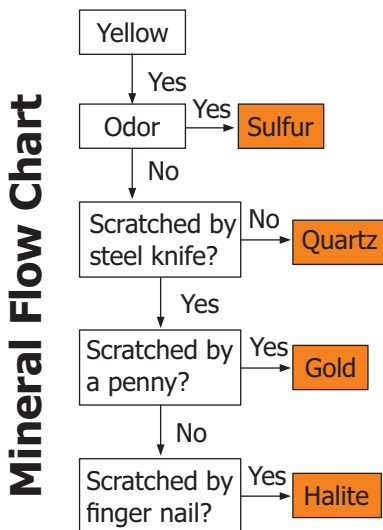
C Change the conditions in the greenhouse and retest the fertilizer.

D Test the fertilizer on plants that are adapted to cooler climates.



Q18. A student wanted to identify a mineral based on the flow chart below. The mineral was yellow and odorless. The student scratched the mineral with a steel knife and a penny, but not with a fingernail.

Based on this flow chart, which mineral could the student have been observing?



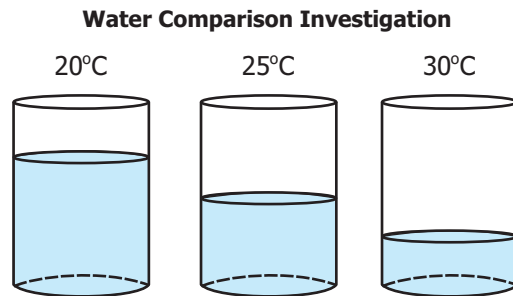
A Sulfur

B Quartz

C Gold

D Halite

- Q19.** A student filled three identical cups with equal amount of water. The student placed each cup in a room with a different air temperature. After a few days, the student compared the amounts of water remaining in each cup.



What cause-and-effect relationship does this investigation support?

- A** As evaporation decreases, air temperature decreases.
- B** As evaporation increases, air temperature increases.
- C** At higher air temperatures, more water evaporates.
- D** At higher air temperatures, less water evaporates.



- Q20.** Some students investigated plant growth by growing two sets of the same type of plant. One set was grown indoors and the other set was grown outdoors. They recorded data in the table below.

The students concluded that the plants grown indoors grew faster because they received better quality light than the plants grown outdoors. Which is the most likely reason this conclusion may be flawed?

Indoor vs. Outdoor Plant Growth

	Indoor Plants Height (cm)			Outdoor Plants Height (cm)		
	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6
Week 1	18.0	14.3	16.6	15.0	16.2	14.7
Week 2	22.1	16.5	18.2	16.5	17.3	15.9
Week 3	24.4	19.0	20.5	17.2	19.1	17.0
Week 4	26.3	22.1	23.6	19.1	20.6	19.4

- A** The students measured the plants at different times.
- B** The students should have grown different types of plants.
- C** The growth of the plants in each set was affected by more than one factor.
- D** The outdoor plants grew faster than the indoor plants.

Q21. Some information about the planets is given below.

Planetary Information						
	Mercury	Earth	Mars	Jupiter	Saturn	Neptune
Approximate distance from the Sun (in millions of kilometers)	58	150	228	778	1,427	4,497
Mass of Planet (Earth = 1)	0.1	1	0.1	317.9	95.2	17.1
Number of Observed Moons	0	1	2	62	60	13

Which conclusion is best supported by the data in the table?

- A** The farther the planets are from the sun, the more moons they have.
- B** The mass of the three farthest planets increases with their distance from the sun.
- C** The greater the mass of the planets, the more moons they have.
- D** The three planets with the smallest mass have the fewest number of moons.



Q22. A student is trying to determine if the composition of ice cubes affects the melting point. Which will be the best investigation to use?

- A** Freeze pure water in 3 identical ice cube trays, and then place each tray on a table in different rooms.
- B** Freeze pure water, sugar water, and salt water in 3 identical ice cube trays, and then place the trays side by side on the same table.
- C** Freeze pure water in 3 different-sized ice cube trays, and then place each tray on a different table in the same room.
- D** Freeze pure water, sugar water, and salt water in 3 different-sized ice cube trays, and then place the trays side by side on the same table.

Q23. The locations of Nashville, TN, and Wilmington, NC, are shown on the map.



How does the climate of Wilmington most likely compare to the climate of Nashville?

- A** Wilmington has hotter summers because it is farther east.
- B** Nashville has more rain because it is farther west.
- C** Wilmington has milder winters because it is closer to the ocean.
- D** Nashville has the same climate because it has the same distance from the equator.



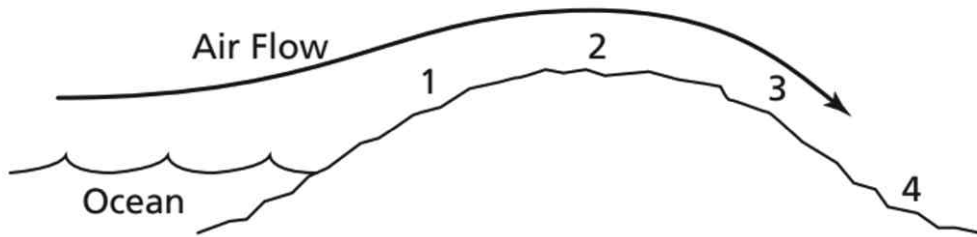
Q24. An animal called a sea anemone uses stinging cells to capture prey.

Although this animal looks like a flower, it must get energy from which source?

- A** Soil
- B** Sunlight
- C** Ocean water
- D** Other organisms



Q25. The picture shows air flow over a mountain.



Which numbered region most likely has the highest summer temperatures?

A 1

B 2

C 3

D 4

Q26. Different types of water pollution and their effects are described in the table below.

Descriptions of Water Pollution

Type	Effect
Raw Sewage	Illnesses such as typhoid and hepatitis can spread to humans
Phosphate and Nitrate	Increases algae, then decaying algae uses up oxygen in water
Poison	Stored in the bodies of fish and builds up in organisms that eat fish
Oil	Becomes stuck on bird feathers
Thermal (heat)	Causes water to be less able to contain oxygen; causes bacteria to grow

Based on the table, which results from both phosphate and nitrate pollution and thermal (heat) pollution in water?

A Diseases are carried through the water.

C Growth of algae rapidly increases.

B Materials contaminate the bodies of birds.

D Levels of oxygen in the water decrease.

Q27. Omar went to a magic show. The magician rubbed a balloon on her hair and then held the balloon against a wall. When the magician released the balloon, Omar was amazed to see that it stuck to the wall! He wonders what factors affect how well balloons stick to different surfaces. So, he decides to design an experiment. He has the following supplies available:

- the hair on his own head
- a cotton blanket
- a wooden door
- five rubber balloons

Using only these supplies, which question can Omar investigate with an experiment?

- A** Do rubber balloons stick to a cotton blanket or a wooden door longer after being rubbed on his hair?
- B** Do rubber balloons or foil balloons stick to the wooden door longer after being rubbed on his hair?
- C** Do rubber balloons stick to a wooden door or a metal door longer after being rubbed on his hair?
- D** None of above.



Q28. Marcy wants to grow sunflowers in her backyard garden. She notices that some sunflowers grow much taller than others. She is curious about what factors affect how sunflowers grow. So, she decides to design an experiment. She has the following supplies available:

- Seeds from one type of sunflower
- Soil
- One wooden planter box in the sun
- One wooden planter box in the shade
- One plastic planter box in the sun
- Water

Using only these supplies, which question can Marcy investigate with an experiment?

- A** Do sunflowers grow taller if they are planted in planter boxes or in pots?
- B** Do sunflowers grow bigger in sunny planter boxes or in shady planter boxes?
- C** Which type of sunflower grows more leaves?
- D** All of the above.

Q29. Natalie is sledding with her friends. She notices that some of them go faster down the sledding hill. She wonders what factors affect sledding speed. So, she decides to design an experiment. She has the following supplies available:

- Access to a small snow-covered hill at the park
- A small plastic sled
- A large plastic sled
- A rubber inner tube sled
- A stopwatch

Using only these supplies, which question can Natalie investigate with an experiment?

- A** Does a rubber inner tube sled go faster down a small hill or down a big hill?
- B** Does a plastic sled or a wooden sled go down a hill faster?
- C** Does a rubber inner tube sled or a plastic sled go faster down a hill?
- D** All of the above.



Q30. A tugboat tows ships out of a harbor. The tugboat starts pulling the ships when they are stopped at a dock.

Masses of ships	
Name	Mass (kg)
Bright Start	1,119
Gardenia	1,222
Margate	2,252
Premier	2,046

The ships have the same acceleration as they begin to move away from the dock. Order the names of the ships to show the size of the force the tugboat applies to each ship.

- A** Bright start, Gardenia, Margate, Premier
- B** Margate, Gardenia, Premier, Bright start
- C** Margate, premier, gardenia, Bright start
- D** Premier, Gardenia, Bright star, Margate

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Congratulations

ICATS Art Contest 2022 National Toppers

Student Name	Father Name	Grade	School
HUMNA NADIR	M. NADIR IKRAM	1	FOUNDATION PUBLIC SCHOOL
HAIDER ALI	ALI MUSHTAQ	2	ARMY PUBLIC SCHOOL & COLLEGE
MUHAMMAD YOUSAF	KAMRAN ASHRAF	3	KOHSAR CHILDREN'S ACADEMY
MUHAMMAD ZAID	M. SOHAIB NIZAMI	4	GENERATIONS SCHOOL
HANIA ABID	MRS. ASMA LATIF	5	FATIMA FERTILIZER SCHOOL
RUQAIYAH ALI ASGHER	ALI ASGHER KHAMBATWALA	5	MSB EDUCATIONAL INSTITUTE
RAMISHA ALI	ABID ALI MUGHAL	6	GOVT. QUEEN MARY GRADUATE COLLEGE
SYEDA FATIMA SURIYA	SYED TAHIR HUSSAIN	7	BEACONHOUSE SCHOOL SYSTEM
MANAL ARSHAD	MUHAMMAD ARSHAD	8	HABIB GIRLS SCHOOL
MARYAM SHAHID	SHAHID IQBAL	9	BAHRIA COLLEGE
AREEBA KHAN	DURAIZ KHAN	10	PRESENTATION CONVENT HIGH SCHOOL

ICATS Creative Writing Contest 2022 National Toppers

Student Name	Father Name	Grade	School
HASSAN WASEEM	M. WASEEM	1	PAKISTAN INT'L PUBLIC SCHOOL
M. AFNAN SUFDER	SUFDER HUSSAIN	2	ARMY PUBLIC SCHOOL AND COLLEGE SYSTEM
FATIMA NOOR	BILAL YOUSAF	3	LAHORE GRAMMAR SCHOOL
M. ABDULLAH HASSAN	RIZWAN AHMAD	3	LAHORE GRAMMAR SCHOOL
SHANZAY ADNAN	ADNAN FAROOQ	3	ARMY PUBLIC SCHOOL
PRATIK PARKASH	PARKASH LAL	4	THE CITY SCHOOL
DANIYAL SHAHZAD	SHAHZAD ASLAM	5	LAHORE GRAMMAR SCHOOL
HASSAN ALI	IMRAN ALI SHAH	6	ARMY PUBLIC SCHOOL & COLLEGE
MAIDA SOHAIL	SOHAIL AKRAM	7	BEACONHOUSE SCHOOL SYSTEM
ATIYA ATIF	MUHAMMAD ATIF NAZAR	8	ROOTS IVY INTERNATIONAL SCHOOL
AYESHA HAFEEZ	CH. GHULAM HAFEEZ	8	ISLAMABAD COLLEGE OF ARTS & SCIENCES
PARTHAM KUMAR	DOULAT RAM	9	AGA KHAN HIGHER SECONDARY SCHOOL
AMNA HUSNAIN	SYED ALI ZAFAR	10	AES SCHOOL FOR GIRLS
RASIKH JAVED	M JAVED	10	BAHRIA FOUNDATION COLLEGE

Compete
if you are the best