

Fig. 1 Gender distribution of participants

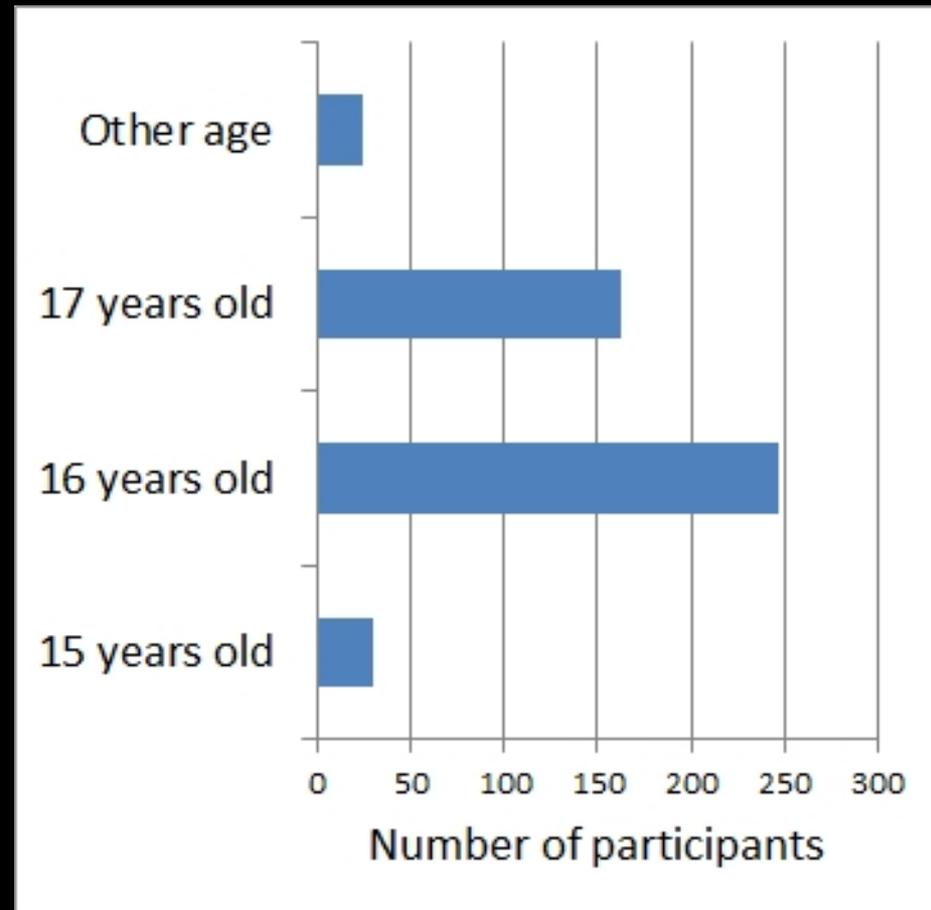


Fig. 2 Age distribution of participants

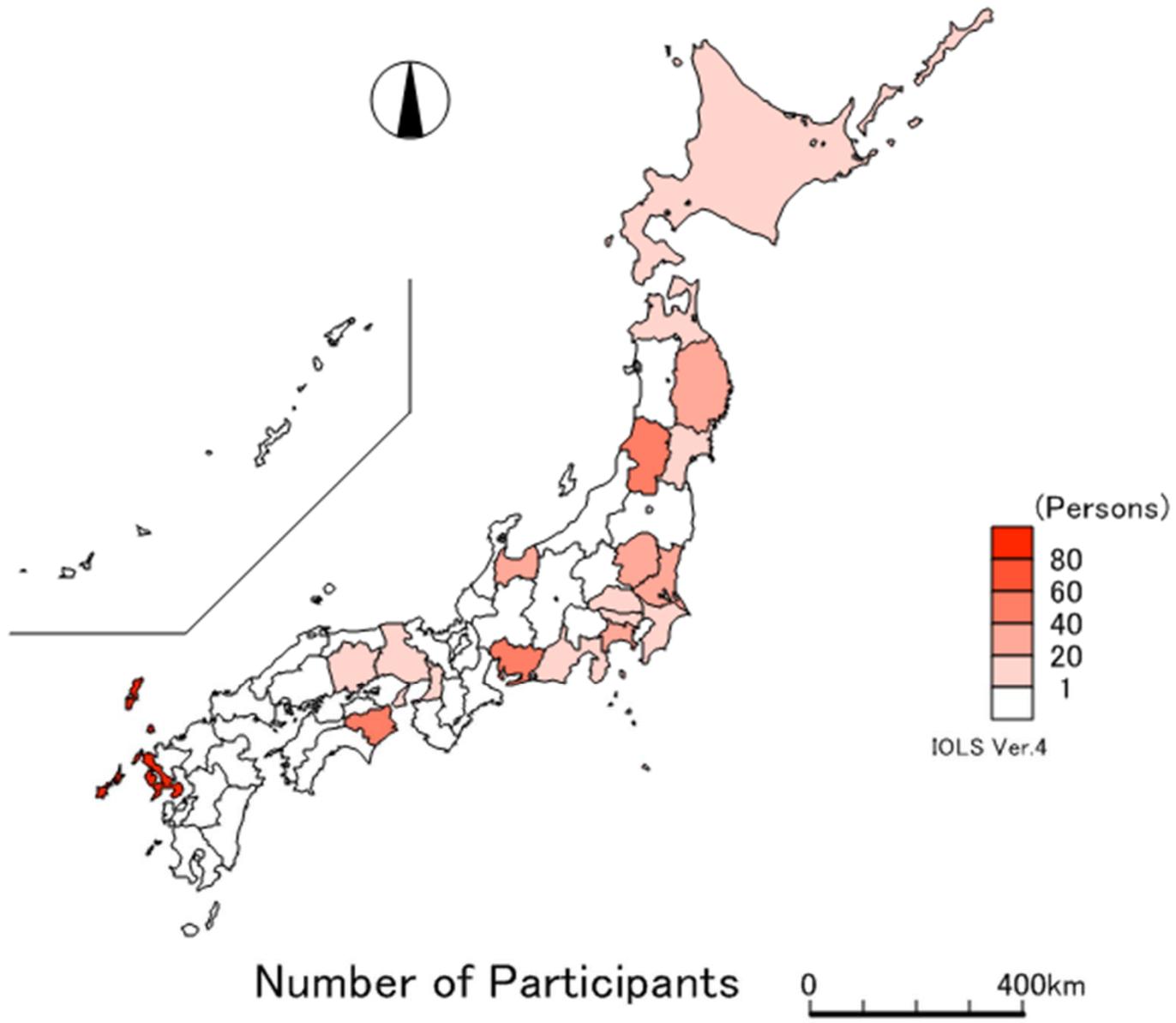


Fig. 3 Participants from each of 19 prefectures.

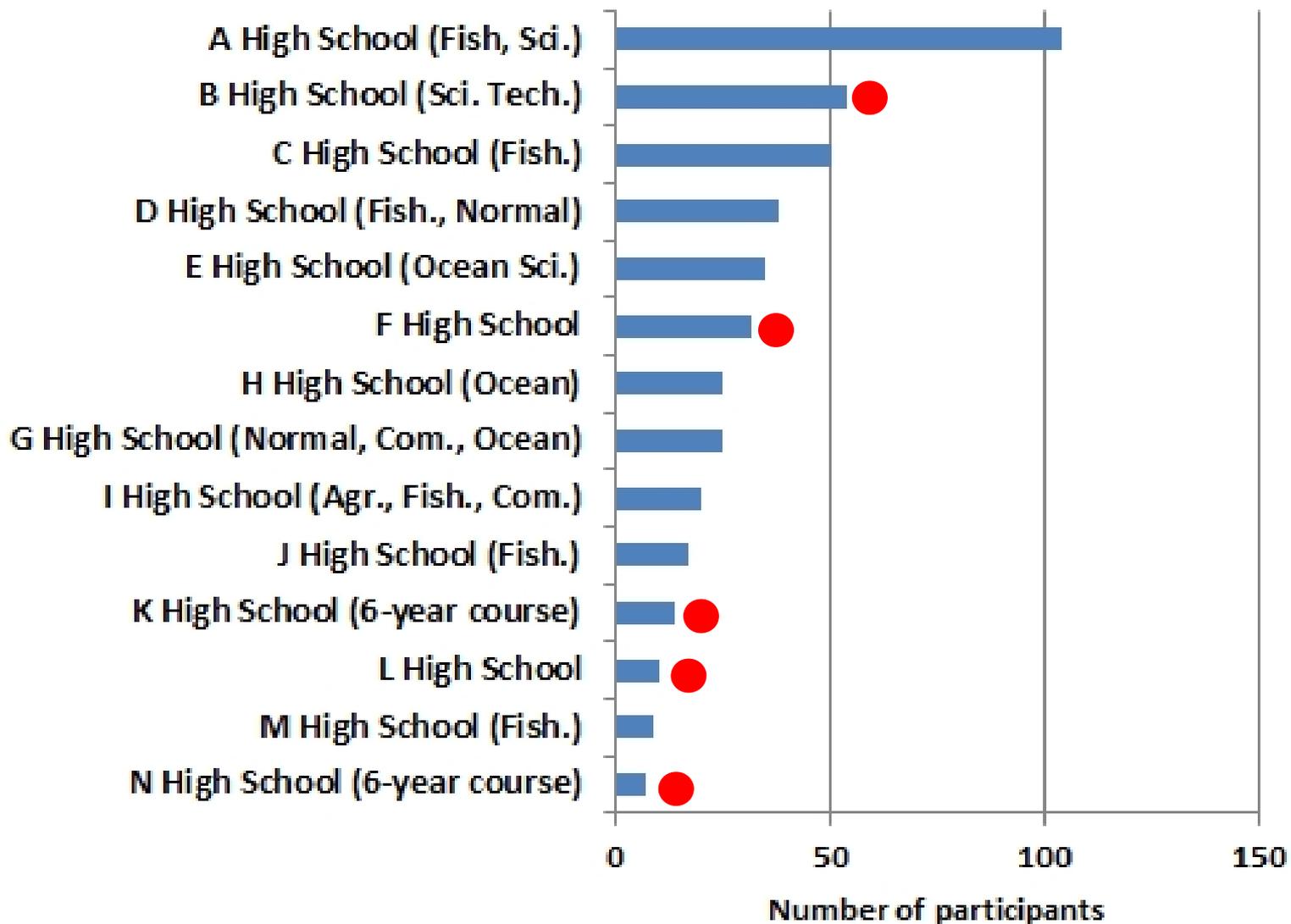


Fig. 4 Participants from each of top 14 high-schools. Red circle indicates the high-school not established for fisheries education in the beginning.

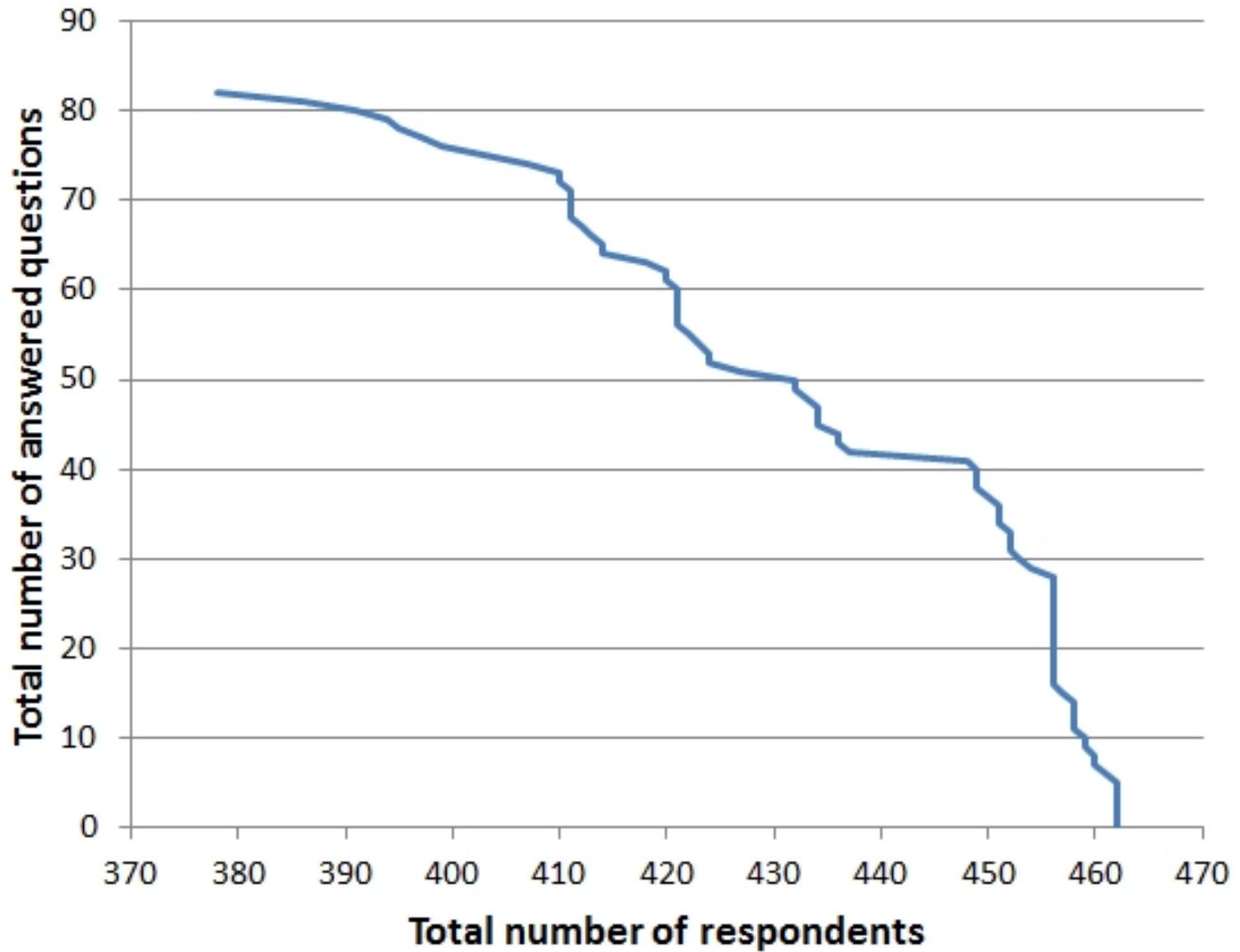


Fig. 5 Total number of questions answered by respondents. Only 378 out of 462 respondents answered all 82 questions.

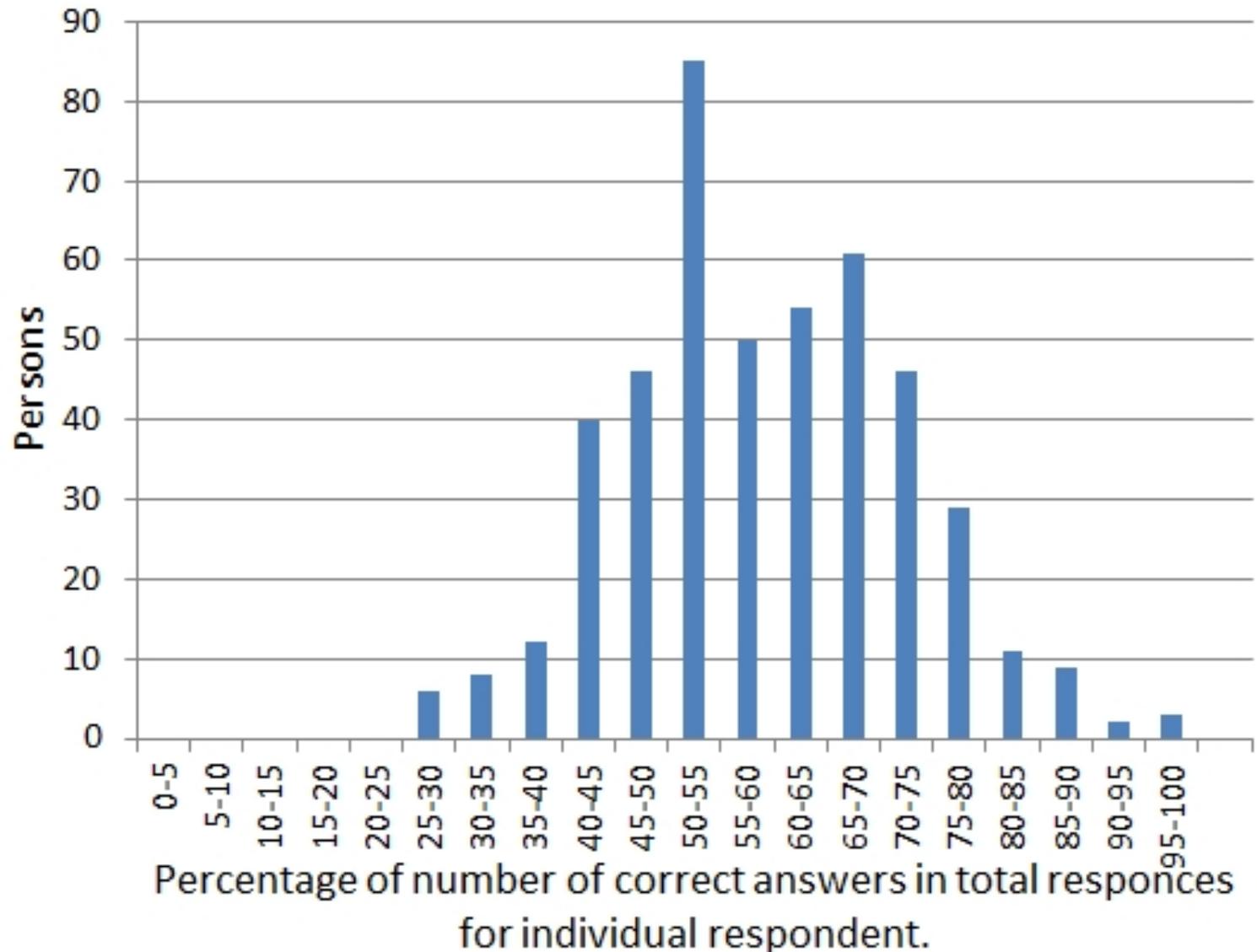


Fig. 6 Histogram of percentage of number of questions which respondents selected correct answers. 86 persons selected correct answer in 50-55 % of questions they responded (not all).

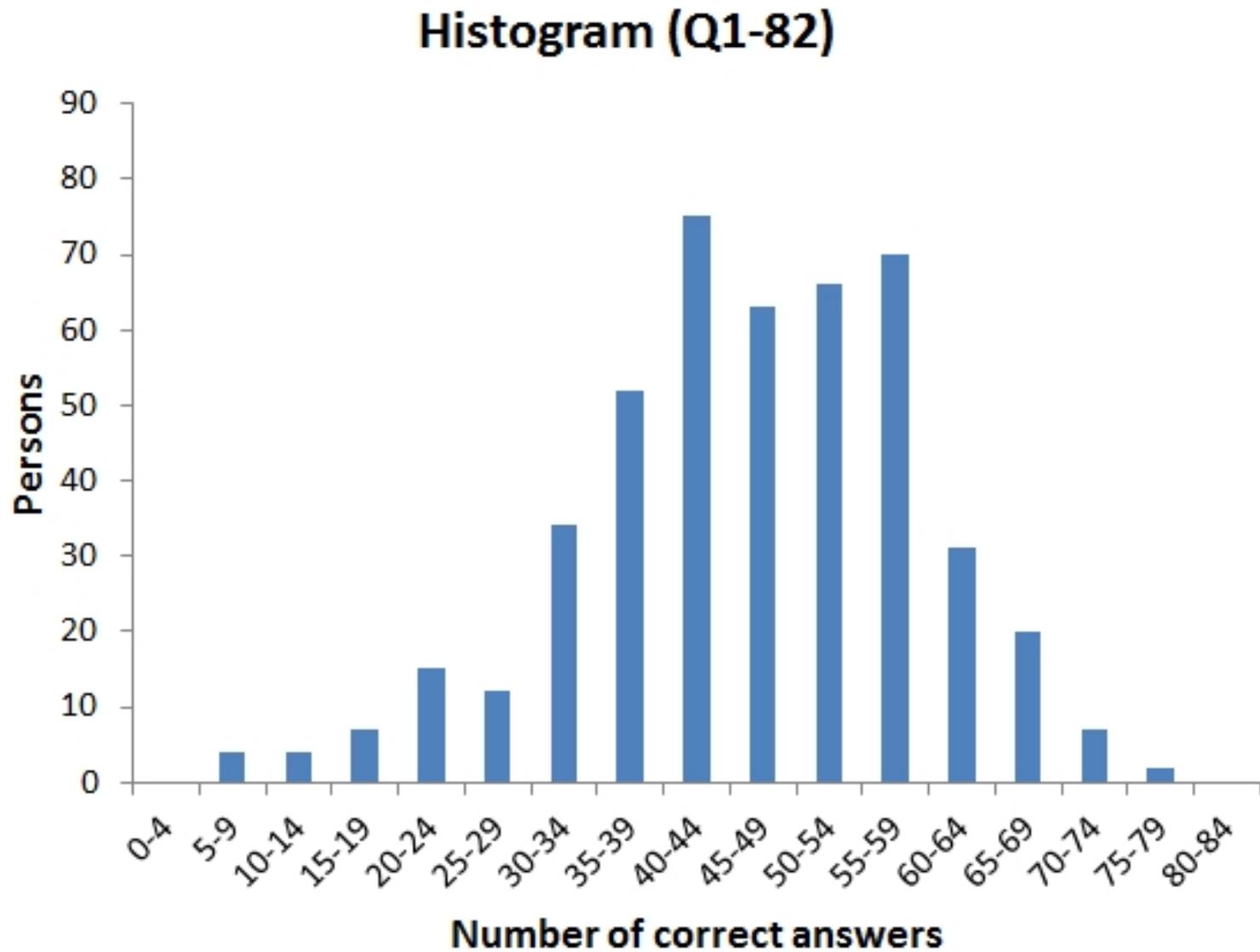
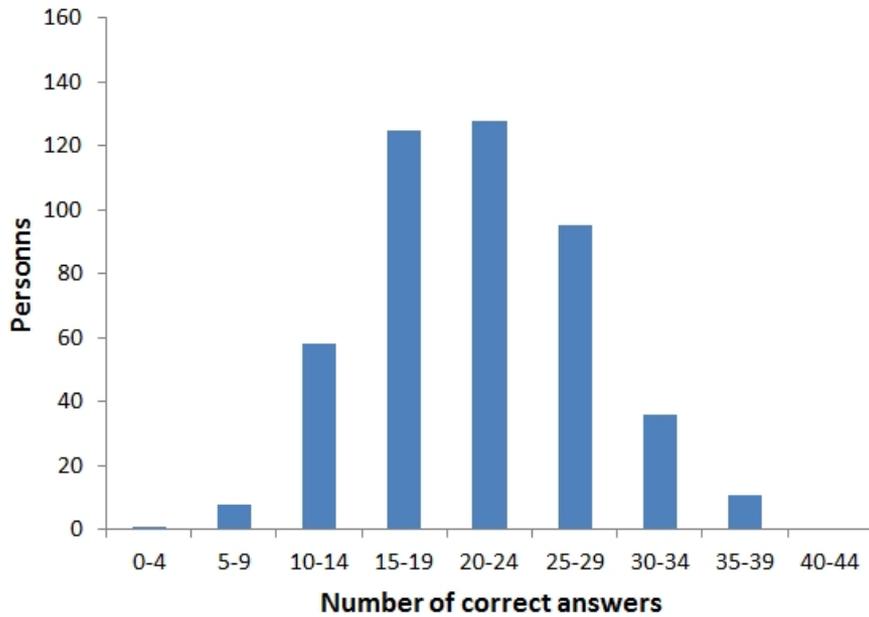


Fig. 7a Histogram of number of questions which respondents selected correct answer.

Histogram (Q1-40)



Histogram (Q41-82)

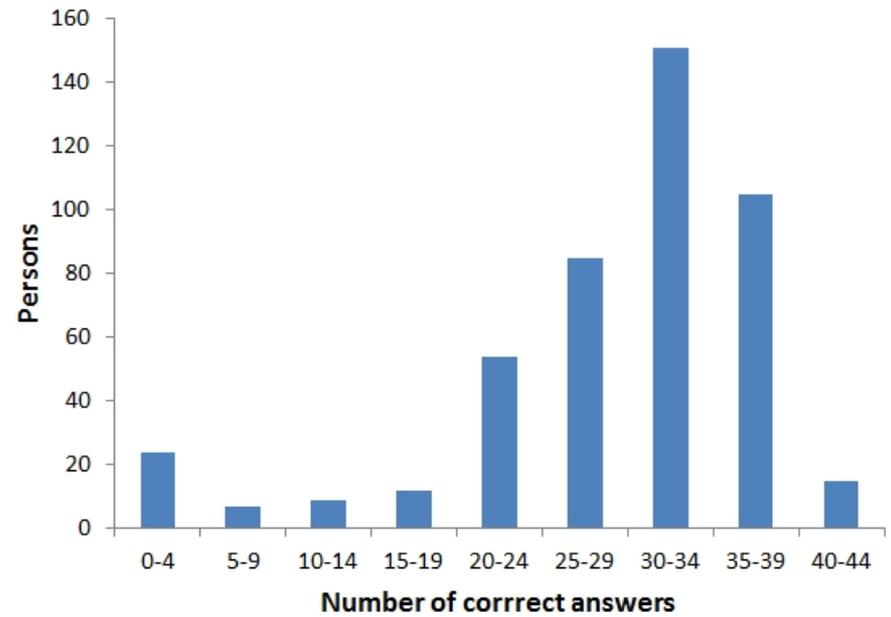


Fig. 7b Histogram of number of questions which respondents selected correct answer in Q1-40 (left) and Q41-82 (right).

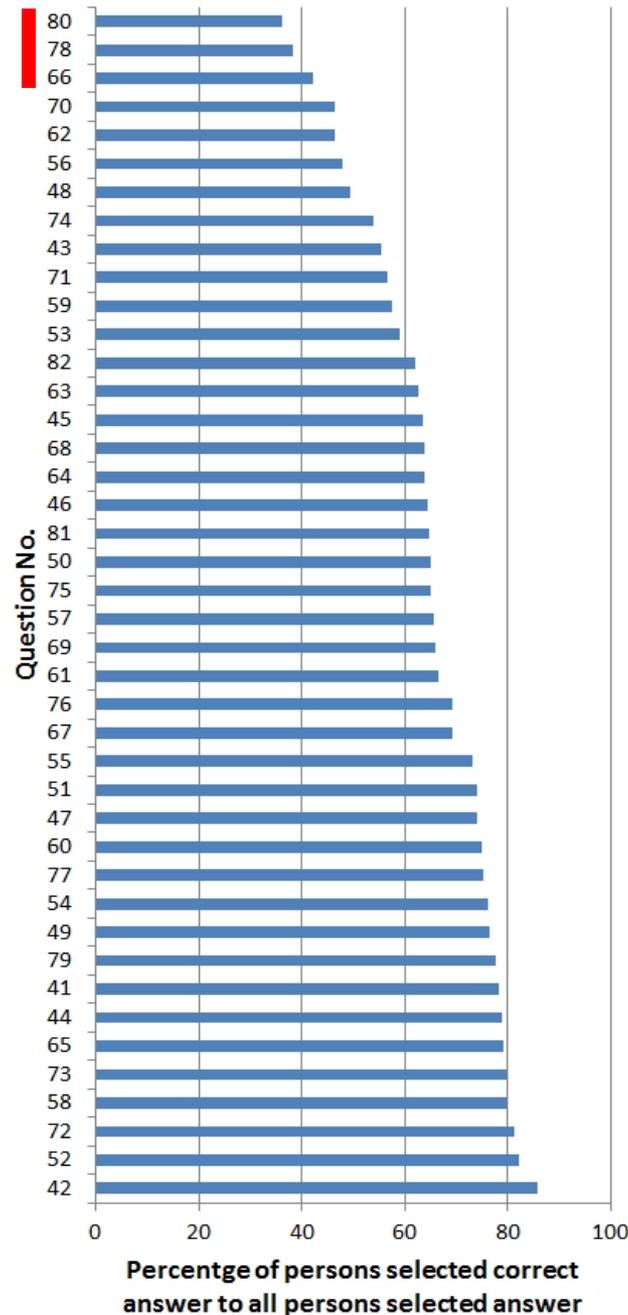
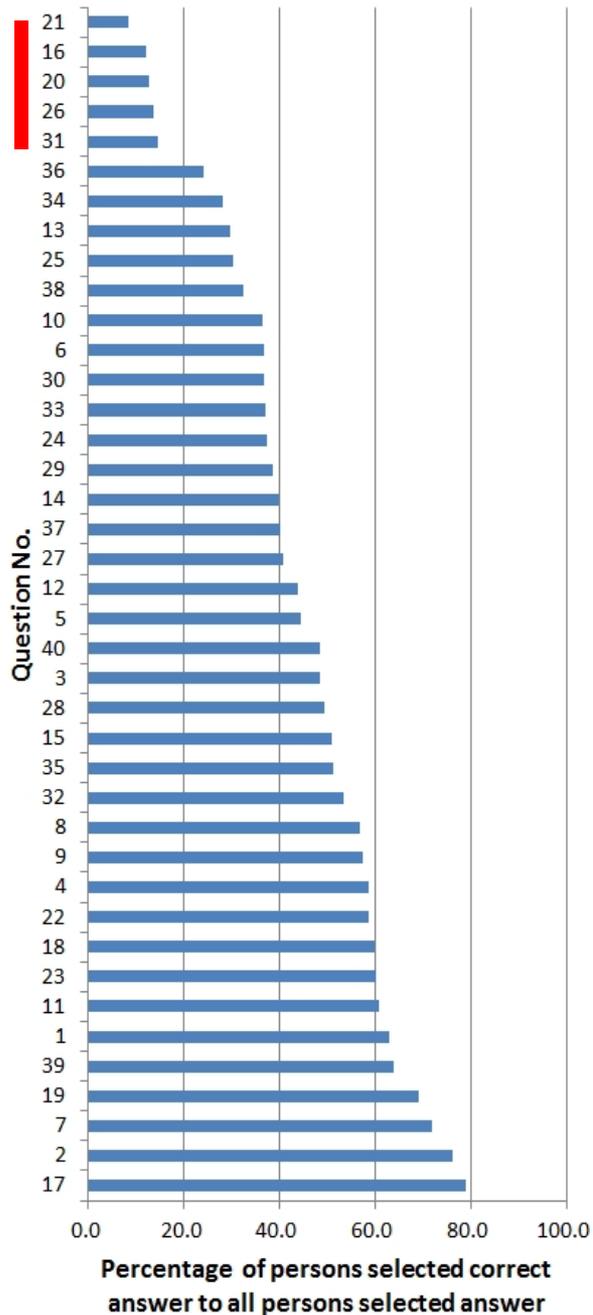


Fig. 8 Question numbers of Q1-40 (left) and Q41-82 (right) sorted by the correct answer ratio, the percentage of persons who selected correct answer out of all persons who responded to the question.

Answers to the five questions with lowest correct answer ratio in Q1-40 (No. 1)

O21 Both land and ocean provide space for organisms to live. How much of Earth's living space is found in the ocean?

54: Only a little bit (less than 10%).

151: About half (40–60%).

209: More than half (60–80%).

38: Nearly all (more than 90%).

10: No response.

O16 Where did most of the oxygen in the atmosphere originally come from?

48: Released into the atmosphere by volcanos erupting.

69: From interstellar gases when the Earth was first formed.

281: Released during photosynthesis by land plants.

55: Released during photosynthesis by marine organisms.

9: No response.

Answers to the five questions with lowest correct answer ratio in Q1-40 (No. 2)

O20 There are over 30 major groups of organisms (vertebrates, arthropods, molluscs, etc.) on Earth. Where are most of these major groups found?

- 52: Most are found exclusively in the tropical rainforests.
- 234: Most are found on both land and in the ocean.
- 106: About half are found exclusively in the ocean.
- 58: Almost all are found exclusively in the ocean.**
- 12: No response.

O26 Which of the following marine ecosystems is the most important nursery areas for many marine species?

- 240: Coral reefs (reefs formed by living corals).
- 71: The deep sea (more than 100m below the ocean surface).
- 77: The open ocean (away from the shoreline).
- 61: Estuaries (where rivers meet the ocean).**
- 12: No response.

Answers to the five questions with lowest correct answer ratio in Q1-40 (No. 3)

O31 Scientists are discovering that more species than they expected live in the deep sea. These discoveries are only being made now because:

98: environmental conditions are causing species to migrate to the deep sea.

185: deep sea species evolve more rapidly than shallow water species.

95: shallow water species have been overfished.

64: scientists are just beginning to explore the deep sea.

20: No response.

Answers to three questions with lowest correct answer ratio in Q41-82

O80 There are different seasons throughout the year because the ocean absorbs much of the heat from the sun.

152: FALSE

268: TRUE

42: No response

O78 People who live near the ocean contribute more to ocean acidification than people who live far from the ocean.

160: FALSE

256: TRUE

46: No response

O66 Humans use the ocean for transportation.

240: FALSE

175: TRUE

47: No response

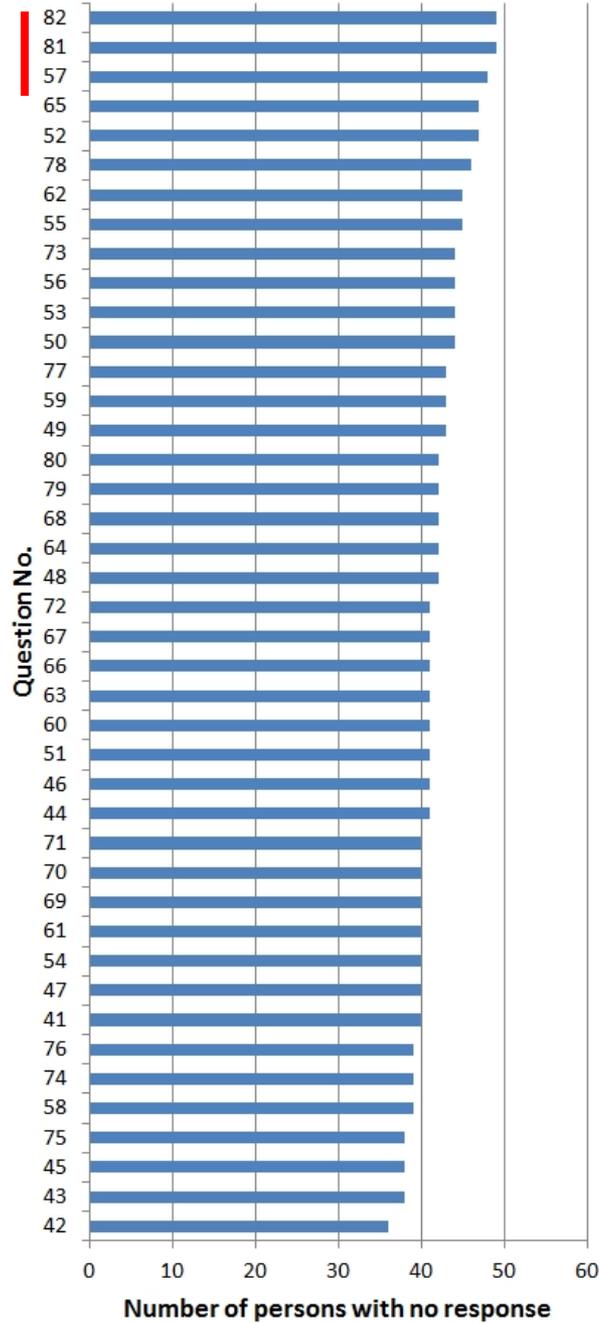
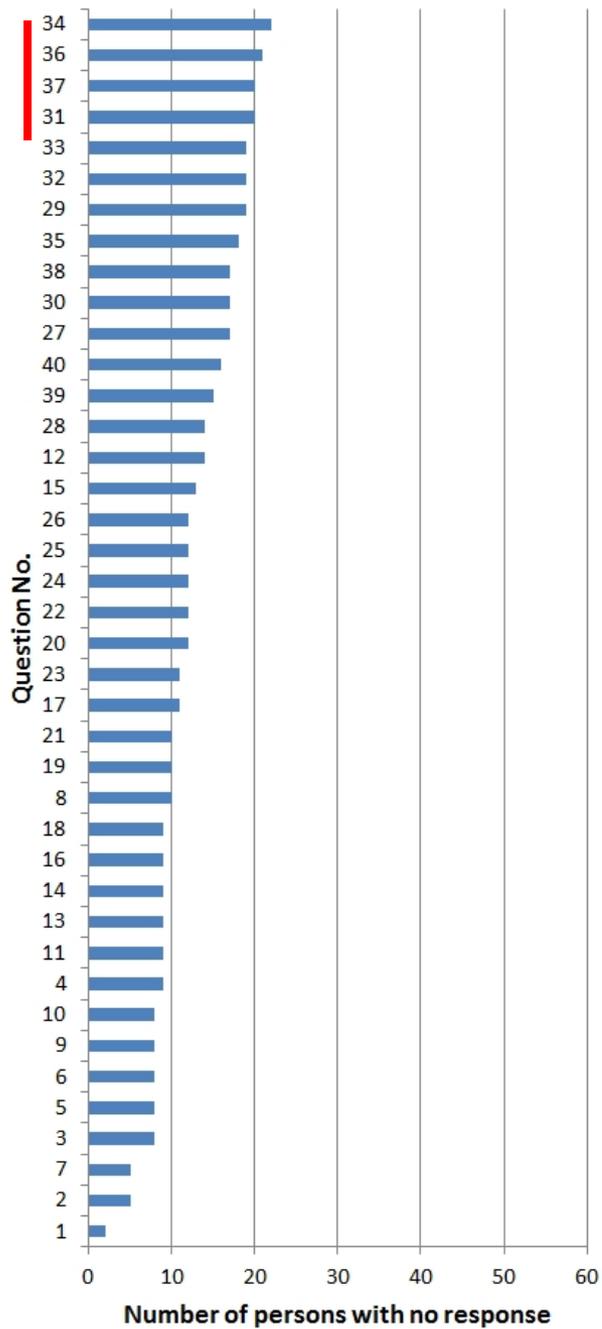


Fig. 9 Question numbers of Q1-40 (left) and Q41-82 (right) sorted by the number of persons who selected no answer. N = 462.

Answers to the four questions with largest number of no response in Q1-40 (No. 1)

O34 Absorption of carbon dioxide (CO₂) by the ocean has a direct influence on which of the following?

106: The greenhouse effect and dead zones in the ocean.

100: Acid rain and harmful algal blooms.

110: Acid rain and ocean acidification.

124: The greenhouse effect and ocean acidification

22: No response.

Answers to the four questions with largest number of no response in Q1-40 (No. 2)

O36 Which of the following is true about ecological relationships in the ocean?

164: They are very similar to those on land, including similar food web, life cycle, and symbiotic relationships.

97: They are mostly unknown since so much of the ocean has not been explored.

73: They are mostly very simple compared to those on land.

107: There are unique features of food webs, life cycles, and symbiotic relationships in the ocean that are not found on land.

21: No response.

Answers to the four questions with largest number of no response in Q1-40 (No. 3)

O37 Which of the following is true concerning the exploration of the ocean?

73: People have been exploring the ocean for thousands of years and most of it has been explored.

93: Almost all of the ocean has been explored in the last 50 years because of new technology.

178: **Most of the ocean is still unexplored despite improvements in technology in the last 50 years.**

98: Most of the ocean is still unexplored because scientists focus on the areas where most organisms live

20: No response.

Answers to the four questions with largest number of no response in Q1-40 (No. 4)

O31 Scientists are discovering that more species than they expected live in the deep sea. These discoveries are only being made now because:

98: environmental conditions are causing species to migrate to the deep sea.

185: deep sea species evolve more rapidly than shallow water species.

95: shallow water species have been overfished.

64: scientists are just beginning to explore the deep sea.

20: No response.

Answers to the three questions with largest number of no response in Q41-82.

O82 Transfer of heat between the ocean and the atmosphere drives global circulation of water and air and can cause storms around the world.

157: FALSE

256: TRUE

49: No response

O81 The water cycle is powered by the transfer of heat between the ocean and the atmosphere.

146: FALSE

267: TRUE

49: No response

O57 Humans depend on the ocean for nuclear fusion.

272: FALSE

142: TRUE

48: No response