Card Game

This problem gives you the chance to:
• figure out and explain probabilities

Mrs. Jakeman is teaching her class about probability.
She has ten cards, numbered 1 to 10.
She mixes them up and stands them on a shelf so that the numbers do not show.

Mrs. Jakeman turns the cards around one at a time.

Students have to guess whether the next card will have a higher or a lower number than the one just turned.

The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower?
   Explain why you made this decision.
   I believe it is going to be higher because there are only 2 digits behind three and 7 above 3.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10?
   Explain how you know.
   Because there are not higher digits than 10 in the cards.

0%
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.
   I believe the next number will be a 6, 8, or 9 because first there is a number below 5 and then higher than five and so on so the next number will be above 5.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? 
   higher
   Explain why you made this decision.

   I made this decision because there are only 2 numbers lower than 3 and there is only 1 number higher than 3. There are more numbers that is why I picked higher.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10?
   \[ \frac{0}{8} \]
   Explain how you know.

   I know this because there is only 10 numbers and it only goes to 10 so there can't be a higher number than 10.
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.

I figured this out because there is only one number above the 8 and the other number is 1 so it matches it.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower?

   Explain why you made this decision.
   
   There are more numbers higher than 3 from 1-10 than there are lower than 3.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10?

   Explain how you know.
   
   There are no numbers over 10 with cards numbered 1-10

   0%
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.
   \[
   \frac{7.14}{\sqrt{5.000}} = 71\% 
   \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.
   \[
   \frac{6.00}{\sqrt{4.00}} = 66\% 
   \]

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.
   
   I lined the numbers up from 1-10, crossed out the numbers that were already used and took the middle number.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? Higher

   Explain why you made this decision.
   ___ because 3 is a low number
   ___ and It's at the beginning so the
   ___ End should be higher.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? 0

   Explain how you know.
   ___ There is only 10 cards + the
   ___ highest number is 10 so there
   ___ can't be anymore numbers Higher
The third card is number 4.

3. What is the probability that the next number is higher than 4? Show your work.
   There is 10 cards 3 are flipped you count the non flipped ones for the denominator and the ones left above 4 for the numerator.
   The fourth card is number 7.

4. What is the probability that the next number is lower than 7? Show your work.
   There are only 2 number left that aren't already flipped 4 less than 4.
   The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be? Explain how you figured it out.
   Higher
   Because there is one more card that is a low number and the rest are higher
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? higher

   Explain why you made this decision.
   I would expect the next number to be higher because there is a 3/10 chance of getting a lower number and a 7/10 chance of getting a higher number.

2. What is the probability that the next card will be a higher number than 10? 0/10 or 0

   Explain how you know.
   I know that it will be a 0/10 chance because there are only cards 1-10 so there is no higher number than ten.
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.

   6
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? __________
   Explain why you made this decision.
   because the only numbers less than 3 is 1, 2 while there are 7 other numbers higher than 3.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? __________
   Explain how you know.
   because it goes 1 to 10 and 10 is the highest card you could get.
The third card is number 4.

3. What is the probability that the next number is higher than 4?
Show your work.

\[ \frac{5}{7} \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
Show your work.

\[ \frac{4}{6} \]

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
Explain how you figured it out.

6. I + is 6 because there is a lower numbers and a higher number.
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Mrs. Jakeman turns the cards around one at a time.

Students have to guess whether the next card will have a higher or a lower number than the one just turned.

The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? Yes
Explain why you made this decision.

There are more numbers 1-10 going higher from 3 than there are going lower

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? 0
Explain how you know.

Mrs. Jakeman didn’t put any cards out that are higher than 10.
The third card is number 3.

3. What is the probability that the next number is higher than 4? Show your work.
   $\frac{5}{7}$

The fourth card is number 7.

4. What is the probability that the next number is lower than 7? Show your work.
   $\frac{4}{6} = \frac{2}{3}$

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be? Explain how you figured it out.
   There are the same number flipped as there is left. $\frac{5}{10} = \frac{1}{2}$.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? 
   Explain why you made this decision.

   I would expect it to be higher because a lot of times in this situation you would normally get a higher number.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? 
   Explain how you know.

   I know this because Mrs. Jakeman numbers the cards 1-10, so there is only one 10
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.

   Five is halfway between 2 and 10, therefore the probability of less and greater will be the same.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower?

   Explain why you made this decision.

   The 3 is only two cards lower than 3 and 7 cards higher.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10?

   Explain how you know.

   There are no cards that can be higher than 10
The third card is number 4.

3. What is the probability that the next number is higher than 4?
Show your work.

\[ 10 - 3 = ? \]
\[ \frac{5}{7} \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7??
Show your work.

\[ \frac{7}{10} \]

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?

Explain how you figured it out.

If you take out everything you have left and mark the middle one out.

\[ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \]

\[ \frac{2}{5} \times 0.89 \]

\[ 2.1 \]
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? __________

   Explain why you made this decision.
   __________
   The higher numbers is 5/10 = 1/2,
   the lower numbers is 4/10 = 2/5. There is a greater chance of getting a higher number,
   because there are more of them.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? __________

   Explain how you know.
   __________
   Mrs. Jakeman has 10 cards, numbered 1-10.
   She can't get a higher number than 10.
The third card is number 4.

3. What is the probability that the next number is higher than 4? Show your work.

5 6 7 8 9 = 5 cards has yet to be flipped.
7 cards are left unflipped.

The fourth card is number 7.

4. What is the probability that the next number is lower than 7? Show your work.

6 5 2 1 = are the numbers left that have not been flipped.
6 are left unflipped.

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?

Explain how you figured it out.

There would be 4 cards that are lower, and 3 cards that are higher. 5 is the 7th card to be flipped. 5 can be lower or higher in probability.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? Higher
   Explain why you made this decision.

   To me if there is a lower number card drawn, I think the next one would be higher.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? 0
   Explain how you know.

   Because she only has 10 cards and they are all 1-10, so there can't be a number that's higher than 10.
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.
   \[
   \frac{6}{10}
   \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.
   \[
   \frac{4}{6}
   \]

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.
   \[
   \begin{align*}
   \text{I wrote out 1-10 then I marked out all the ones that have been used and I had 2,5,6,8,9 left}
   \end{align*}
   \]
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? higher

Explain why you made this decision.
It would probably be higher because there are more possible cards to flip higher than lower.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? 0/8

Explain how you know.
I know this because there is no card higher than "10."
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work. \[ \frac{5}{7} \text{ chance} \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work. \[ \frac{5}{7} \text{ chance} \]

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.
   I figured this out by getting the median of the numbers left, 2, 5, 6, 8, 9. The number six has the same probability higher than lower.
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower?  
   Higher
   Explain why you made this decision.
   Higher because there is only one number less than three and 7 numbers that are higher

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10?  
   0/10
   Explain how you know.
   There is no number above ten in the cards
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.
   \[ \frac{5}{7} \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.
   \[ \frac{4}{6} \]
   There are 4 numbers left under 7

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be? \( 5, 2, 6, 9, 8 \)
   Explain how you figured it out.
   1 is the lowest number and only numbers left are
   \[ \boxed{5, 2, 6, 9, 8} \]
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower?
   higher
   Explain why you made this decision.
   Because there is a \( \frac{2}{10} \) chance of
   being a lower number and there is a \( \frac{7}{10} \) chance of getting a higher number

   The second card is number 10.

   2. What is the probability that the next card will be a higher number than 10?
   0
   Explain how you know.
   Because there is no higher number than
   10 in the deck of cards.
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.

   \[ \frac{5}{6} \]

The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.

   \[ \frac{4}{6} \]

The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.

   I guessed
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The first card turned is the number 3.

1. Would you expect the next number to be higher than 3 or lower? ____________

   Explain why you made this decision.

   There are 7 cards higher than 3 and only 2 lower.

The second card is number 10.

2. What is the probability that the next card will be a higher number than 10? ____________

   Explain how you know.

   10 is the highest number
The third card is number 4.

3. What is the probability that the next number is higher than 4?
   Show your work.
   
   7 cards
   
   The fourth card is number 7.

4. What is the probability that the next number is lower than 7?
   Show your work.
   
   6 cards
   
   The fifth card is the number 1.

When the sixth card is turned the probability that the next card is higher is the same as the probability that it is lower.

5. What must the sixth card be?
   Explain how you figured it out.
   
   2 + 5 are lower and 8 + 9 are both higher than 6.