



ALLEN INSTITUTE  
*for* ARTIFICIAL INTELLIGENCE



# ***The Allen AI Science Challenge***

*or: Is your model smarter than an 8th grader?*

***Sean Osier***

12/15/2015



# The Problem



# The Challenge

## Example Questions

**1. When athletes begin to exercise, their heart rates and respiration rates increase. At what level of organization does the human body coordinate these functions?**

- A. at the tissue level
- B. at the organ level
- C. at the system level**
- D. at the cellular level

**2. Which example describes a learned behavior in a dog?**

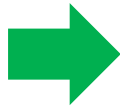
- A. smelling the air for odors
- B. barking when disturbed
- C. sitting on command**
- D. digging in soil



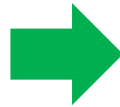
# Approach

## Approach

**Random  
Guess**



**Simple  
Model**



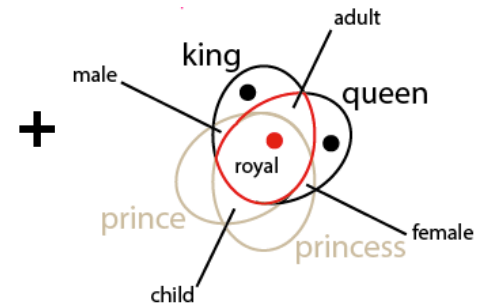
**Wikipedia  
Corpus**



+

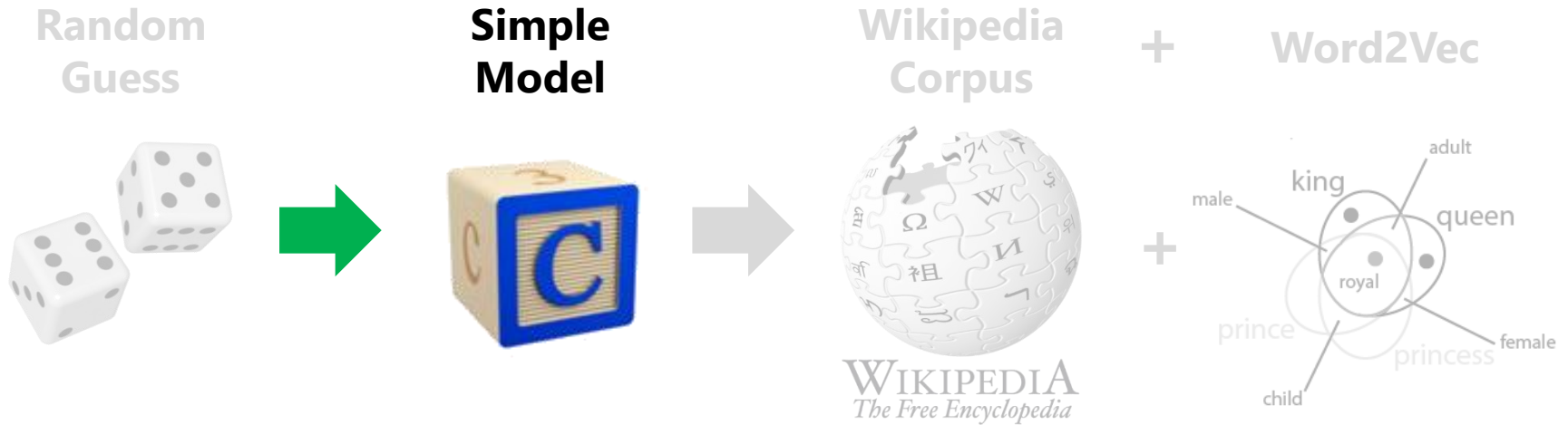
**Word2Vec**

+



# Simple Model

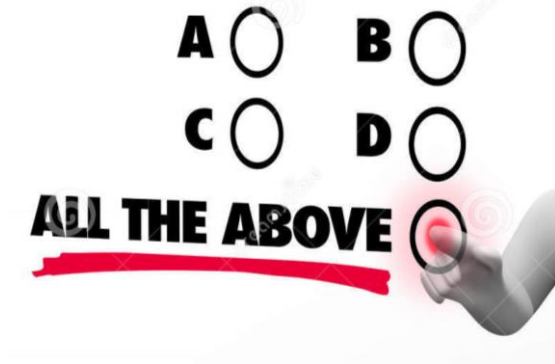
## Approach



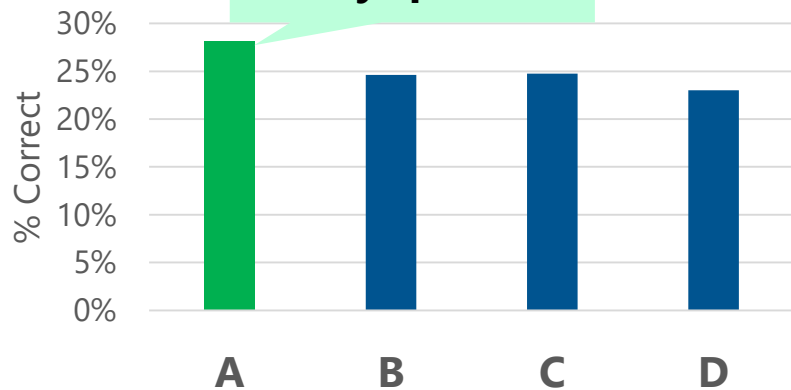
# Simple Model

## Simple (Rule-Based) Model

*If "All / None of the Above":*

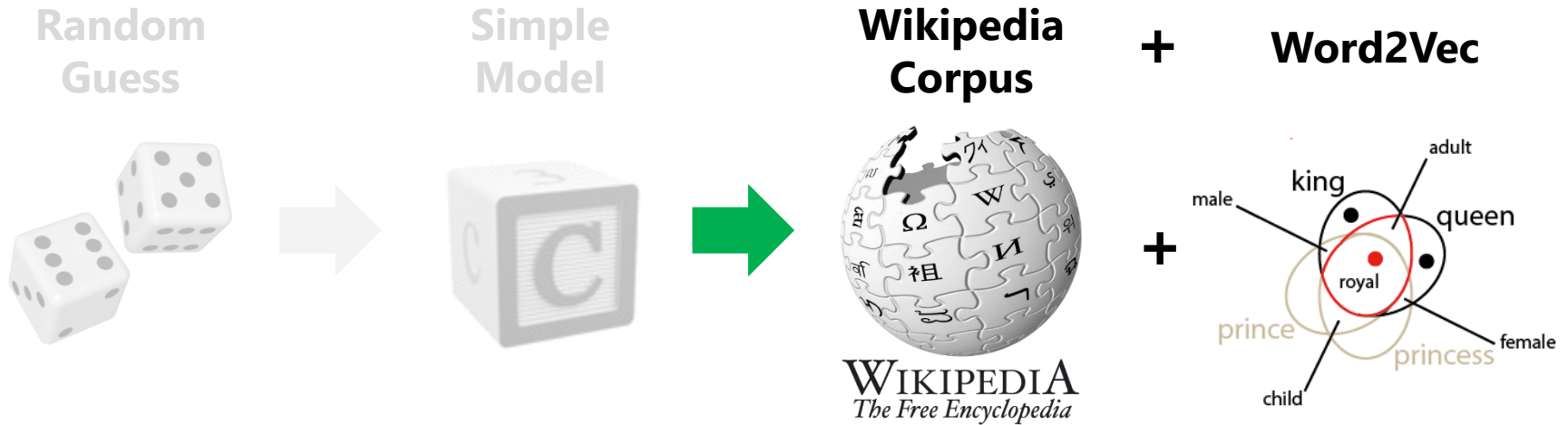


*Else:*



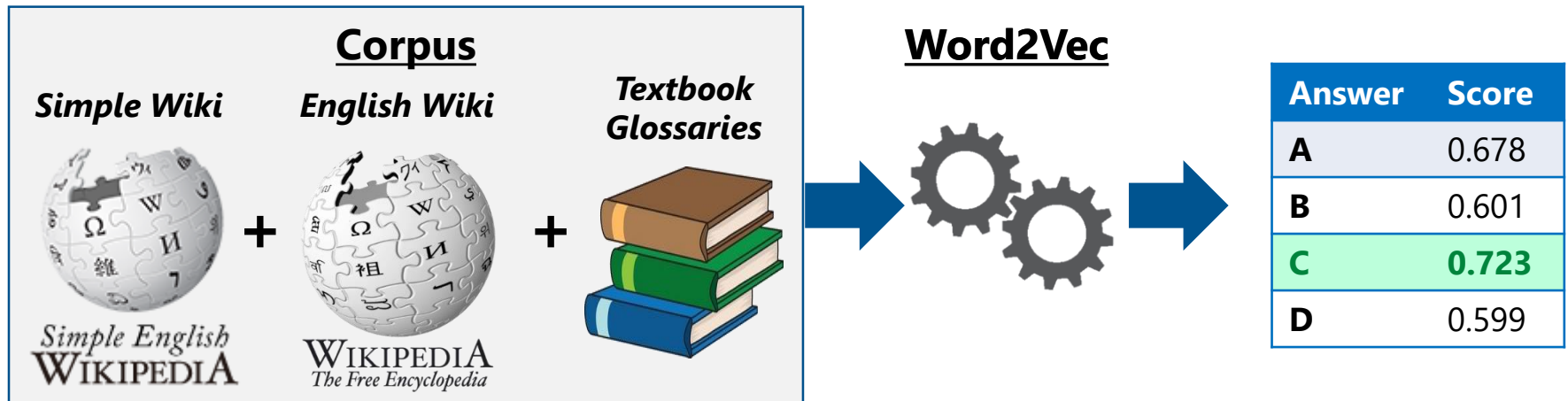
# Word2Vec Model

## Approach



# Word2Vec Model

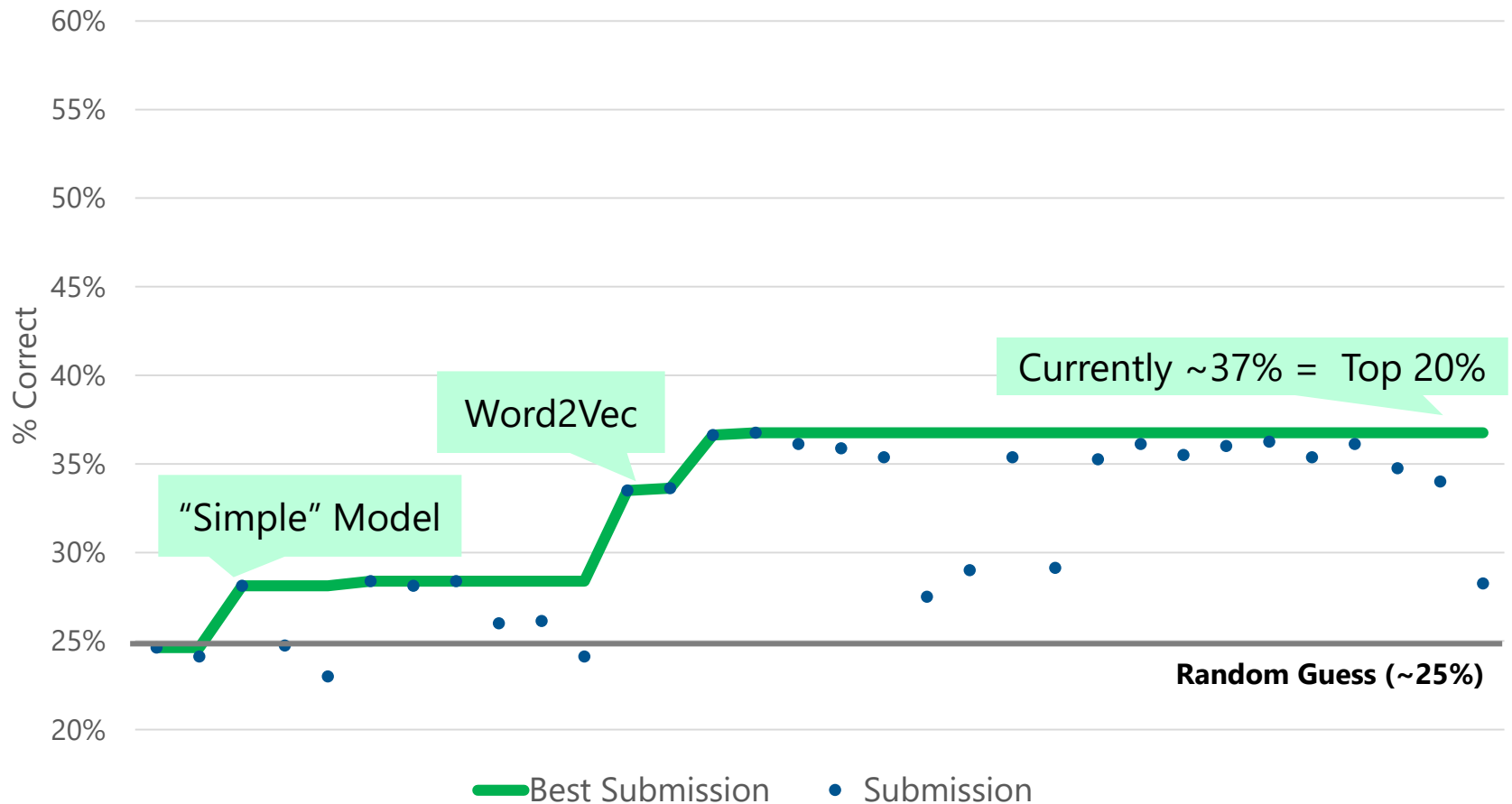
## Word2Vec Model





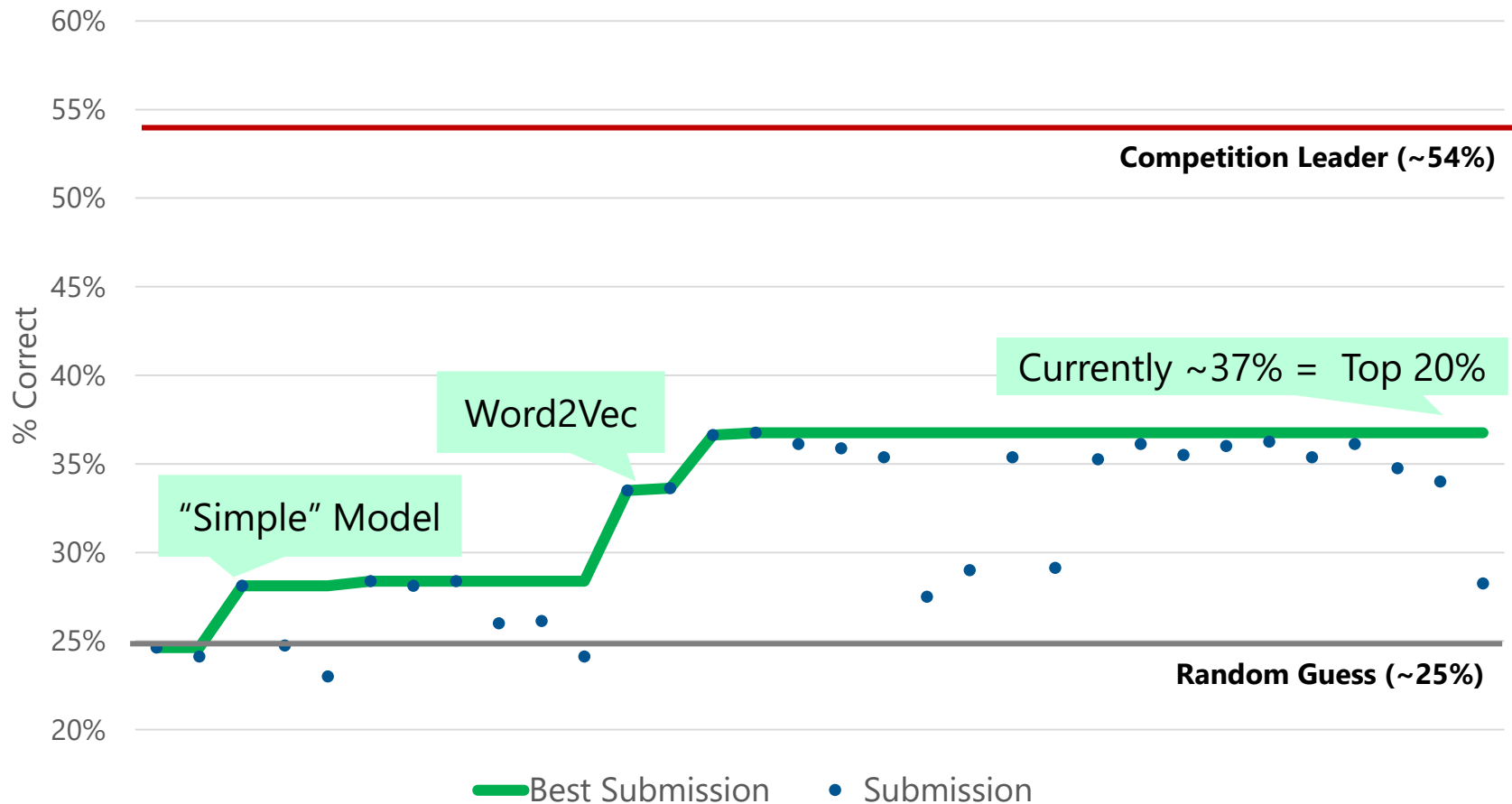
# Results

## Kaggle Submissions



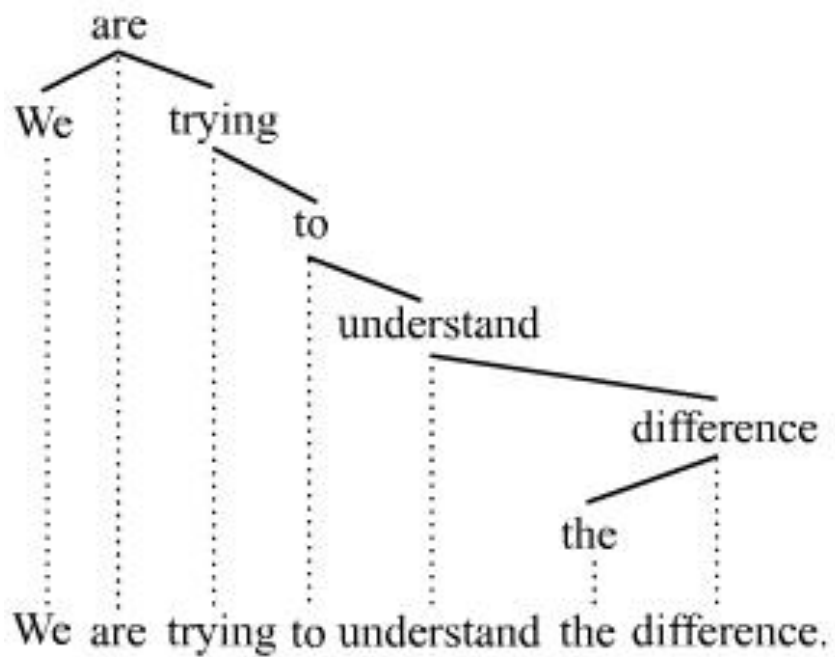
# Results

## Kaggle Submissions

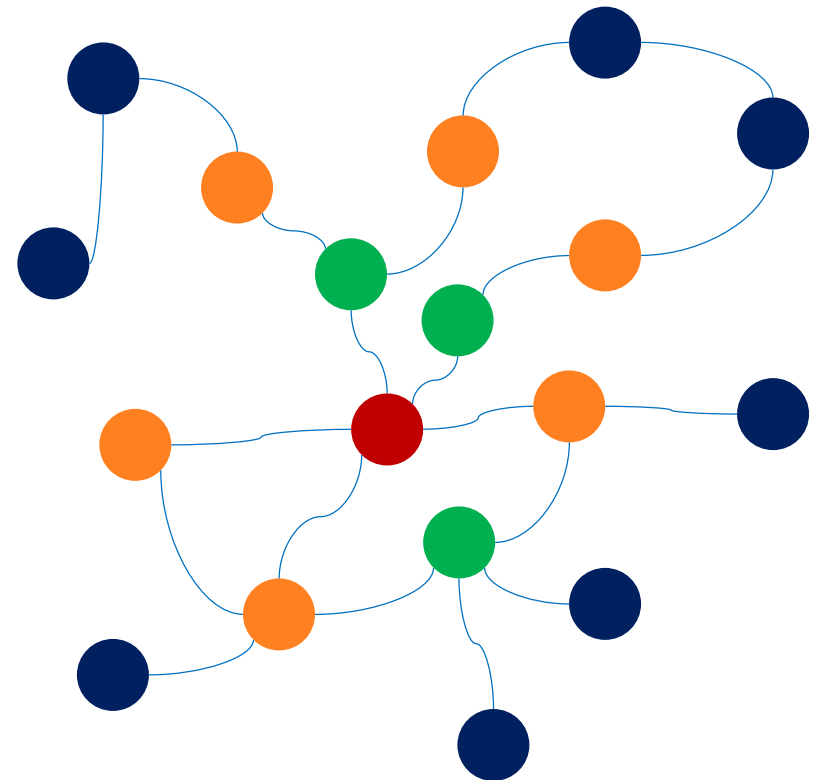


# Opportunities for Improvement

## Improved Question Analysis



## Knowledge Graph



# Thank You!

## To Learn More About the Challenge:

- <https://www.kaggle.com/c/the-allen-ai-science-challenge>
- <http://allenai.org/>

## To Learn More About Sean Osier:

- Contact me at: [sean@seanosier.com](mailto:sean@seanosier.com)
- <https://www.linkedin.com/in/seanosier>
- <https://github.com/sosier>





ALLEN INSTITUTE  
*for* ARTIFICIAL INTELLIGENCE

kaggle™

## *Appendix*



# Word2Vec Model

## Example

	Raw	Computer Reads As	Similarity with Q
<b>Question (Q)</b>	Which cellular structure allows nutrients to pass into cells?	cellular structure allows nutrients pass cells	100%
<b>A</b>	mitochondrion	mitochondrion	58%
<b>B</b>	nucleus	nucleus	56%
<b>C</b>	<b>membrane</b>	<b>membrane</b>	<b>76%</b>
<b>D</b>	chloroplast	chloroplast	61%

