

## Appendix B: Question Wording and Topline

2014 PEW RESEARCH CENTER'S AMERICAN TRENDS PANEL  
 WAVE 6 AUGUST  
 AUGUST 11-SEPTEMBER 3, 2014  
 TOTAL N=3,278  
 WEB RESPONDENTS N=2,923  
 MAIL RESPONDENTS N=355<sup>26</sup>

### PRIOR QUESTIONS PREVIOUSLY RELEASED OR HELD FOR FUTURE RELEASE

**FOR FIRST SCREEN ONLY:** Here's a different kind of question. As far as you know...

**ASK ALL:**

**RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT1 **This picture shows an object in space that has an icy core with a tail of gas and dust that extends millions of miles. Is this<sup>27</sup> ... (We'd like your best guess)**



78	A comet ( <i>correct</i> )
22	Net incorrect/no answer
6	A star
16	An asteroid
*	A moon
1	No answer

**RANDOMIZE ITEMS KNOSCT2 TO KNOSCT12**

**ASK ALL:**

**RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT2 **Which kind of waves is used to make and receive cellphone calls?**  
*(We'd like your best guess)<sup>28</sup>*

72	Radio waves ( <i>correct</i> )
28	Net incorrect/no answer
3	Light waves
22	Sound waves
2	Gravity waves
1	No answer

<sup>26</sup> This topline shows question wording and order from the web version of the survey. Question wording, format, and order were adapted for the paper questionnaire delivered by mail; the mail questionnaire is available on request. All questions asked in both modes unless noted.

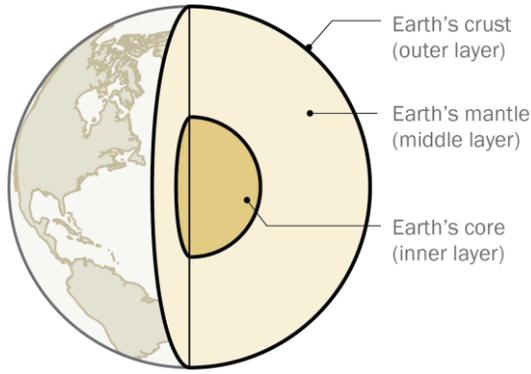
<sup>27</sup> Images were displayed for each response option on both web and mail questionnaire.

<sup>28</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

**ASK ALL:  
RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT3

**This picture shows three layers of the earth. Which layer is the hottest?**<sup>29</sup>  
(We'd like your best guess)<sup>30</sup>



- |    |  |
|----|--|
| 86 | The inner layer called the Earth's core ( <i>correct</i> ) |
| 14 | Net incorrect/no answer                                    |
| 7  | The outer layer called the Earth's crust                   |
| 6  | The middle layer called the Earth's mantle                 |
| 1  | No answer  |

**ASK ALL:  
RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT4

**Ocean tides are created by which of the following?** (We'd like your best guess)<sup>31</sup>  
[Check all that apply]

- |               |   |
|---------------|---|
| 63            | The gravitational pull of the moon (alone)                              |
| 5             | The gravitational pull of the sun (alone)                               |
| 16            | The rotation of the earth on its axis (alone)                           |
| 1             | No answers selected   |
| NET responses |   |
| 76            | NET The gravitational pull of the moon (coded as correct) <sup>32</sup> |
| 10            | Net any two responses   |
| 5             | Net all three selected  |

<sup>29</sup> This question was adapted with permission from the Trends in International Mathematics and Science Study (TIMSS) grade 8 science assessment items in 1999. Image from Pew Research Center.

<sup>30</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>31</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>32</sup> The index of science knowledge treats all those who selected the gravitational pull of the moon as a correct response.

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**KNOSCT5 **What does a light-year measure? Is it...** *(We'd like your best guess)*<sup>33</sup>

72	Distance <i>(correct)</i>
28	Net incorrect/no answer
4	Brightness
22	Time
1	Weight
1	No answer

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**KNOSCT6 **Denver, CO is a higher altitude than is Los Angeles, CA. Which of these statements is correct?** *(We'd like your best guess)*<sup>34</sup>

34	Water boils at a lower temperature in Denver than Los Angeles <i>(correct)</i>
66	Net incorrect/no answer
26	Water boils at a higher temperature in Denver than Los Angeles
39	Water boils at the same temperature in both Denver and Los Angeles
1	No answer

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**KNOSCT7 **Which of these pictures best illustrate what happens when light passes through a magnifying glass?** <sup>35</sup>*(We'd like your best guess)*<sup>36</sup>

46  *(correct)*

54 Net incorrect/no answer

9 

34 

10 

2 No answer

<sup>33</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>34</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>35</sup> This question was adapted with permission from the Trends in International Mathematics and Science Study (TIMSS) grade 8 science assessment items in 1999. Images from Pew Research Center.

<sup>36</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown. Response options consisted of images only, with no verbal labels.

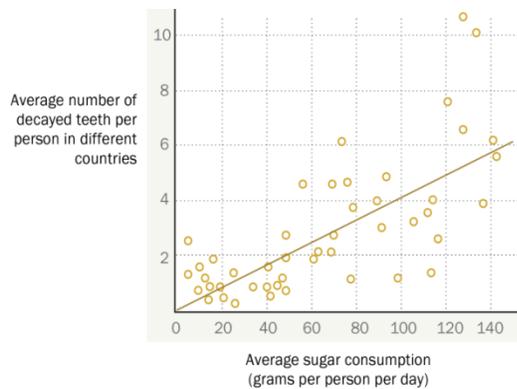
**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT8 **The loudness of a sound is determined by what property of a sound wave? Is it...**  
*(We'd like your best guess)*<sup>37</sup>

35	Amplitude or height (correct)
65	Net incorrect/no answer
33	Frequency
23	Wavelength
8	Velocity or rate of change
1	No answer

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT9 **Which of the following statements best describes the data in the graph below? Is it...**  
*(We'd like your best guess)*<sup>38 39</sup>



63	The more sugar people eat, the more likely they are to get cavities (correct)
37	Net incorrect/no answer
12	In recent years, the rate of cavities has increased in many countries
6	In some countries, people brush their teeth more frequently than in other countries
17	In recent years, the consumption of sugar has increased in many countries
2	No answer

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT10 **Which of these elements is needed to make nuclear energy and nuclear weapons? Is it...**  
*(We'd like your best guess)*<sup>40</sup>

82	Uranium (correct)
18	Net incorrect/no answer
2	Sodium chloride
10	Nitrogen
4	Carbon dioxide
1	No answer

<sup>37</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>38</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>39</sup> This question was adapted with permission from the OECD (2009), *Take the Test: Sample Questions from OECD's PISA Assessments*, PISA, OECD Publishing. Image from Pew Research Center.

<sup>40</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT11 **Which of these people developed the polio vaccine? Is it...** *(We'd like your best guess)*<sup>41</sup>

74	Jonas Salk (correct)
26	Net incorrect/no answer
5	Isaac Newton
14	Marie Curie
5	Albert Einstein
2	No answer

Response options were shown with photo images with each name as in the following example:



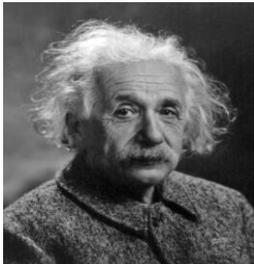
Jonas Salk



Isaac Newton



Marie Curie



Albert Einstein

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<sup>41</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

**ASK ALL:****RANDOMIZE ORDER OF RESPONSE OPTIONS**

KNOSCT12 **Which of these terms is defined as the study of how the positions of stars and planets can influence human behavior? (We'd like your best guess)**<sup>42</sup>

73	Astrology (correct)
27	Net incorrect/no answer
2	Alchemy
22	Astronomy
3	Meteorology
1	No answer

**TOTAL NUMBER CORRECT, KNOSCT1 THROUGH KNOSCT 12**<sup>43</sup>

6	12 of 12 Correct
12	11 of 12 Correct
15	10 of 12 Correct
15	9 of 12 Correct
12	8 of 12 Correct
12	7 of 12 Correct
9	6 of 12 Correct
7	5 of 12 Correct
6	4 of 12 Correct
3	3 of 12 Correct
2	2 of 12 Correct
1	1 of 12 Correct
*	0 of 12 Correct
*	Refused all

For details on question wording of knowledge questions from other surveys see the sources below. Any other details about these surveys and their findings are also available on request.

**Dec. 3-7, 2014:** Pew Research Center report "[As U.S. Energy Production Grows, Public Policy Views Show Little Change.](#)"

**ASK ALL:**

Q.19 From what you've read and heard, has the amount of energy produced in the United States been increasing, decreasing, or staying about the same in recent years?

Dec 3-7		Sep 4-8
<u>2014</u>		<u>2013</u>
54	Increasing	48
10	Decreasing	12
27	Staying about the same	31
9	Don't know/Refused ( <b>VOL.</b> )	10

<sup>42</sup> In the web version of the survey this prompt for a best guess was only shown if the respondent attempted to skip the question. On the mail version of the survey this prompt was always shown.

<sup>43</sup> Figures in this table are based on N=3,269 and include all those who identified the gravitational pull of the moon in KNOSCT4 as correct. Alpha reliability coefficient based on the same twelve items is .73.

**Aug. 15-25, 2014:** Pew Research Center report “[Americans, Politics, and Science Topics](#)”

**ASK ALL:**

Here’s a different kind of question. As far as you know...

**[RANDOMIZE KNOSCT14 THROUGH KNOSCT19]**

**ASK ALL:**

KNOSCT14 Which of these is a major concern about the overuse of antibiotics? **[READ AND RANDOMIZE]**  
**[INTERVIEWER NOTE: IF NO ANSWER, PROBE ONCE:** We’re just looking for your best guess on this.]

Aug 15-25, 2014		Mar 7-10, 2013 <sup>44</sup>
74	It can lead to antibiotic-resistant bacteria ( <i>Correct</i> )	77
26	NET Incorrect/No answer	23
8	<i>Antibiotics are very expensive</i>	6
15	<i>People will become addicted to antibiotics</i>	10
2	<i>Don’t know/Refused (VOL.)</i>	7

**[RANDOMIZE KNOSCT14 THROUGH KNOSCT19]**

**ASK ALL:**

KNOSCT15 Is the following statement true or false? Lasers work by focusing sound waves. [IF NECESSARY: Is this statement true or false?] **[INTERVIEWER NOTE: IF NO ANSWER, PROBE ONCE:** We’re just looking for your best guess on this.]

	( <i>Correct</i> ) False	NET incorrect/ no answer	True	DK/Ref
Aug 15-25, 2014	65	35	27	9
Mar 7-10, 2013	48	52	19	34
May 19-June 6, 2010	60	40	21	19
June 18-21, 2009	47	53	21	31

**TREND FOR COMPARISON:** <sup>45</sup>

General Social Survey, 2012	45	55	24	31
General Social Survey, 2010	48	52	19	33
General Social Survey, 2008	48	52	24	28
General Social Survey, 2006	45	55	17	38

**[RANDOMIZE KNOSCT14 THROUGH KNOSCT19]**

**ASK ALL:**

KNOSCT16 Does nanotechnology deal with things that are extremely **[READ AND RANDOMIZE]**  
**[INTERVIEWER NOTE: IF NO ANSWER, PROBE ONCE:** We’re just looking for your best guess on this.]

Aug 15-25, 2014		Mar 7-10, 2013
64	Small ( <i>Correct</i> )	65
36	NET Incorrect/No answer	35
8	<i>Large</i>	3
6	<i>Cold</i>	2
13	<i>Hot</i>	4
1	<i>Don’t know/Refused (VOL.)</i>	26

<sup>44</sup> 2013 Pew Research Center/Smithsonian Magazine survey. Introduction to series of questions was “Here are some questions about things you might have learned in school or seen in the news. For each statement that I read, please tell me if it is true or false. If you don’t know, just tell me so, and we will skip to the next question...” Survey administration did not include probe and was conducted on an omnibus survey.

<sup>45</sup> Results from General Social Surveys are provided for comparison where available; these surveys were conducted in-person and thus may not be directly comparable with surveys conducted by telephone.

**[RANDOMIZE KNOSCT14 THROUGH KNOSCT19]****ASK ALL:**

KNOSCT17 Which is an example of a chemical reaction? **[READ AND RANDOMIZE]**  
**[INTERVIEWER NOTE: IF NO ANSWER, PROBE ONCE: We're just looking for your best guess on this.]**

Aug 15-25, 2014		Mar 7-10, 2013
63	Nails rusting ( <i>Correct</i> )	66
37	NET Incorrect/No answer	34
15	<i>Water boiling</i>	12
17	<i>Sugar dissolving</i>	12
5	<i>Don't know/Refused (VOL.)</i>	10

**[RANDOMIZE KNOSCT14 THROUGH KNOSCT19]****ASK ALL:**

KNOSCT18 What is the main function of red blood cells? Is it... **[READ AND RANDOMIZE]** **[INTERVIEWER NOTE: IF NO ANSWER, PROBE ONCE: We're just looking for your best guess on this.]**

Aug 15-25, 2014		Mar 7-10, 2013
76	To carry oxygen to all parts of the body ( <i>Correct</i> )	78
24	NET Incorrect/No answer	22
12	<i>To fight disease in the body</i>	9
8	<i>To help the blood to clot</i>	6
4	<i>Don't know/Refused (VOL.)</i>	7

**[RANDOMIZE KNOSCT14 THROUGH KNOSCT19]****ASK ALL:**

KNOSCT19 What gas do most scientists believe causes temperatures in the atmosphere to rise? Is it **[READ AND RANDOMIZE]** **[INTERVIEWER NOTE: IF NO ANSWER, PROBE ONCE: We're just looking for your best guess on this.]**

Aug 15-25, 2014		Mar 7-10 2013	June 18-21 2009	Apr 28-May 12 2009
71	Carbon dioxide ( <i>Correct</i> )	58	65	66
29	NET Incorrect/No answer	42	35	34
9	<i>Hydrogen</i>	10	7	7
5	<i>Helium</i>	8	4	4
7	<i>Radon</i>	7	5	6
7	<i>Don't know/Refused (VOL.)</i>	16	20	17

**American Trends Panel (wave 5) 2014:** Pew Research Center report "[From Telephone to the Web: The Challenge of Mode of Interview Effects in Public Opinion Polls.](#)"

Q.28 Which of the following sources of energy provides the most electricity in the U.S. Is it: **[RANDOMIZE]**

	Jul 7-Aug 4, 2014		
Based on total [N=3,351]	Based on web mode [N=1,509]	Based on phone mode [N=1,494]	
49	51	51	Coal ( <i>Correct</i> )
21	22	21	Nuclear
22	20	21	Hydroelectric
8	7	7	Wind
1	*	1	Don't know/Refused ( <b>VOL.</b> )

**Mar. 7-10, 2013:** Pew Research Center report “[Public’s Knowledge of Science and Technology](#)” from survey conducted with Smithsonian Magazine.

**ASK ALL:**

Here are some questions about things you might have learned in school or seen in the news

PEW.7 For each statement that I read, please tell me if it is true or false. If you don’t know, just tell me so, and we will skip to the next question. First, **[INSERT FIRST ITEM, RANDOMIZE]**...is that true or false? Next, **[INSERT ITEM, RANDOMIZE] [IF NECESSARY: Is that true or false?]**

		<u>True</u>	<u>False</u>	<u>(VOL.) DK/Ref</u>
a.	All radioactivity is man-made			
	March 7-10, 2013	22	<b>66</b>	12
	June 18-21, 2009	21	<b>63</b>	16
	<b>TREND FOR COMPARISON:</b>			
	<i>General Social Survey, 2012</i>	18	<b>70</b>	12
	<i>General Social Survey, 2010</i>	20	<b>67</b>	13
b.	Electrons are smaller than atoms			
	<i>General Social Survey, 2008</i>	18	<b>70</b>	12
	<i>General Social Survey, 2006</i>	14	<b>70</b>	17
	March 7-10, 2013	<b>47</b>	27	25
	June 18-21, 2009	<b>46</b>	24	30
	<b>TREND FOR COMPARISON:</b>			
	<i>General Social Survey, 2012</i>	<b>53</b>	20	27
	<i>General Social Survey, 2010</i>	<b>51</b>	20	29
	<i>General Social Survey, 2008</i>	<b>52</b>	23	25
	<i>General Social Survey, 2006</i>	<b>53</b>	19	28
d.	The continents on which we live have been moving their location for millions of years and will continue to move in the future			
	March 7-10, 2013	<b>77</b>	10	13
	June 18-21, 2009	<b>76</b>	10	13
	<b>TREND FOR COMPARISON:</b>			
	<i>General Social Survey, 2012</i>	<b>81</b>	7	12
	<i>General Social Survey, 2010</i>	<b>79</b>	9	12
	<i>General Social Survey, 2008</i>	<b>77</b>	10	13
	<i>General Social Survey, 2006</i>	<b>79</b>	8	13

**Correct answers for each trend in bold**

**ASK ALL:**

PEW.8 Which one of the following types of solar radiation does sunscreen protect the skin from? **[READ AND RANDOMIZE]**

March 7-10

2013

3	X-rays
5	Infrared
83	Ultraviolet ( <i>Correct</i> )
2	Microwaves
8	Don't know/Refused <b>(VOL.)</b>

**ASK ALL:**

PEW.10 Which gas makes up most of the Earth's atmosphere? **[READ AND RANDOMIZE]**

March 7-10

2013

14	Hydrogen
20	Nitrogen <i>(Correct)</i>
19	Carbon dioxide
36	Oxygen
11	Don't know/Refused <b>(VOL.)</b>

**ASK ALL:**

PEW.14 Which is the better way to determine whether a new drug is effective in treating a disease? If a scientist has a group of 1,000 volunteers with the disease to study, should she **[READ AND RANDOMIZE]**

March 7-10

2013

19	Give the drug to all of them and see how many get better
75	Give the drug to half of them but not to the other half, and compare how many in each group get better <i>(Correct)</i>
6	Don't know/Refused <b>(VOL.)</b>

**ASK ALL:**

PEW.16 Which natural resource is extracted in a process known as "fracking"? Is it **[READ AND RANDOMIZE]**?

March 7-10

2013

51	Natural gas <i>(Correct)</i>
12	Coal
5	Diamonds
4	Silicon
28	Don't know/Refused <b>(VOL.)</b>

**June 18-21, 2009:** Pew Research Center survey released in conjunction with the report "[Public Praises Sciences; Scientists Fault Public, Media](#)"

Now I have just a few short questions such as you might see on a television game show. First, **RANDOMIZE Q11 THROUGH Q19 BLOCK WITH Q20a-e; RANDOMIZE Q11 THROUGH Q19**

**ASK ALL:**

Q.11 According to most astronomers, which of the following is no longer considered a planet **[READ AND RANDOMIZE]**?

June

2009

60	Pluto <i>(Correct)</i>
4	Mercury
5	Neptune [OR]
3	Saturn
27	Don't know/Refused <b>[VOL. DO NOT READ]</b>

**RANDOMIZE Q11 THROUGH Q19****ASK ALL:**

Q.12 Which of the following may cause a Tsunami **[READ AND RANDOMIZE]**?

June	
<u>2009</u>	
77	An earthquake under the ocean ( <i>Correct</i> )
9	A very warm ocean current
4	A melting glacier [OR]
1	A large school of fish
9	Don't know/Refused <b>[VOL. DO NOT READ]</b>

**RANDOMIZE Q11 THROUGH Q19****ASK ALL:**

Q.13 The global positioning system, or GPS, relies on which of these to work: **[READ AND RANDOMIZE]**?

June	
<u>2009</u>	
82	Satellites ( <i>Correct</i> )
2	Stars
2	Magnets
3	Lasers
11	Don't know/Refused <b>[VOL. DO NOT READ]</b>

**RANDOMIZE Q11 THROUGH Q19****ASK ALL:**

Q.15 What have scientists recently discovered on Mars...? Is it...**[READ AND RANDOMIZE]**

June		May
<u>2009</u>		<u>2009</u>
61	Water ( <i>Correct</i> )	60
3	Platinum	5
9	Mold	9
5	Plants	5
21	Don't know/Refused <b>[VOL. DO NOT READ]</b>	21

**RANDOMIZE Q11 THROUGH Q19****ASK ALL:**

Q.16 Which over-the-counter drug do doctors recommend that people take to help prevent heart attacks ...  
is it **[READ AND RANDOMIZE]**

June		May
<u>2009</u>		<u>2009</u>
91	Aspirin ( <i>Correct</i> )	89
3	Cortisone	4
1	Antacids	1
5	Don't know/Refused <b>[VOL. DO NOT READ]</b>	5

**RANDOMIZE Q11 THROUGH Q19****ASK ALL:**

Q.17 How are stem cells different from other cells? **[READ AND RANDOMIZE]**

June		May
<u>2009</u>		<u>2009</u>
4	They are found ONLY in plants	4
52	They can develop into many different types of cells ( <i>Correct</i> )	55
	[OR]	
22	They are found ONLY in bone marrow	24
21	Don't know/Refused <b>[VOL. DO NOT READ]</b>	18

**RANDOMIZE Q11 THROUGH Q19 BLOCK WITH Q.20a-e****ASK ALL:**

Q.20 Now, for each statement that I read, please tell me if it is true or false. If you don't know or aren't sure, just tell me so, and we will skip to the next question. Remember: true, false or don't know.

**[RANDOMIZE ITEMS; READ EACH ITEM, FOLLOWED BY...is that true or false?]**

**Correct answers shown in bold**

		<u>True</u>	<u>False</u>	<b>(VOL.)</b> <u>DK/Ref</u>
d.	Antibiotics will kill viruses as well as bacteria.			
	June, 2009	36	<b>54</b>	10
	<b>TREND FOR COMPARISON:</b>			
	<i>General Social Survey, 2008</i>	39	<b>54</b>	8

**Other items asked are shown with more recent surveys**