American Adolescents' Knowledge, Attitudes and Sources of Information on Climate Change

GEORGE MASON UNIVERSITY
CENTER *for* CLIMATE CHANGE COMMUNICATION

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Introduction

The past several years have witnessed a dramatic increase in young people's activism on climate change, accompanied by calls for society to act more aggressively to protect their futures. To better understand what young people think and feel about climate change, we surveyed American adolescents, asking what they know, feel and believe about the issue, what questions they have about it, and where they are obtaining their information. This report summarizes the results of the survey and is intended to support efforts to inform and educate American youth about climate change.

In the following pages, we address the following questions:

- Where are teens learning about climate change?
- What do they know about the issue?
- How do they feel about it?
- What questions do they have about climate change?
- Are adolescents' climate change knowledge and attitudes associated with their sources of information on the topic? If so, how?
- Do the knowledge and attitudes of older and younger teens differ?
- Do males and females differ?
- Do adolescents who are interested in science differ from those who are less interested?

The data for this report were gathered in May, 2018, using an online survey with roughly equal numbers of 13-to-18-year-olds *(n=1,257).* The survey's design included a visit to the NASA climate change website, *climate.nasa,gov,* and a split sample: adolescents were randomly assigned to one of two groups, answering half of the knowledge and attitude questions before their website visit and half of these questions afterwards. Prior to visiting the website, all participants answered questions about their sources of climate change information, and what they would most like to know about the issue. All of the results summarized in this report are from questions asked *before* the participants had visited NASA's website.

Results from the questions that were asked after the website visit are included in our second report, *American Adolescents' Responses to the NASA Climate Change Website,* which assesses the impact of the website on teens' knowledge and attitudes. In this report, we focus solely on what adolescents knew and felt prior to visiting the website. For most of the group comparisons in the report (e.g., age and gender differences in knowledge), we describe the results in the text, but do not present tables or figures containing the data. The relevant tables and figures, however, are available upon request. More details on the survey's methods are provided in the Methods section on p. 30.

Results Summary

Media Use and Sources of Climate Change Information

- Adolescents rely on social media and television as general news sources more than other information channels, with 56 percent reporting they often use social media for news, and 46 percent saying they often use television. Less than half as many often use radio (16%) or newspapers (21% online and 10% print).
- Large numbers of adolescents follow news topics where they are likely to encounter stories about climate change: science and technology (54% very or somewhat closely); nature and the environment (50%); world affairs (46%); and politics (41%).
- Nearly eight out of ten of adolescents hear their science teachers talk about climate change at least sometimes (78%). More than half hear their parents discuss the topic often or sometimes (58%), and over a third hear their friends discuss the topic often or sometimes (37%).
- Older adolescents follow news topics relevant to climate change more closely than younger adolescents, and hear about the issue more often. They are less likely than younger adolescents to trust their parents as sources on the topic.
- Adolescent males are more likely than females to use most news sources, and to hear about climate change. They also tend to trust and agree with their sources on the issue more than females do.
- Adolescents who are more interested in science classes at school are more likely to follow relevant news topics (i.e., science and technology; nature and the environment; world affairs; and politics). They hear more about the topic from NASA scientists, and from their parents and friends, and they have greater trust in their sources.

Knowledge About Climate Change

- A large majority of adolescents understand that climate change is real: eight out of ten say it's happening, and close to six out of ten are extremely or very sure it's happening (57%). Fewer than one in ten think it's not happening (6%).
- A quarter of adolescents realize that human activities are the sole cause of climate change, while another 60 percent think that humans are at least partially responsible.
- Close to three-quarters of adolescents have some understanding of the basic processes causing climate change – i.e., that the burning of fossil fuels produces CO2, which traps heat and causes a greenhouse effect. This understanding is shaky, however: only three in ten (36%) correctly identified as false the assertion that industrial activities have *reduced* greenhouse gases in the atmosphere. If they fully understood that burning fossil fuels was responsible for the greenhouse effect, they would also recognize that industrial activities have increased atmospheric greenhouse gases.

- Half also mistakenly believe that if we reduce greenhouse gas emissions, the climate will return to its prior stability; i.e., they do not realize that the changes occurring in Earth's climate will persist long-term.
- When asked to identify the environmental impacts that are evidence of climate change, adolescents recognize an average of 2.5 of five impacts (increased global temperatures; glaciers, ice sheets and sea ice decreasing; extreme weather events increasing; warmer oceans; and oceans becoming more acidic). The most recognized impact is the decrease in glaciers, ice sheets and sea ice (64%), and the least recognized is ocean acidification (23%).
- Teens are generally aware that most scientists agree human-caused climate change is happening, but they're not aware of how high the consensus is. The mean estimate of the level of scientific consensus is 70.5 percent, while the actual level of consensus is 97 percent or higher.
- Adolescents with more accurate knowledge about climate change are more likely to
  - read online newspapers;
  - follow news about politics, world affairs, science, technology, nature and the environment; and
  - hear climate change discussed at home or at school.
- Surprisingly, knowledge about climate change does not differ much by age: younger adolescents are as certain that climate change is real; they're equally aware of its impacts and of the scientific consensus. Older adolescents do, however, have greater understanding of the science underlying climate change.
- Males and females have roughly equal knowledge about climate change with one exception: females are more aware of the environmental impacts of climate change.
- Teens who are interested in science have more accurate knowledge about the science underlying climate change, but do not otherwise vary from those with less interest in the subject.

Concern, Risk Perceptions, and Response Efficacy

- Two-thirds of adolescents are worried about climate change, including close to a quarter who are very worried (23%).
- Eight out of ten say it's at least somewhat personally important to them, including one in six who say it's extremely important.
- Half of adolescents think they personally will be harmed by climate change a great deal (13%) or a moderate amount (37%). Only one in seven (14%) believe they won't be harmed at all.
- Eight out of ten adolescents (81%) think future generations of people will be harmed by climate change a great deal (46%) or a moderate amount (35%).

- Six out of ten adolescents expect that their generation will be harmed more by climate change than their parents' generation will be, and over half believe their parents' generation isn't doing enough to protect them from climate change (56%).
- Nonetheless, many teens express optimism about climate change. Over half disagree with the assertion that there's nothing their generation can do about climate change (58%), and half say they'll be able to adapt to the effects of climate change.
- Adolescents who follow *any* news source are more emotionally engaged with the issue of climate change: they expect more harm; they're more worried and say the issue is more personally important. They're also more likely to feel their parents' generation isn't doing enough to protect them, but that their generation will be able to adapt to the impacts of climate change.
- Adolescents who follow relevant news topics – science, technology, nature, the environment, politics, and/or world affairs – are more emotionally engaged with climate change than those who don't follow these topics. They expect more harm; they're more worried and view the issue as more personally important; and they're more optimistic that their generation can act on climate change and adapt.
- Likewise, adolescents who often hear others discussing the topic of climate change—including science teachers, parents, friends, their favorite news source, and scientists at NASA—are more engaged. They have higher risk perceptions; they're more worried; they view the issue as more personally important; and they have higher expectations that their generation can adapt.
- Older adolescents are more emotionally engaged with the issue of climate change, and they are more critical of their parents' response to the threat. However, estimates of the harm climate change will cause to them and to future generations don't differ by age, and younger adolescents have as much confidence as those who are older that their generation will be able to effectively act on the threat.

Questions about Climate Change

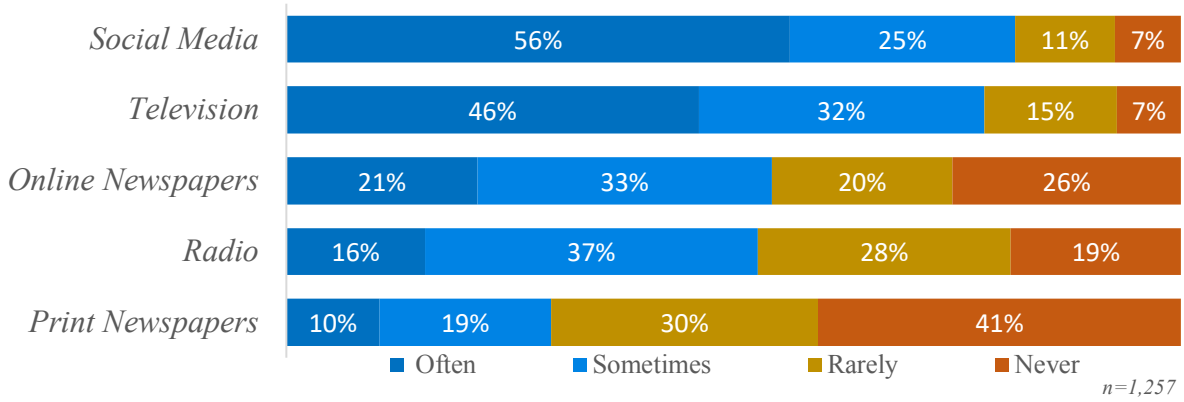
- Adolescents are more likely to have questions about climate solutions (30%) than other climate topics. Roughly one in five have questions on the topics of: the reality of climate change (19%); its causes (21%); and its impacts (18%).
- Adolescents' most asked specific questions are: (1) whether there's still time to reduce climate change or it's too late; and (2) how scientists know that climate change is caused by humans rather than by natural changes in the environment (14% for each).
- Information sources are largely unrelated to adolescents' questions about climate change. The primary difference is that those who hear or read about the topic more often, regardless of the source, are more likely to actually have questions on the topic – i.e., they're less likely to say they don't have any questions. This suggests that any form of exposure to information on the topic arouses curiosity about the issue among teens.

I. Media Use and Sources of Climate Change Information

News Sources

Adolescents use social media and television as news sources more than other information channels, with 56 percent reporting they often use social media for news, and 46 percent saying they often use television. Fewer than half as many often use radio (16%), online newspapers (21%), or print newspapers (10%).

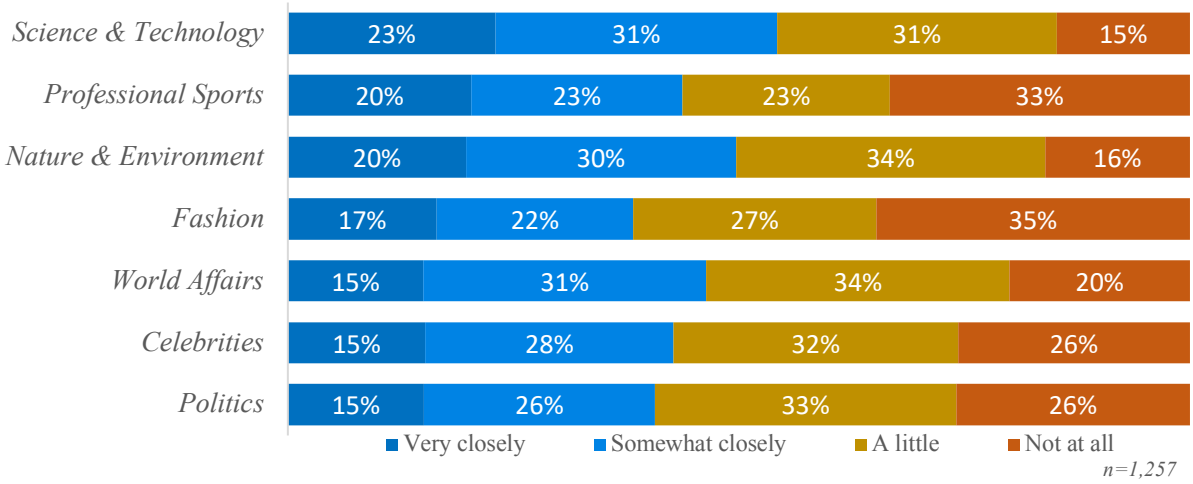
How often do you use each of the following as a source for news?



Attention to Types of News

Large numbers of adolescents follow news topics where they are likely to encounter stories about climate change: science and technology (54% very or somewhat closely); nature and the environment (50%); world affairs (46%); and politics (41%).[1]

How closely do you follow news about each of the following?

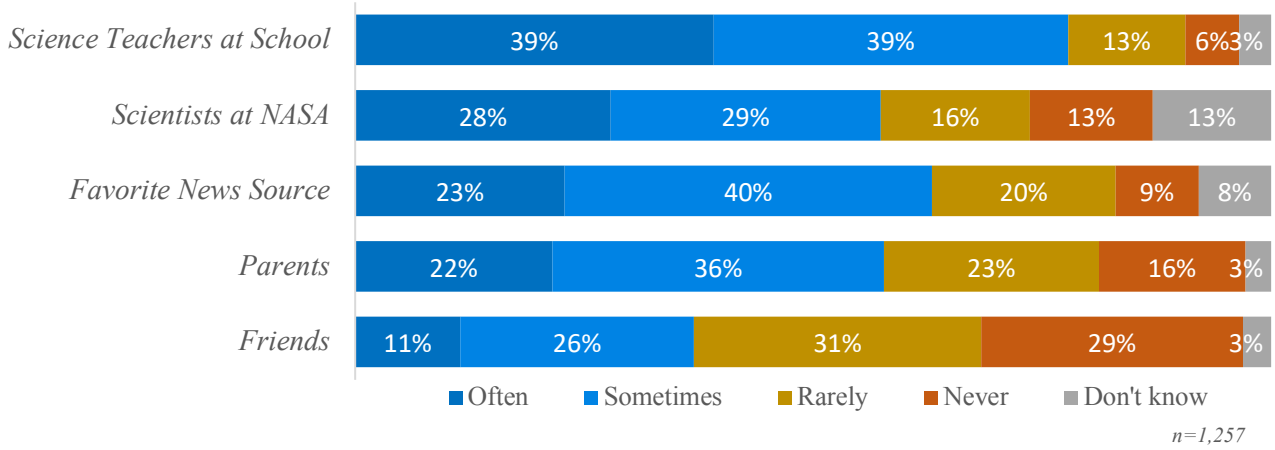


[1] Note that the questions on news topics adolescents follow closely were asked early in the survey, before climate change was mentioned. Hence, these responses are not the result of a sample skewed toward adolescents who are concerned about climate change.

Frequency of Hearing Sources Discuss Climate Change

Adolescents are much more likely to hear about climate change from their science teachers than from other sources. Close to eight out of ten hear their teachers talk about the topic often (39%) or sometimes (39%). More than half hear their parents discuss the topic often or sometimes (58%), and over a third hear their friends discuss the topic often or sometimes (37%).

About how often, if ever, have you heard each of the following talk about climate change?



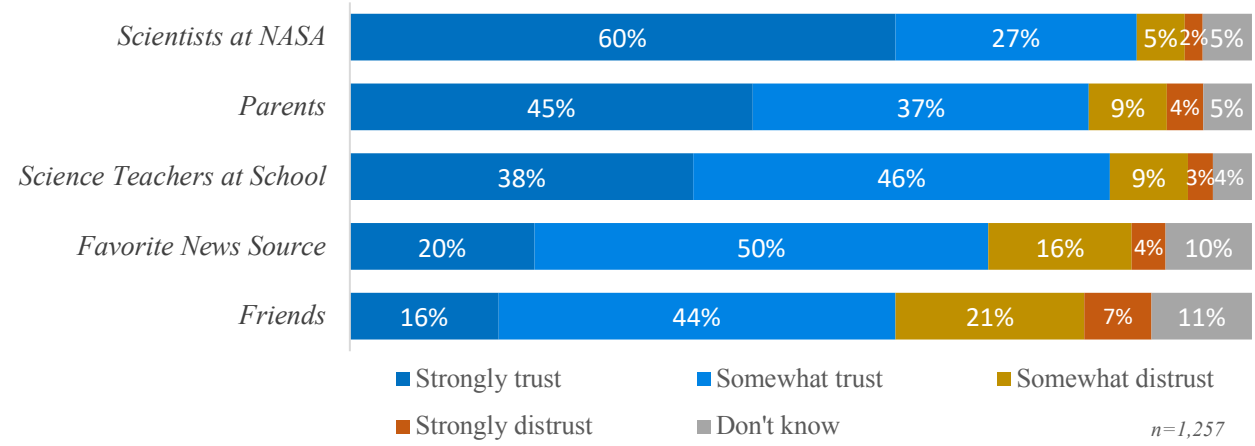
n=1,257

Trust in Sources of Information on Climate Change

Large majorities of adolescents trust the sources where they're most likely to encounter information on climate change. NASA scientists are the most trusted source: close to 90 percent of adolescents trust NASA scientists for information on climate change, including 60 percent who strongly trust them. Sixty percent trust their friends, but only 16 percent trust them strongly.

Eighty-four percent trust their science teachers at school, an important finding given that their teachers are the source they hear from most often on the topic.

If each of the following were to discuss climate change, how much would you trust them as a source of information on the topic?

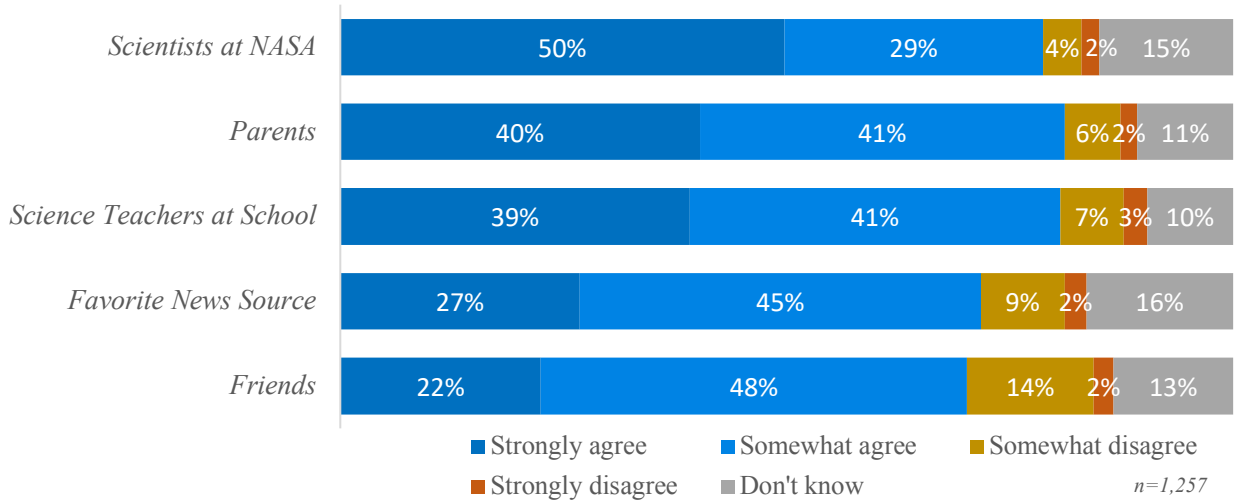


n=1,257

Agreement with Sources of Information on Climate Change

Adolescents are in broad agreement with their sources of information on climate change. Close to eight out of ten teens agree with what they hear about climate change from scientists at NASA (79%), their parents (81%), and their science teachers (81%). Close to three-quarters agree with their favorite news source (72%), and their friends (70%).

Overall, how much do you agree or disagree with the things you have heard about climate change from each of the following?



Group Differences in Media Use and Sources of Climate Change Information

❖ *Age*

Unsurprisingly, older adolescents pay more attention to news and hear about climate change more often than younger adolescents do.

- News Sources**:** Older teens are more likely to use online newspapers *(p≤.01)* and print newspapers *(p≤.05)* than younger teens are.[2]
- Types of News: They follow more types of news, including politics *(p≤.001),* world affairs *(p≤.01),* nature and the environment *(p≤.01),* and science and technology *(p≤.05).*
- Frequency of Hearing from Sources about Climate Change: Older adolescents tend to hear more about climate change from all five information sources *(favorite news source, friends, and scientists at NASA: p≤.01; parents: p≤.05; science teachers: p≤.10.*
- Trust in Sources: Trust in sources of climate change information is largely unrelated to age, with one notable exception: older adolescents are less likely to trust their parents as sources of information on the topic *(p≤.01).*

[2] See the methods section for a description of the statistical tests used in this and all subsequent sections of the report.

Agreement with Sources: Agreement with sources of information on climate change does not vary by age.

❖ *Gender*

Male adolescents are more likely than females to use most news sources and to hear news about climate change. They also tend to trust and agree more with their sources of information.

- News Sources**:** Males are more likely to use print newspapers *(p≤.001)* and television *(p≤.01)* as news sources. Females are more likely to use social media for news *(p≤.01)*.
- Types of News: The sole type of news that is equally likely to be followed by both females and males is news about nature and the environment. Males are more likely than females to follows news on politics, world affairs, science, and technology *(all p≤.001)*.
- Frequency of Hearing from Sources about Climate Change: Males hear more from their parents, and NASA scientists *(p≤.001),* and from their favorite news source *(p≤.01)*.
- Trust in Sources: Males are more likely than females to trust their parents *(p≤.001),* scientists at NASA *(p≤.01),* and their friends *(p≤.01)* as sources of climate information.
- Agreement with Sources: Males are more likely to agree with their parents, favorite news source, and NASA scientists *(all p≤.001)*; and with their friends, *(p≤.01)*. Not only did females express less agreement with these sources, they were also more likely to say they didn't know whether they agreed or not.

❖ *Interest in Science*[3]

- News Sources**:** Adolescents who are more interested in science classes at school are more likely to use print newspapers than other teens *(p≤.05)*.
- Types of News: These teens are also more likely to follow news about science and technology, and nature and the environment than other teens *(p≤.001 for both)*.
- Frequency of Hearing from Sources about Climate Change: Adolescents who are interested in science hear about climate change more often from NASA scientists *(p≤.001*) and from their friends and parents (*p≤.05)*.
- Trust in Sources: Adolescents who are interested in science have greater trust in all five sources of information *(parents: p≤.001; science teachers p≤.01; scientists at NASA and friends: p≤.05; and their favorite news source: p≤.10),* in comparison to other teens.
- Agreement with Sources: These adolescents are also more likely to agree with NASA scientists and their parents *(p≤.001),* science teachers *(p≤.01),* and their favorite news source *(p≤.05)* than other teens.

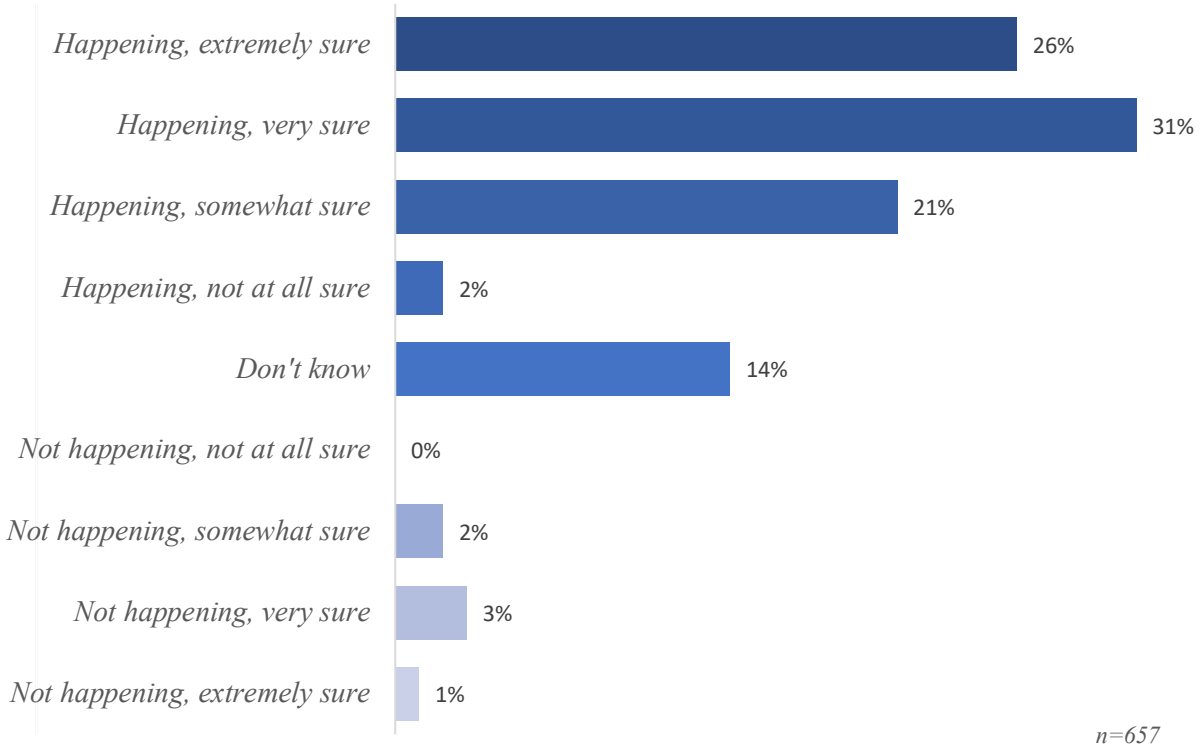
[3] Adolescents ranked eight classes from their most to least favorite: English; foreign languages; social studies; science; art; math; music; and physical education. Their ranking of science was used to assess interest in science.

II. Knowledge about Climate Change

Recognition that Climate Change Is Happening

A large majority of adolescents understand that climate change is real: eight out of ten say it's happening, and close to six out of ten are extremely or very sure it's happening (57%). Fewer than one in ten believe it's not happening (6%).

Is climate change happening? How sure are you?

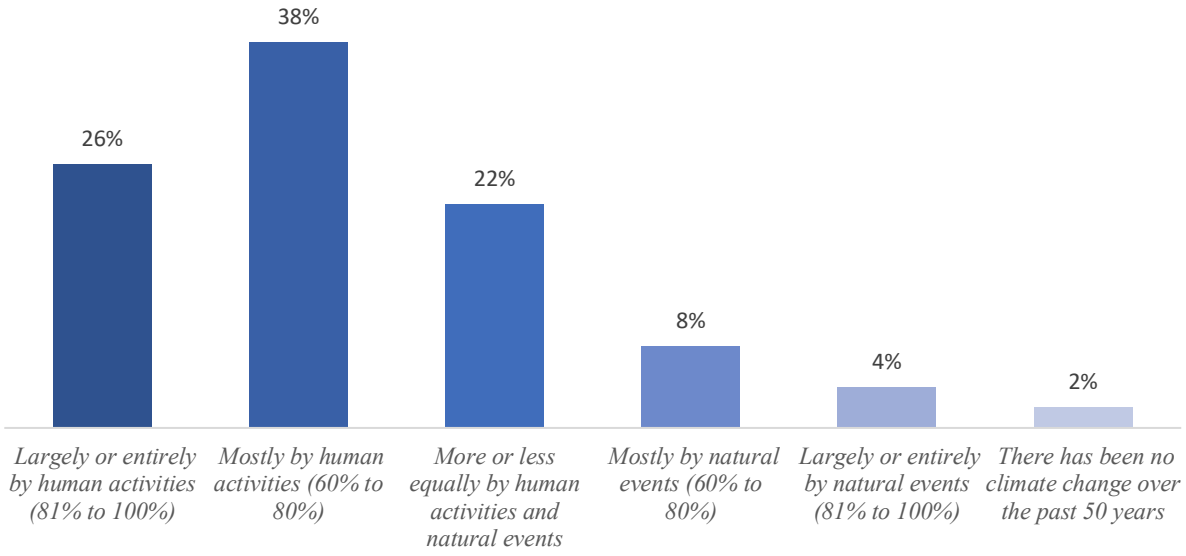


Full Question Wording: Responses to two questions were combined: (1) "Climate change refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result. What do you think: Do you think that climate change is happening?" [Yes; No; Don't know]; (2) "How sure are you that climate change is/is not happening?" [Extremely sure; very sure; somewhat sure; not at all sure].

Awareness that Human Activities Are Causing Climate Change

While most adolescents understand that climate change is happening, only a quarter realize the extent to which human activities are the cause (26%). Six in ten think that either we are mostly responsible (38%) or that human activities and natural changes are equally to blame (22%), while 14 percent believe that climate change is either caused by natural changes, or that it is not happening.

Assuming climate change is happening, do you think that any climate change has occurred over the past 50 years has been caused by…



n=657

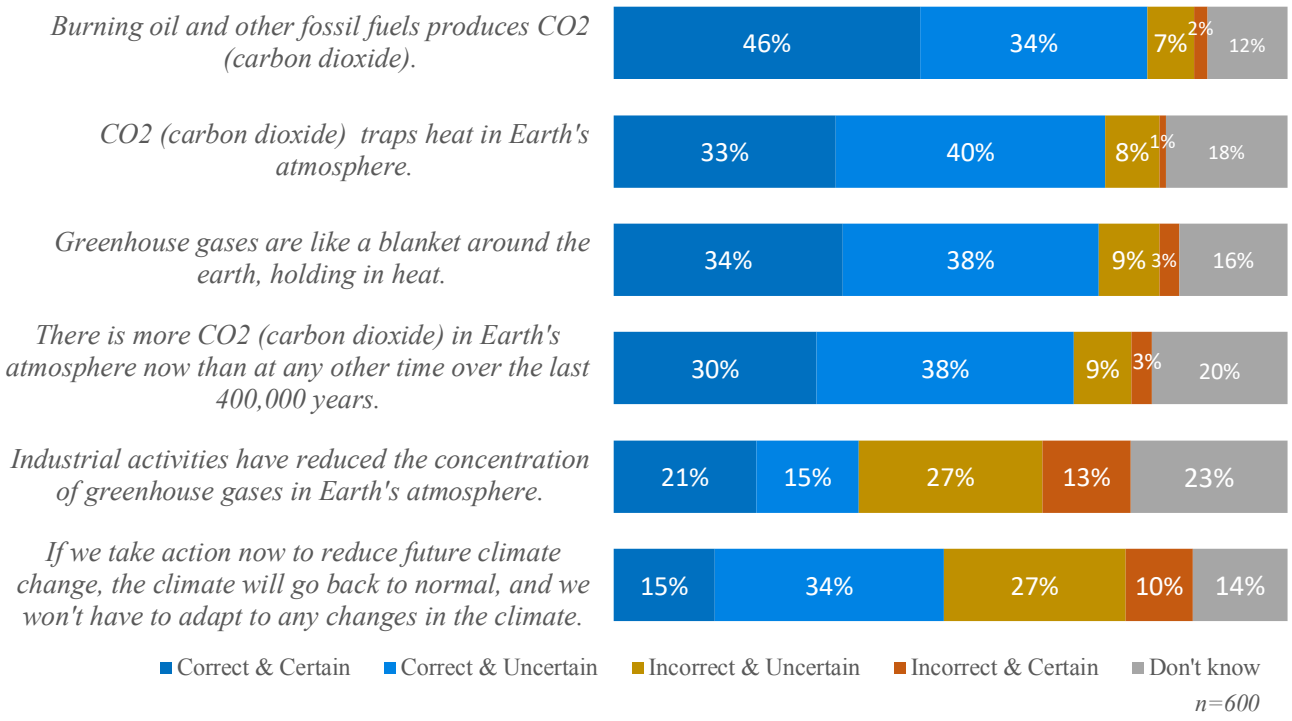
Understanding of the Science Underlying Climate Change

A majority of adolescents have some understanding of the basic processes causing climate change – i.e., that the burning of fossil fuels produces CO2, which traps heat in the atmosphere and causes a greenhouse effect. The results suggest, however, that for many adolescents, this understanding is incomplete and partial.

Eighty percent recognize that burning fossil fuels produces CO2, and close to three-quarters understand that CO2 traps heat (73%) and causes a greenhouse effect (72%). Thus, the majority of adolescents appear to understand the basic process creating climate change.

This knowledge is shaky, however: forty percent think that industrial activities have *reduced* greenhouse gases in the atmosphere, and another quarter (23%) say they don't know how industrial activities have affected greenhouse gas concentrations. If adolescents fully understood that burning fossil fuels was responsible for the greenhouse effect that is warming the planet, they would realize that industrial activities have increased, rather than decreased the concentration of greenhouse gases in the atmosphere.

Further, only half realize that climate change is causing long-term change, and that emission reductions will not restore the prior stability in the climate system (49%).



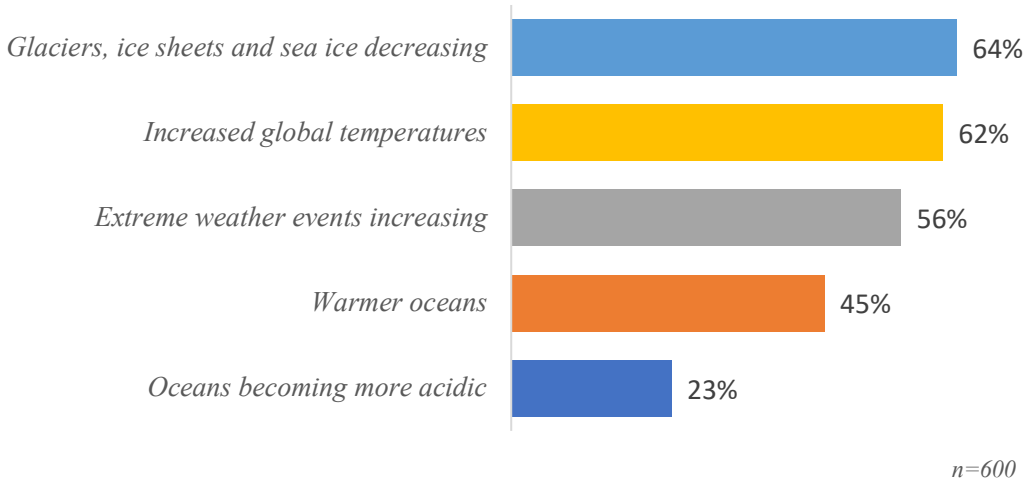
Note: Survey response options were: Definitely true; Probably true; Don't know; Probably false; and Definitely false." Because some statements are false, questions have been recoded to facilitate interpretation: Correct, certain; Correct, uncertain; Don't know; Incorrect, uncertain; and Incorrect, certain.
Note: In subsequent sections of this report, we will be using an index of understanding of the science underlying climate change, created by averaging responses to the first four measures in this figure, with the following coding: 1=Incorrect & Certain; 2=Incorrect & Uncertain; 3=Don't Know; 4=Correct & Uncertain; 5=Correct and Certain; $\alpha_{UnderstandingScienceIndex} = .77$*).*

Understanding of the Impacts of Climate Change

Close to two-thirds of adolescents know there have been decreases in glaciers, ice sheets and sea ice (64%), and an increase in global temperatures (62%). Many fewer, but still a majority, are aware that the increase in extreme weather is evidence of climate change (56%). The least recognized impact of climate change is ocean acidification, which is understood by just under a quarter of adolescents (23%).

Adolescents can correctly identify an average of 2.50 of these five impacts of climate change. More than one in ten are not able to identify any impacts (12%), and one in four can name only a single impact (25%). A third (32%) are familiar with four or five of the impacts listed.

Which of the following are evidence that climate change is happening? (Check all that apply.)

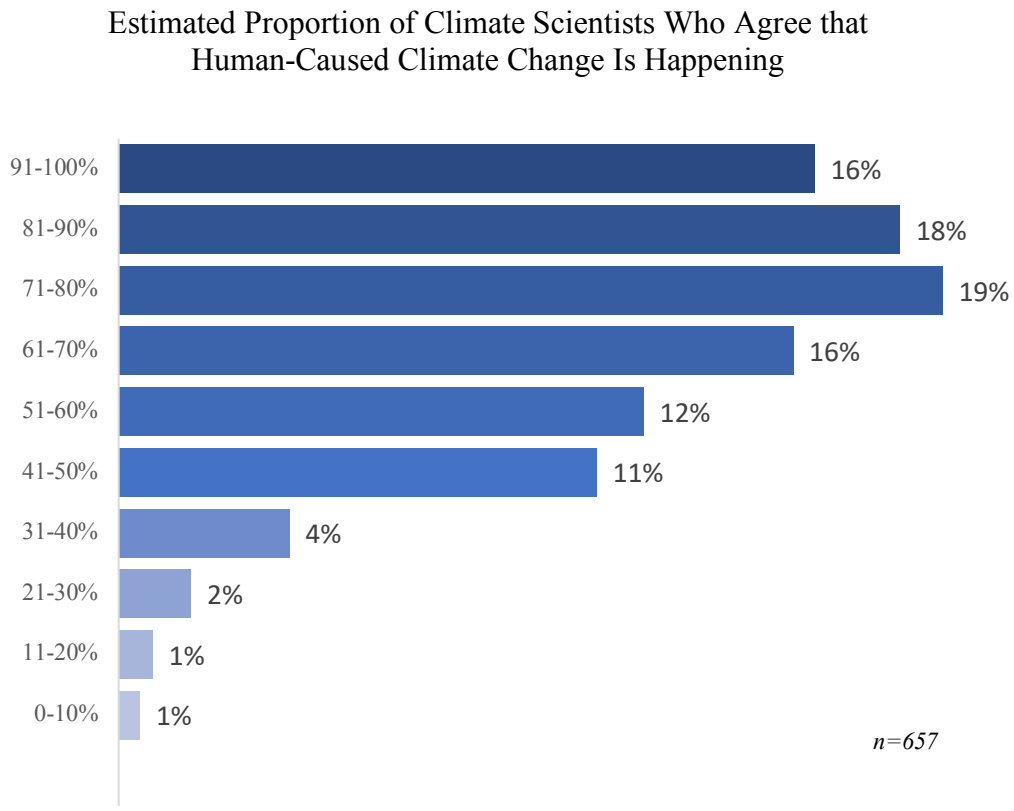


Note: In subsequent sections of this report, we will be using an index of understanding of the impacts of climate change, created by summing the number of correct climate change impacts identified; $\alpha_{UnderstandingImpactsIndex} = .72$*).*

Awareness of the Scientific Consensus on Climate Change

Adolescents are generally aware that most climate scientists agree human-caused climate change is happening, but most are not aware of how high the consensus is; i.e., 97 percent or more climate scientists recognize that human-caused climate change is happening.

The mean estimate of the consensus by adolescents is 70.5 percent, and close to four out of ten think the level of agreement is more than 80 percent (37%). Only one in five thinks that a minority scientists agree that human-caused climate change is happening (19% of respondents).



Question text: To the best of your knowledge, what percentage of climate scientists think that human-caused climate change is happening? Please click on the slider bar below to indicate your answer. You can slide the indicator on the bar anywhere from 0% (no climate scientists think it's happening) to 100% (all climate scientists think it's happening).

Knowledge Differences Associated with Adolescents' Sources of Information

❖ *Frequently Used News Sources*

Adolescents who often read online newspapers have more accurate knowledge about climate change than those who use other sources. They are significantly more likely than their peers to provide correct answers to every knowledge question in the survey. Print newspapers and social media news are also associated with more accurate knowledge; adolescents who often use these news sources are more certain that human-caused climate change is happening.

- Certainty that climate change is happening is stronger among adolescents who read either print and online newspapers more often, or who follow news on social media more often *($p \leq .001$ for all three sources)*.
- Understanding that human activities are causing climate change is greater among adolescents who use online newspapers *($p \leq .001$);* social media news *($p \leq .01$);* and print newspapers *($p \leq .05$)* more often.
- Understanding of the science underlying climate change[4] is greater among adolescents who read online newspapers more frequently *($p \leq .001$)*.
- Awareness of the environmental impacts of climate change[5] is higher among adolescents who read online newspapers more frequently *($p \leq .01$)*.
- Estimates of the level of scientific consensus on human-caused climate change are higher among adolescents who read online newspapers more frequently *($p \leq .001$)*.

❖ *Types of News Followed*

Adolescents who follow news on (a) science & technology, (b) nature & the environment, (c) politics, and/or (d) world affairs have more accurate knowledge about climate change. Specifically:

- Certainty that climate change is happening is stronger among adolescents who follow any of these four types of news *(all $p \leq .001$)*.
- Understanding that human activities are causing climate change is greater among adolescents who follow news about nature and the environment *($p \leq .001$);* and/or world affairs *($p \leq .05$)*. Those who follow political news also tend to have more understanding of human causation *($p = .06$)*.
- Understanding of the science underlying climate change is greater among adolescents who follow any of these four types of news *(all $p \leq .001$)*.

[4] Understanding of the science underlying climate change is assessed using an index created by averaging responses to four measures shown on p. 14.
[5] Awareness of the impacts of climate change is assessed by summing the number of correct environmental impacts that are evidence of climate change shown on p. 15.

- Awareness of the environmental impacts of climate change is higher among adolescents who follow any of these four types of news *(p≤.001 for political news, world affairs, and science & technology news; p≤.01 for news about nature & the environment).*
- Estimates of the level of scientific consensus are higher among adolescents who follow any of these four types of news *(all p≤.001).*

❖ *Frequency of Hearing Sources Discuss Climate Change*

Adolescents who hear more about climate change from any of the five sources we assessed – their favorite news source, their teachers, parents, friends, scientists at NASA – have more accurate knowledge about climate change.

- Certainty that climate change is happening is higher among adolescents who hear about climate change more often from any of these five sources *(all p≤.001).*
- Understanding that human activities are causing climate change is greater among adolescents who hear about the topic more often from scientists at NASA *(p≤.001),* their friends *(p≤.001),* parents *(p≤.01),* and teachers *(p≤.05).*
- Understanding of the science underlying climate change is greater among adolescents who hear about the topic more often from their teachers *(p≤.001),* their favorite news source *(p≤.001),* their parents *(p≤.01),* scientists at NASA *(p≤.01),* and their friends *(p≤.05).*
- Awareness of the environmental impacts of climate change is higher among adolescents who hear more about the topic from their teachers *(p≤.001),* NASA scientists *(p≤.01),* their parents *(p≤.05),* and their favorite news source *(p≤.05).*
- Estimates of the level of scientific consensus on human-caused climate change are higher among adolescents who hear about the topic more frequently from any of these five sources *(all p≤.001).*

Group Differences in Knowledge about Climate Change

❖ *Age*

Few age differences are apparent in adolescents' knowledge about climate change. Given that the Next Generation Science Standards include curriculum recommendations on climate change education at each grade level, this is surprising. Older adolescents have more understanding of human causation *(p≤.05),* but that is the sole age difference in knowledge.

- Certainty that climate change is happening does not vary by age.
- Understanding that human activities are causing climate change is greater among older adolescents *(p≤.05).*
- Understanding of the science underlying climate change does not vary by age.
- Awareness of the environmental impacts of climate change does not vary by age.
- Estimates of the level of scientific consensus do not vary by age.

❖ *Gender*

Male and female adolescents do not differ very much in their knowledge about climate change. Females are more aware of the environmental impacts that are evidence of climate change, while males are more aware of the scientific consensus. No other differences are apparent.

- Certainty that climate change is happening does not vary by gender.
- Understanding that human activities are causing climate change does not vary by gender.
- Understanding of the science underlying climate change does not vary by gender.
- Awareness of the environmental impacts of climate change is greater among females *($p \leq .01$)*. Females are significantly more likely to recognize that glaciers, ice sheets and sea ice are melting, and that global temperatures are increasing *($p \leq .05$ for both)*.
- Estimates of the level of scientific consensus are higher among males *($p \leq .05$)*.

❖ *Interest in Science*

Adolescents who are interested in science have more accurate knowledge about science underlying climate change, but do not otherwise vary from those with less interest in the subject.

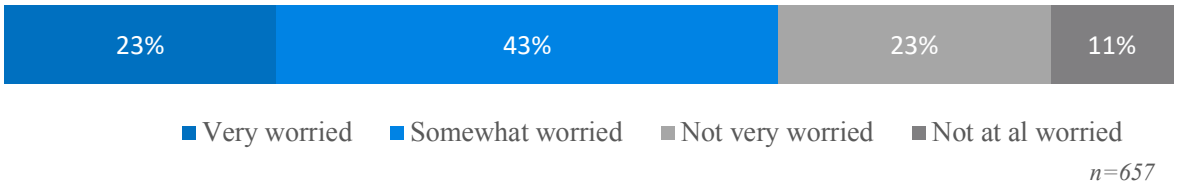
- Certainty that climate change is happening does not vary by interest in science.
- Understanding that human activities are causing climate change does not vary by interest in science.
- Understanding of the science underlying climate change tends to be greater among adolescents who are interested in science *($p \leq .10$)*. Specifically, they're more likely to understand that burning oil and other fossil fuels produces CO2 and that industrial activities have not reduced the concentration of greenhouse gases in the atmosphere *($p \leq .05$ for both)*. They also tend to have better understanding that greenhouse gases act like a blanket around the earth, and that the climate will not return to its former stability even if we take action to reduce climate change *($p \leq .10$ for both)*.
- Awareness of the environmental impacts of climate change does not vary by interest in science.
- Estimates of the level of scientific consensus are higher among adolescents who are interested in science *($p \leq .05$)*.

III. Concern, Risk Perceptions, and Response Efficacy

Worry and Personal Importance of Climate Change

Two-thirds of adolescents are worried about climate change (66%), including close to a quarter who are very worried (23%).

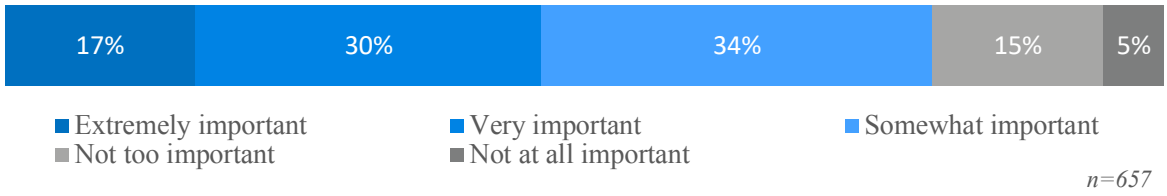
How worried are you about climate change?



n=657

Eight out of ten say it's at least somewhat personally important to them (81%), including one in six who say it's extremely important (17%).

How important is the issue of climate change to you personally?



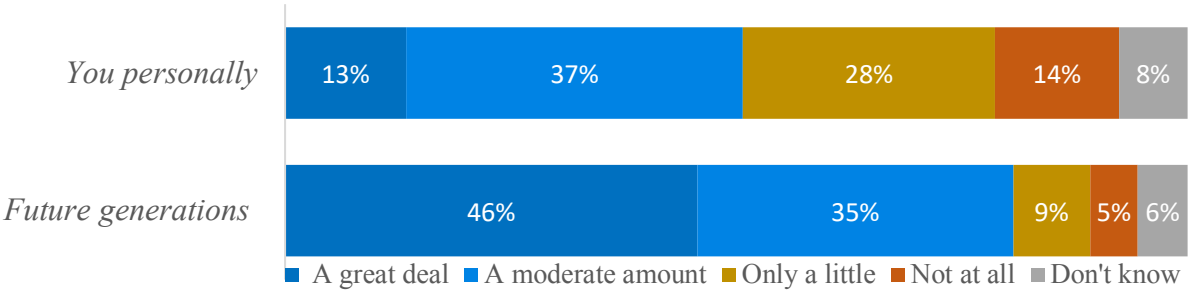
n=657

Perceptions of the Harm Climate Change Will Cause to Them Personally and to Future Generations

Half of adolescents think they personally will be harmed by climate change a great deal (13%) or a moderate amount (37%). Only one in seven (14%) think they won't be harmed at all.

Expectations of harm to future generations are much higher: eighty-one percent think future generations will be harmed a great deal (46%) or a moderate amount (35%).

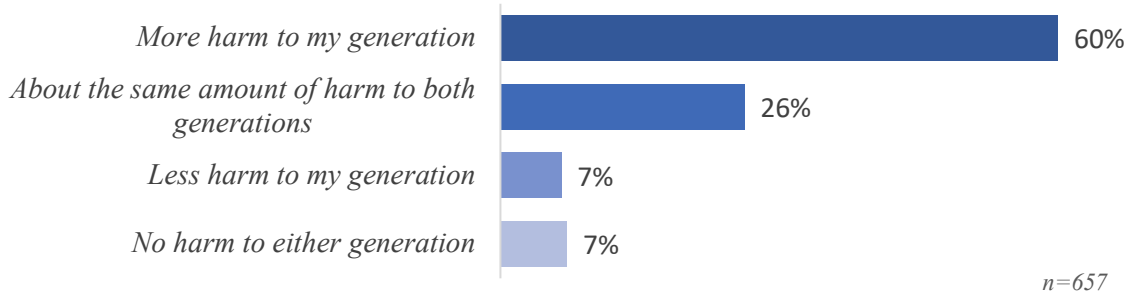
How much do you think climate change will harm…



n=657

Six out of ten adolescents expect that their generation will be harmed more by climate change than their parents' generation will be.

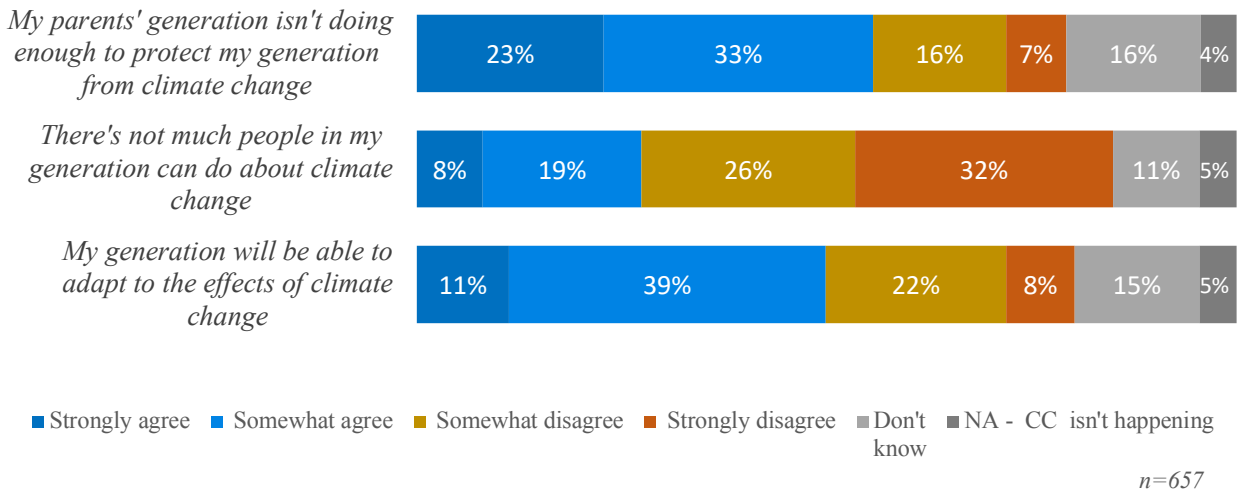
Do you think climate change will cause more, less, or about the same amount of harm to your generation as it will cause to your parents' generation?



Perceptions of the Efficacy of Their Parents' and Their Own Generation's Responses to Climate Change

Over half of adolescents believe their parents' generation isn't doing enough to protect them from climate change. Nonetheless, a majority express optimism that their generation can do something about climate change and half believe that they'll be able to adapt to the effects.

- Fifty-six percent of adolescents agree that their parents' generation isn't doing enough to address climate change, while under a quarter (23%) disagree.
- Close to 60% disagree with the assertion that there is not much their generation can do about climate change (58%); just over a quarter agree (27%).
- Exactly half agree that their generation will be able to adapt to climate change. Another 30 percent disagree.



Attitudinal Differences Associated with Sources of Information on Climate Change

❖ *Frequently Used News Sources*

Adolescents' use of news sources is strongly related to their attitudes toward climate change. Use of all five news sources assessed in the survey – online & print newspapers, television, radio and social media – is associated with greater concern about climate change and with stronger feelings that their generation will be able to act effectively to adapt to the threat.

As with knowledge about climate change, use of online newspapers stands out as the news source most strongly associated with adolescent readers' views.

- Worry about the issue is greater among adolescents who use any of the five news sources *($p \leq .001$ for television, print and online newspapers, and social media; $p \leq .05$ for radio).*
- The issue is more personally important to adolescents who use any of the five news sources *(all $p \leq .001$).*
- Perceptions that they will personally be harmed by climate change are more prevalent among adolescents who follow most news sources *(online and print newspapers: $p \leq .001$; television and radio: $p \leq .01$).*
- Expectations of harm to future generations are stronger among those who read online newspapers *($p \leq .001$)* or print newspapers *($p \leq .05$),* or who watch television news *($p \leq .05$).*
- Expectations that their generation will be harmed more than their parents' generation are stronger among those who read online newspapers *($p \leq .05$).*
- Belief that their parent's generation isn't doing enough to protect them from climate change is stronger among those who often use online or print newspapers *($p \leq .001$ for both),* television news, and/or radio *($p \leq .05$ for both).*
- Belief that there's not much their generation can do about climate change is weaker among those who often read online newspapers *($p \leq .001$),* or social media news *($p \leq .01$).*
- Belief that their generation will be about to adapt to the effects of climate change is stronger among users of all five types of news media *(online and print newspapers: $p \leq .001$; social media: $p \leq .01$; television and radio: $p \leq .05$).*

❖ *Types of News Followed*

Adolescents who follow news on (a) science & technology, (b) nature & the environment, (c) politics, and/or (d) world affairs are more concerned with the issue, perceive it to be more harmful, and have more confidence that their generation will be able to adapt.

- Worry about the issue is higher among adolescents who follow any of the four types of news *(all $p \leq .001$).*
- The issue is more personally important to adolescents who follow any of the four types of news *(all $p \leq .001$).*

- Perceptions that they will personally be harmed by climate change are more prevalent among adolescents who follow any of the four types of news *(all p≤.001)*.
- Expectations of harm to future generations are higher among adolescents who follow any of the four types of news *(all p≤.001)*.
- Expectations that their generation will be harmed more than their parents' generation do not vary by the types of news adolescents follow.
- Belief that their parent's generation isn't doing enough to protect them from climate change is stronger among those who follow any of the four types of news *(p≤.001 for politics, world affairs, and nature & the environment; p≤.01 for science & technology)*.
- Belief that there's not much their generation can do about climate change is weaker among those who follow any of the four types of news *(political news: p≤.001; news about nature & the environment: p≤.001; world affairs: p≤.01; science & technology: p≤.05)*.
- Belief that their generation will be about to adapt to the effects of climate change is stronger among those who follow any of the four types of news *(all p≤.001)*.

❖ *Frequency of Hearing Sources Discuss Climate Change*

Adolescents who hear others talking about climate change are much more concerned about the issue and have higher expectations that their generation will be able to adapt. This holds for all five sources we assessed – science teachers, scientists at NASA, their parents and friends, and their favorite news source.

- Worry about the issue is higher among adolescents who often hear about the topic from any of these five sources of information *(all p≤.001)*.
- The issue is more personally important to adolescents who often hear about the topic from any of these five sources of information *(all p≤.001)*.
- Perceptions that they will personally be harmed by climate change are higher among adolescents who often hear about the topic from any of these five sources of information *(all p≤.001)*.
- Expectations of harm to future generations are higher among adolescents who often hear about the topic from any of these five sources of information *(all p≤.001)*.
- Expectations that their generation will be harmed more than their parents' generation are higher among adolescents who often hear about the topic from any of these five sources of information *(favorite news source: p≤.001; teachers: p≤.01; parents: p≤.01; scientists at NASA: p≤.01; friends: p≤.05)*.
- Belief that their parent's generation isn't doing enough to protect them from climate change is stronger among those who often hear about the topic from any of these five sources of information *(all p≤.001)*.

- Belief that there's not much their generation can do about climate change is weaker among adolescents who often hear about the topic from any of these five sources of information *(all p≤.001)*.
- Belief that their generation will be about to adapt to the effects of climate change is stronger among those who often hear about the topic from any of these five sources of information *(parents: p≤.001; NASA scientists: p≤.001; friends: p≤.01; favorite news source: p≤.05; teachers: p≤.05)*.

Group Differences in Concern, Perceived Risk and Response Efficacy

❖ *Age*

Older adolescents are more emotionally engaged with the issue of climate change, and they are more critical of their parents' response to the threat. However, estimates of the harm climate change will cause to them and to future generations don't differ by age, and younger adolescents have as much confidence as those who are older that their generation will be able to effectively act on the threat.

- Worry about the issue is higher among older adolescents *(p≤.01)*.
- The issue is more personally important to older adolescents *(p≤.001)*.
- Perceptions that they will personally be harmed do not vary by age.
- Expectations of harm to future generations do not vary by age.
- Expectations that their generation will be harmed more than their parents' generation are higher among older adolescents *(p≤.05)*.
- Belief that their parents' generation isn't doing enough to protect them from climate change is stronger among older adolescents *(p≤.01)*.
- Belief that there's not much their generation can do about climate change does not vary by age.
- Belief that their generation will be able to adapt to the effects of climate change does not vary by age.

❖ *Gender*

There are no gender differences in concern, risk perceptions or response beliefs.

❖ *Interest in Science*

The sole attitudinal difference between adolescents who differ in their interest in science is that those who are more interested in science view climate change as more personally important than those who are less interested *(p≤.05)*.

IV. Questions about Climate Change

What Adolescents Would Most Like to Know about Climate Change

Adolescents have more questions about solutions to climate change than any other topic, and the single most asked question is whether there's still time to reduce climate change or it's too late.

If you had the chance, which of the following questions would you most like to ask an expert on climate change?

Topic	Specific Questions	Percent
Solutions (30%)	What can I do to reduce climate change?	8%
	What can the United States do to reduce climate change?	8%
	Is there still time to reduce climate change, or is it too late?	14%
Causes (21%)	What causes climate change?	7%
	How do you know that climate change is mostly caused by human activities, not natural changes in the environment?	14%
Reality of Climate Change (19%)	Is climate change really happening?	10%
	How do you know climate change is happening?	9%
Impacts (18%)	What harm will climate change cause?	11%
	What benefits will climate change have?	4%
	Will climate change harm people?	3%
Other (12%)	What kind of research are you conducting on climate change?	6%
	I don't have any questions about climate change.	4%
	Other questions [text]	1%

Note: These questions were identified in prior research in which an open-ended question asked adults what question they would like to ask a climate expert. Their responses were coded into the fifteen questions, only eleven of which are used here. Four, such as the question asking how much it would cost the US to reduce climate change, were omitted, as they were unlikely to be asked by adolescents.

Associations between Information Sources and Questions about Climate Change

Associations between information sources and the types of questions teenagers have about climate change are weak. However, one finding is clear: Exposure to information on the topic from *any* source generates curiosity. Adolescents who are exposed to information on climate change have questions about the issue – regardless of whether their information sources are news media, social media, friends, teachers, parents or NASA scientists – while those who are not exposed to any information on the issue are more likely to say they don't have any questions.

Group Differences in Questions about Climate Change

Gender differences are apparent in adolescents' questions about climate change, but there are no age differences. Teens who are interested in science tend to have different questions than those who are less interested, but these differences are small.

- Age: Age is unrelated to the questions adolescents have about climate change.
- Gender: Males are more likely to ask questions about the reality and causes of climate change than females, while females are more likely than males to ask questions about solutions *($p \leq .001$)*.
- Interest in Science: Adolescents who are interested in science are somewhat more likely to ask questions about the causes of climate change and they tend to be less likely to ask questions about the reality of climate change *($p = .06$)*.

		Reality	Causes	Impacts	Solutions	Other	No questions
Gender	Males	22%	24%	18%	25%	7%	4%
	Females	15%	18%	19%	35%	8%	5%
Interest in Science Classes at School	Low	23%	19%	19%	30%	5%	4%
	Medium	18%	20%	18%	30%	9%	6%
	High	15%	24%	18%	32%	8%	3%

Note: Percentages are within gender and within interest in science categories.

V. Sample Characteristics

Demographics		
Age	**Percent**	**Frequency**
. 13	16.7	210
. 14	16.7	210
. 15	16.7	210
. 16	16.7	210
. 17	16.7	210
. 18	16.7	210
Grade	**Percent**	**Frequency**
. 9th	39.3	495
. 10th	18.4	232
. 11th	16.3	205
. 12th	21.6	272
. Not attending school	4.1	52
. No response	0.3	4
Gender	**Percent**	**Frequency**
. Male	50.3	634
. Female	49.0	617
. Prefer to self-describe	0.7	9
Race/Ethnicity *(multiple responses allowed)*	**Percent**	**Frequency**
. Asian	12.3	155
. Black or African American	21.1	266
. Hispanic/Latino	15.7	198
. Native American or Alaskan Native	2.7	34
. Native Hawaiian or Pacific Islander	1.0	13
. White	64.8	816
. Other	5.1	64
. Prefer not to answer	0.8	10

Grades	Percent	Frequency
• As and Bs	72.2	910
• Bs and Cs	22.6	285
• Cs and Ds	3.4	43
• I'm not going to school	1.7	21

School Subjects, Ranked by Preference		
How much do you like each of the following subjects at school? (1=favorite; 8=least favorite)[a]	Mean	SE
• Science	3.75	0.06
• Art	4.30	0.07
• English	4.34	0.06
• Music	4.36	0.07
• Math	4.40	0.07
• Social studies	4.58	0.06
• P.E. (Physical Education)	4.80	0.07
• Foreign languages	5.49	0.06

Full question text: *"How much do you like each of the following subjects at school? Please rank the subjects from "1" for your favorite subject to "8" for your least favorite subject. Drag your favorite subject to the top of the list, your second-favorite subject to the line below your favorite class, and so on. Even if you're not going to school now, please rank the subjects, based on the feelings you had when you were attending school."*

Career Aspirations		
How much do you think you would enjoy a career as a scientist?	Percent	Frequency
• I would enjoy it a lot	25.8	325
• I would kind of enjoy it	34.9	440
• I don't know	19.8	249
• I would not enjoy it very much	11.7	148
• I would not enjoy it at all	7.6	96
• No response	0.2	2
Even if you're not sure, what do you think you'll do after high school?	Percent	Frequency
• Get a job	10	126
• Attend a community college	15.5	195
• Attend a 4-year college or university	59.7	752
• Join the military	3.2	40
• Learn a trade/skill, like car repair	2.4	30
• Go into business for myself	1.8	23
• Other	2.1	26
• I have no idea what I'll do	5.2	66
• No response	0.2	2

VI. Methods

Survey Design

In May of 2018, we surveyed American adolescents, ages 13-18, using the online sample provider, Qualtrics. The survey was fielded May 15 - May 31; 1,260 adolescents responded, but three invalid participants who failed to visit the website have been dropped from the sample, for a final N of 1,257. The sample contains roughly equal number of respondents of each age, and has a margin of error of three percentage points.

The survey included a visit to the NASA climate change website, *climate.nasa.gov.* Prior to visiting the site, participants were asked where they obtain information about climate change, what types of news they follow, and what question they would most like to ask a climate expert. They were then instructed to search for the answer to their question at NASA's website. They were required to spend a minimum of four minutes browsing the site. The participants were randomly assigned to one of two groups, and each group answered half of the knowledge and attitude questions before they visited the website, and half after the site visit (the number of questions was equivalent in each quadrant). The design is shown below:

Survey Design		
Questions Asked of Both Groups Prior to the Site Visit	• Favorite School Subjects • Career Aspirations • Types of News Followed • Where They Find Information about Climate Change • Top Question to Ask an Expert about Climate Change	
	Group 1	**Group 2**
Questions Asked of Only One Group Prior to the Site Visit	• Science Underlying Climate Change • Impacts of Climate Change	• Certainty Climate Change is Happening • Cause of Climate Change • Concern, Perceived Risk, and Response Efficacy • Consensus Estimate
Questions Asked of Only One Group After Site Visit	• Certainty Climate Change is Happening • Cause of Climate Change • Concern, Perceived Risk, and Response Efficacy • Consensus Estimate	• Science Underlying Climate Change • Impacts of Climate Change
N	*600*	*657*

This report contains *only* the responses to questions asked prior to the website visit. Comparisons of the pre- and post-site visit answers are presented in our second report, *American Adolescents' Responses to NASA's Climate Change Website.*

Analysis Methods

Analysis-of-variance and chi-square tests were used in all statistical testing in this report.

Part I: Analysis of variance tests were conducted using age, gender and interest in science as independent variables.

The dependent variables were:

- Use of each of the five media sources
- Types of news followed
- Frequency of hearing each of five sources discuss climate change
- Trust in each of five sources of information
- Agreement with each of five sources of information on climate change.

Part II: All analyses used analysis-of-variance tests, with age, gender and interest in science as independent variables, as well as the teens' information sources; i.e.:

- Use of each of five media sources
- Following relevant types of news (science & technology; nature & environment; world affairs; and politics)
- Frequency of hearing each of five sources discuss climate change.

Dependent variables were:

- Recognition that climate change is happening
- Awareness that human activities are causing climate change
- Understanding of the science underlying climate change
- Understanding of the impacts of climate change
- Awareness of the scientific consensus on climate change.

Part III: All testing used the same independent variables as Part II.

Analysis-of-variance tests were used with two dependent variables:

- Worry
- Personal importance of climate change

Chi-square tests were used with the other dependent variables:

- Perceived risk from climate change
- Perceptions of the efficacy of parents' and own generation's responses to climate change

VII. Questionnaire

Start of Block: Consent

This survey is for American teens. We'd like to ask you about your interests and beliefs, and about a current issue you may have been hearing about from news and people you know. We'll also ask you to visit a website, and then tell us what you think about it.

Please read the following information and indicate whether you agree to be part of the study.

RISKS: There are no foreseeable risks from participating in this study. You have the right to withdraw at any time and you do not have to answer any question that you do not wish to answer on the survey.

BENEFITS: Your answers will help us reach teens with information that can be useful to people your age.

CONFIDENTIALITY: The data in this study will be private. We won't know your name, and we won't share your answers with anyone.

PARTICIPATION: Your participation is voluntary, and you may withdraw from the study at any time and for any reason. There are no costs to you or any other party for participation.

CONTACT: This research is being conducted by Drs. Connie Roser-Renouf at George Mason University. Should you wish to contact Dr. Roser-Renouf, you may get in touch with her through email at: croserre@gmu.edu. You may contact the George Mason University Office of Research Integrity and Assurance at irb@gmu.edu if you have questions or comments regarding your rights as a participant in the research. This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT:

○ Please click here if you consent to participating in this study. (1)

End of Block: Consent

Start of Block: Introductory Questions

Q1 First, a few questions about you, your family and your friends...

(randomize order of subjects)
Q2 How much do you like each of the following subjects at school? Please rank the subjects from "1" for your *favorite subject* to "8" for your *least favorite subject.*

_____ English
_____ Foreign languages
_____ Social studies
_____ Science
_____ Art
_____ Math
_____ Music
_____ P.E. (Physical Education)

Q3 How much do you think you would enjoy a career as a scientist?

- ○ I would not enjoy it at all
- ○ I would not enjoy it very much
- ○ I don't know
- ○ I would kind of enjoy it
- ○ I would enjoy it a lot

(randomize topics)

Q4 How closely do you follow news about each of the following?

	Not at all	A little	Somewhat closely	Very closely
Politics	☐	☐	☐	☐
World affairs	☐	☐	☐	☐
Science and technology	☐	☐	☐	☐
Nature and the environment	☐	☐	☐	☐
Professional sports	☐	☐	☐	☐
Celebrities	☐	☐	☐	☐
Fashion	☐	☐	☐	☐

(randomize sources)

Q5 How often do you use each of the following as a source for news?

	Often	Sometimes	Rarely	Never
Television	○	○	○	○
Radio	○	○	○	○
Print newspapers	○	○	○	○
Online newspapers	○	○	○	○
Social media (e.g. Facebook or Twitter)	○	○	○	○

(randomize statements)

Q6 How much do you agree or disagree with each of the statements below?

For the statements that ask about your parent, please choose *the parent that you feel closest to,* and think about that parent as you answer.

	Strongly disagree	Somewhat disagree	Don't know	Somewhat agree	Strongly agree
My parent doesn't really trust me.	○	○	○	○	○
I can tell my parent almost anything.	○	○	○	○	○
In my family, we often talk about topics like politics and religion, where some people disagree with others.	○	○	○	○	○
My parent often asks my opinion when the family is talking about something.	○	○	○	○	○
Getting your ideas across is important, even if others don't like it.	○	○	○	○	○

(randomize questions

Q7 When you think about the parent you feel closest to and your closest friend, who would you say...

	Closest friend	Parent
Best understands what you think and feel	○	○
Is most interested in hearing what you think	○	○
Knows you best	○	○
Has the most influence on you	○	○
You trust the most	○	○
You rely on the most for advice	○	○
Most influences your beliefs and opinions	○	○

End of Block: Intro Qs

Start of Block: Introduction to Climate Change

Q8 Now we'd like to ask you some questions about *climate change*.

Climate change refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change in a number of ways as a result.

Many people call climate change "global warming," and to many people, the terms mean the same thing.

End of Block: Intro to CC

Start of Block: Climate Change Information Sources

(randomize sources)
Q9 If each of the following were to discuss climate change, how much would you trust them as a source of information on the topic?

	Strongly trust	Somewhat trust	Somewhat distrust	Strongly distrust	Don't know
Your favorite news source	○	○	○	○	○
Your friends	○	○	○	○	○
Your parents	○	○	○	○	○
Science teachers at school	○	○	○	○	○
Scientists at NASA (the National Aeronautics & Space Administration)	○	○	○	○	○

Q10 About how often, if ever, have you heard each of the following talk about climate change?

	Never	Rarely	Sometimes	Often	Don't know
Your favorite news source	○	○	○	○	○
Your friends	○	○	○	○	○
Your parents	○	○	○	○	○
Science teachers at school	○	○	○	○	○

(Respondents who answered "never" to an information source in Q10 don't see that source in the list on Q11.)

Q11 Overall, how much do you agree or disagree with the things you have heard about climate change from each of the following?

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	Don't know
Your favorite news source	○	○	○	○	○
Your friends	○	○	○	○	○
Your parents	○	○	○	○	○
Science teachers at school	○	○	○	○	○

End of Block: CC info sources

Start of Block: Climate Change Beliefs

Half the respondents will see this block in the pretest. The other half will see it in the post-test.

Q12 What do you think? Do you think climate change is happening?

- ○ Yes
- ○ No
- ○ Don't know

Display This Question:

If What do you think? Do you think climate change is happening? = Yes

Q13 How sure are you that climate change is happening?

- ○ Not at all sure
- ○ Somewhat sure
- ○ Very sure
- ○ Extremely sure

Display This Question:

If What do you think? Do you think climate change is happening? = No

Q14 How sure are you that climate change is not happening?

- ○ Not at all sure
- ○ Somewhat sure
- ○ Very sure
- ○ Extremely sure

(Half the respondents see the response options in the order listed below; the other half see the reverse order.)
Q15 Assuming climate change is happening, do you think that any climate change that has occurred over the past 50 years has been caused...

- ○ Largely or entirely by human activities (81% to 100%)
- ○ Mostly by human activities (60% to 80%)
- ○ More or less equally by human activities and natural events
- ○ Mostly by natural events (60% to 80%)
- ○ Largely or entirely by natural events (81% to 100%)
- ○ There has been no climate change over the past 50 years

Q16 How much do you think climate change will harm future generations of people?

- ○ A great deal
- ○ A moderate amount
- ○ Only a little
- ○ Not at all
- ○ Don't know

Q17 How much do you think climate change will harm you personally?

- ○ A great deal
- ○ A moderate amount
- ○ Only a little
- ○ Not at all
- ○ Don't know

Q18 How important is the issue of climate change to you personally?

- ○ Not at all important
- ○ Not too important
- ○ Somewhat important
- ○ Very important
- ○ Extremely important

Q19 How worried are you about climate change?

- ○ Very worried
- ○ Somewhat worried
- ○ Not very worried
- ○ Not at all worried

Q20 Do you think climate change will cause more, less, or about the same amount of harm to your generation as it will cause to your parents' generation?

- ○ Less harm to my generation
- ○ More harm to my generation
- ○ About the same amount of harm to both generations
- ○ No harm to either generation
- ○ Don't know

(randomize order of statements)

Q21 How much do you agree or disagree with each of the following statements?

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Don't know	Not applicable because climate change isn't happening
My parents' generation isn't doing enough to protect my generation from climate change	○	○	○	○	○	○
My generation will be able to adapt to the effects of climate change	○	○	○	○	○	○
There's not much people in my generation can do about climate change	○	○	○	○	○	○

Q22 To the best of your knowledge, what percentage of climate scientists think that human-caused climate change is happening?

Please click on the slider bar below to indicate your answer. You can slide the indicator on the

bar anywhere from 0% (no climate scientists think it's happening) to 100% (all climate scientists think it's happening).

	None				Half				All	
	0	10	20	30	40	50	60	70	80	90	100
Click to write Choice 1 (1)											

If you don't know enough to say, just click here.

○ Don't know (1)

End of Block: Climate Change Beliefs

Start of Block: Climate Change Expert Question

All respondents see this block in the pre-test.

Q23 If you had the chance, which of the following questions would you most like to ask an expert on climate change?

- ○ Is climate change really happening?
- ○ How do you know climate change is happening?
- ○ What causes climate change?
- ○ How do you know that climate change is mostly caused by human activities, not natural changes in the environment?
- ○ What harm will climate change cause?
- ○ What benefits will climate change have?
- ○ Will climate change harm people?
- ○ What can I do to reduce climate change?
- ○ What can the United States do to reduce climate change?
- ○ Is there still time to reduce climate change, or is it too late?
- ○ What kind of research are you conducting on climate change?
- ○ I don't have any questions about climate change.
- ○ Other: _____

End of Block: Climate Change Expert Question

Start of Block: Knowledge Block

The respondents who *did not see* the Climate Change Beliefs block in the pre-test see this block in the pre-test & the Climate Change Beliefs block in the post-test. Respondents *who did see* the CC beliefs block in the pre-test will see this block in the post-test.

(randomize response options)
Q24 Which of the following are evidence that climate change is happening? (Check all that apply.)

- ☐ Increased global temperatures
- ☐ Warmer oceans
- ☐ Oceans becoming more acidic
- ☐ Glaciers, ice sheets and sea ice decreasing
- ☐ Extreme weather events increasing
- ☐ Volcanic eruptions increasing
- ☐ Acid rain increasing
- ☐ Hole in the ozone layer getting bigger
- ☐ None of the above because climate change isn't happening

(randomize items)

Q25 True or false?

	Definitely true	Probably true	Probably false	Definitely false	Don't know
Burning oil and other fossil fuels produces CO2 (carbon dioxide).	○	○	○	○	○
Industrial activities have reduced the concentration of greenhouse gases in Earth's atmosphere.	○	○	○	○	○
Greenhouse gases are like a blanket around the earth, holding in heat.	○	○	○	○	○
If we take action now to reduce future climate change, the climate will go back to normal, and we won't have to adapt to any changes in the climate.	○	○	○	○	○
CO2 (carbon dioxide) traps heat in Earth's atmosphere.	○	○	○	○	○
There is more CO2 (carbon dioxide) in Earth's atmosphere now than at any other time over the last 400,000 years.	○	○	○	○	○

End of Block: Knowledge Block

Start of Block: Website intro

Q26 Now we'd like to show you a website designed by NASA that provides people with information on climate change. Please take up to eight minutes browsing the website.

We'd like you to look for information that answers your question *(the response to Q23 – the question the respondent would most like to ask a climate expert – is inserted here).*

Q27 If you see a message like "The page you are on is trying to open a site in a new window," please click "Accept."

Please come back to the survey after you have browsed the website. You can leave this survey window open while you look around the website. We'll alert you after ten minutes have passed.

When you are finished browsing the website and are ready to answer a few questions, please come back to this window and click the "Next" button that will appear shortly.

HIDE NEXT BUTTON FOR 1 MINUTE
TIME HOW LONG UNTILTHE RESPONDENT HITS THE "NEXT" BUTTON
IF RESPONDENT HAS NOT CLICKED "NEXT" AFTER 10 MINUTES, POP-UP A REMINDER WINDOW WITH THE FOLLOWING TEXT:

Just as a reminder, please return to the survey when you are finished browsing the website. We have just a few more questions for you!

End of Block: website intro

Start of Block: Website Evaluation

Q28 How interesting did you find the information on the pages you visited?

- ○ Very interesting
- ○ Somewhat interesting
- ○ Not very interesting
- ○ Not at all interesting

Q29 How clear did you find the information on the pages you visited?

- ○ Not at all clear
- ○ Not very clear
- ○ Somewhat clear
- ○ Very clear

Q30 How useful did you find the information on the pages you visited?

- ○ Very useful
- ○ Somewhat useful
- ○ Not very useful
- ○ Not at all useful

Q31 How likely would you be to visit the website on your own time?

- Definitely will not
- Probably will not
- Not sure
- Probably will
- Definitely will

Q32 How much information did you find on NASA's website about your question (the response to Q27 – the question the respondent would most like to ask a climate expert – is inserted here)?

- A great deal (1)
- A lot (2)
- A moderate amount (3)
- A little (4)
- None at all (5)

Q33 Did the information on NASA's website fully answer your question *(the response to Q23 – the question the respondent would most like to ask a climate expert – is inserted here)?*

- No, not at all
- Yes, partially
- Yes, mostly
- Yes, fully

Q34 If you were assigned a project on climate change at school, how likely would you be to use this website for your assignment?

- ○ Very unlikely
- ○ Somewhat unlikely
- ○ Not sure
- ○ Somewhat likely
- ○ Very likely

(randomize order of statements)

Q35 Now, thinking about the NASA climate change website overall, how much do you agree or disagree with each of the following statements?

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
The information on the website is what I need to understand climate change	○	○	○	○	○
The information on the website is effective for informing young people like me about climate change	○	○	○	○	○
It's easier to find information on climate change on this website than from other sources	○	○	○	○	○
The website looks attractive	○	○	○	○	○
I enjoyed looking at the website	○	○	○	○	○
The website fits with my image of NASA	○	○	○	○	○
The text on the website is easy to understand	○	○	○	○	○
The images on the website helped me understand climate change	○	○	○	○	○
The images on the website are beautiful	○	○	○	○	○
I found the website easy to use	○	○	○	○	○
I feel confident that the information on the website is accurate	○	○	○	○	○
I trust this website	○	○	○	○	○
I learned a lot from visiting this website	○	○	○	○	○

Q36 How much do you trust the scientific research conducted by NASA on the topic of climate change?

- Strongly distrust
- Somewhat distrust
- Somewhat trust
- Strongly trust
- Don't know

End of Block: website evaluation

Start of Block: Demos

Q37 Finally, just a few questions about you.

Q38 How old are you?

- 13
- 14
- 15
- 16
- 17
- 18

Q39 What grade are you in?

- ○ 9th
- ○ 10th
- ○ 11th
- ○ 12th
- ○ I'm not going to school

Q40 Are you:

- ○ Male
- ○ Female
- ○ Other

Q41 What is your race and ethnicity?

- ○ Non-Hispanic White
- ○ Non-Hispanic Black
- ○ Hispanic
- ○ Asian
- ○ Native American/Pacific Islander
- ○ Two or more of the above
- ○ Other _____

Q42 At school, are your grades mostly...

- ○ As and Bs
- ○ Bs and Cs
- ○ Cs and Ds
- ○ Not applicable

Q43 Even if you're not sure, what do you think you'll do after high school?

- ○ Get a job
- ○ Attend a community college
- ○ Attend a 4-year college or university
- ○ Join the military
- ○ Learn a trade/skill, like car repair
- ○ Go into business for myself
- ○ Other _____
- ○ I have no idea what I'll do

Thanks for taking the time to complete this survey!

Your answers will help NASA improve their website to make it more appealing to teens like you.

End of Block: Demos