

# iStronG Pre-Survey 2022

## Dear Upward Bound Students:

You will soon start the iStronG project, which was designed by a group of curriculum developers and Upward Bound programs, including yours.

Before we start the project, we would like you to answer this pre-survey, which will take about 20 minutes to complete. Your answers on this survey will help us understand what you have learned from the iStronG curriculum when you receive the same questions on the post-survey at the end. Knowing what students learn from the curriculum (and what they don't understand) will help us improve the curriculum for the future. We will also be asking you to answer questions at the end of each iStronG curriculum unit so you can tell us what you think and hopefully help us improve it for next time.

This survey is not a test. The surveys are for iStronG project team to improve the curriculum. Your responses will not affect your academic and program standing.

## Questions About You

### 1. Name

### 2. Program

- University of Kansas
- Family Centered Education Agency (FCEA)
- University of Georgia
- University of Massachusetts Boston
- Weatherford College
- Rutgers University
- Georgia State University
- If other, please indicate your institution: \_\_\_\_\_

### 3. What grade will you be entering in the fall of 2021?

- 9
- 10
- 11
- 12

### 4. What is your gender?

- Female

- Male
- Other/don't wish to specify

**5. Are you planning on majoring in Science, Technology, Engineering, or Mathematics in college?**

- Yes
- No
- Haven't decided

### Questions About Climate Change

**6. How much have you learned about climate change, either from school, the news, your family, or friends in your community?**

- I have almost no knowledge of climate change. I have not studied it in school or heard much about it.
- I have limited knowledge. I have heard about it, but I am not aware of the facts.
- I have gathered some information about climate change from school or other sources.
- I have studied climate change a lot or heard a lot about it from other sources.
- I am very knowledgeable about climate change. Other people look to me as a source of knowledge.

**7. Do you think that climate change is happening?**

- Yes, I am extremely sure
- Yes, I am very sure
- Yes, I am somewhat sure
- Yes, I am not at all sure
- No, I am extremely sure
- No, I am very sure
- No, I am somewhat sure
- No, I am not at all sure
- Don't know

**8. Assuming climate change is currently happening, do you think it is:**

- Caused mostly by human activities
- Caused mostly by natural changes in the environment
- Caused equally by both
- Don't know

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

- Extremely important
- Very important
- Somewhat important

- Not too important
- Not at all important

**10. How worried are you about climate change?**

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

**11. Please rate how you feel about climate change. Fill in one bubble between each set of bipolar adjectives.**

	1 - Most like the left option	2	3	4	5 - Most like the right option
Hopeless (1) to Hopeful (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discouraged (1) to Empowered (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indifferent (1) to Engaged (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not Guilty (1) to Guilty (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calm (1) to Outraged/Angry (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unconcerned (1) to Alarmed (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not afraid at all (1) to Very afraid (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**12. To what extent have you learned about and discussed climate solutions that can be taken by your family, school, or community?**

- A lot
- Somewhat
- A little
- Not at all

**13. To what extent do you think there are actions that you could take now to address climate issues?**

- There are a lot of available actions I could take
- There are a moderate number of available actions I could take
- There only a very small number of actions I could take
- Nothing I could do would make any difference

**14. To what extent do you have an interest in making educational choices that will make you better prepared to work on solutions to climate issues?**

- A lot
- Somewhat
- A little

Not at all

**15. How likely are you to do the following?**

	Very likely	Somewhat likely	Unlikely	Will not do
Take action to reduce your personal carbon footprint (e.g., ride your bike more, turn off lights when they are not needed, purchase renewable energy sources if available from your utility, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss climate change with your family and friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss climate change with your peers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take some form of political action (e.g., write to your government officials, sign a petition, participate in a town hall meeting or rally) in support of climate change policy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**16. Assuming climate change is happening, what are its expected impacts over the next few decades?**

	Extremely likely	Somewhat likely	Somewhat unlikely	Not likely	I don't know
Increased temperatures globally.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decreased temperatures globally.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An overall increase in clean, potable water globally.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An overall decrease in clean, potable water globally.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased incidence and intensity of heat waves.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased rates of extinction of plant and animal species.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An overall decrease in global food production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An overall increase in global food production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased global sea level.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased intensity of storms across many regions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No changes beyond natural variability in weather.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**17. To what extent do you agree with the following statements?**

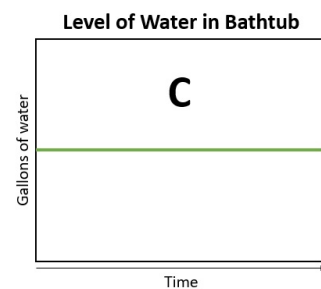
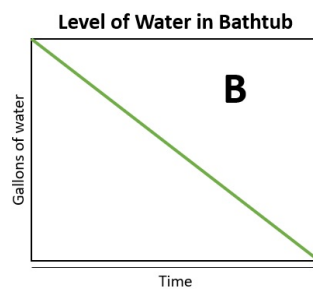
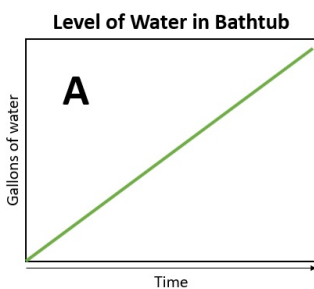
	Strongly agree	Moderately agree	Neither agree nor disagree	Moderately disagree	Strongly disagree
I am interested in climate and sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I am interested in taking courses related to climate and sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am interested in pursuing a minor or major related to climate and sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am interested in pursuing a career related to climate and sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am interested in, or already have, joined a local, state, or national environmental club or organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In order for a society to be sustainable, it should be able to meet the needs of the present generation without jeopardizing the ability of future generations to meet their own needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social, economic, and environmental systems are interconnected and interdependent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With the current rate of heat-trapping/ greenhouse gas emissions, CO2 levels will continue to increase because emission rates are higher than the rate at which CO2 is being taken out of the atmosphere.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Questions about Systems

Before answering the following three questions, imagine a bathtub with a faucet and a drain. The faucet adds water to the tub, where water accumulates, and the drain empties water from the tub. Both the faucet and the drain can be adjusted to allow different rates of water flow.

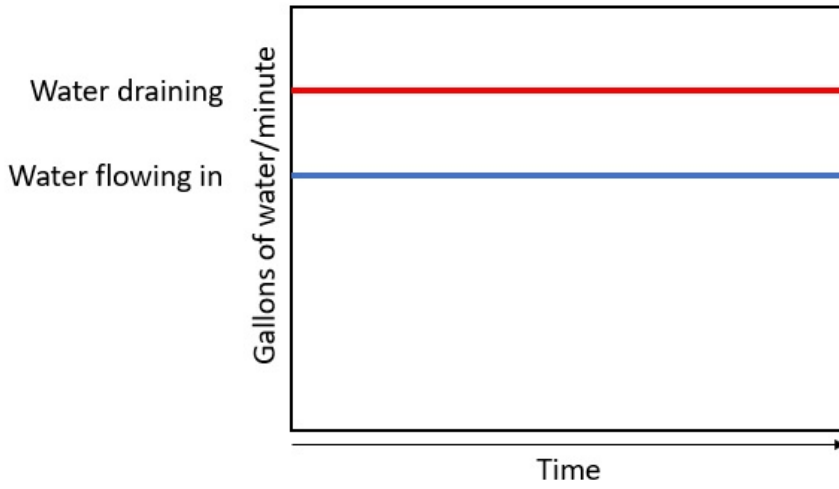
For the three questions, the graph shows the water flow rates of both the faucet (in blue) and drain (in red). Given what you know about the relationship between these two flows and the level of water in the bathtub, match each flow graph with the corresponding “Level of Water in Bathtub” graph below to show how you think the water in the bathtub will change over time (green line).



### 18. Faucet and Drain 1

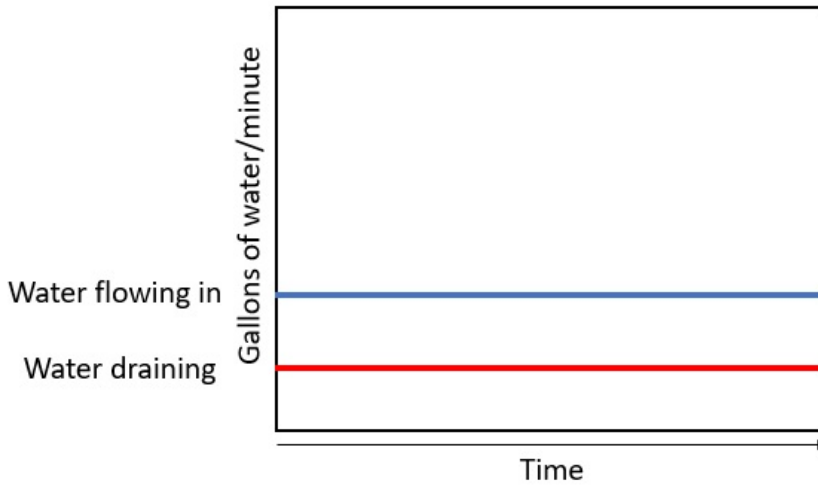
- A
- B
- C

### Water Flows



19. Faucet and Drain 2

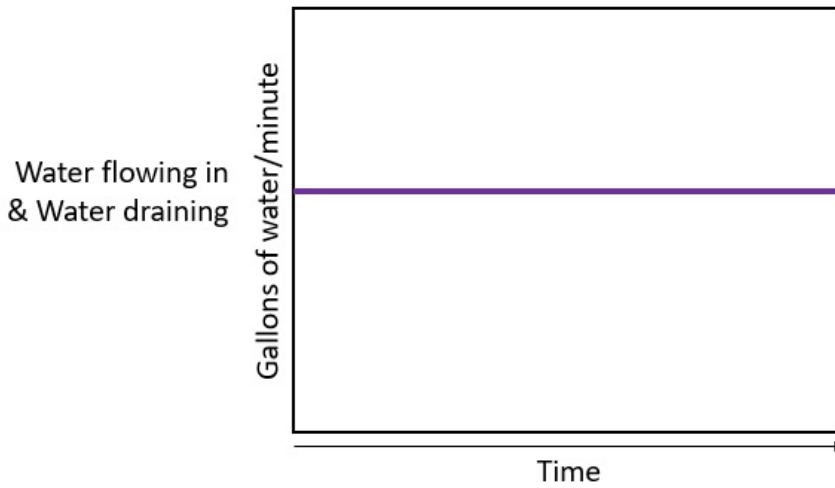
### Water Flows



- A
- B
- C

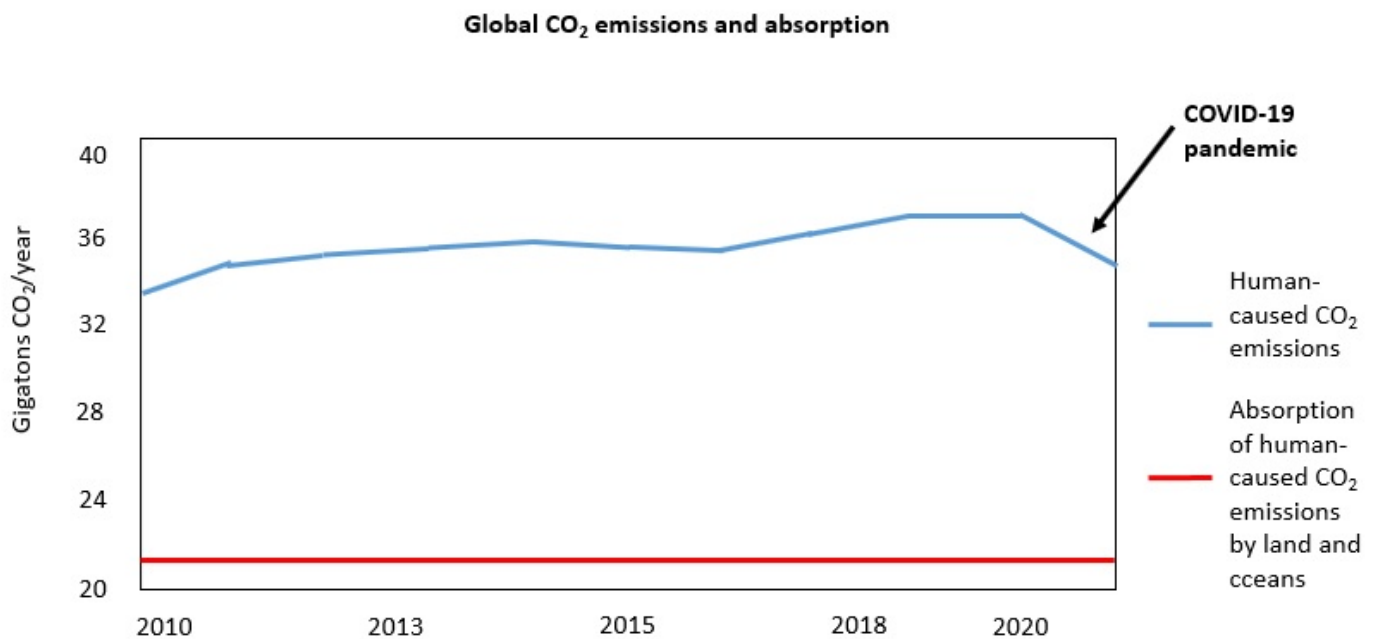
20. Faucet and Drain 3

### Water Flows



- A
- B
- C

The graph below displays *human-caused CO<sub>2</sub> emissions* and the *absorption of human-caused CO<sub>2</sub> emissions by land and oceans* from the years 2010 – 2020. As you can see towards the end of the timeline, global CO<sub>2</sub> emissions fell in 2020 due to reduced travel and economic activity during the COVID-19 pandemic.



21. Assuming that the absorption of human-caused CO<sub>2</sub> emissions by land and oceans remained the same (shown in red), did this decline in human-caused CO<sub>2</sub> emissions cause a decrease in the amount of CO<sub>2</sub> in the atmosphere?

- Yes
- No

22. Why or why not?

23. Currently, climate-polluting fossil fuels power most of the global electricity supply. Every year about 3% of power plants become too old and need to be shut down. At the same time, new power plants equivalent to about 6% of the global supply are added every year. If 50% of all new power plants rely on clean energy such as solar or wind, how do you expect the global electricity supply to change over the next ten years?

- The proportion of clean energy and fossil fuel-based energy will stay the same over time.
- The proportion of clean energy will grow, but the amount of fossil fuel-based energy supply will stay the same.
- The proportion of clean energy will decline, while the proportion of fossil fuel-based energy will grow over time.
- Not enough information.

24. You might have studied the concepts of systems and systems thinking in your classes, for example, when you studied the human body or the solar system. The following questions concern certain concepts that can apply to multiple systems. Thinking generally about systems, which of the following statements are true or false?

	True	False
Systems that are in equilibrium never change over time.	<input type="radio"/>	<input type="radio"/>
All systems have function or purpose and in reality no single part of a system can achieve anything alone.	<input type="radio"/>	<input type="radio"/>
Each system has discrete pieces within the system that are called elements. These elements must be material objects.	<input type="radio"/>	<input type="radio"/>
Models of systems are always limited and imperfect representations.	<input type="radio"/>	<input type="radio"/>
To be an identified system there must be more than one element that is interconnected with another element in an organized way.	<input type="radio"/>	<input type="radio"/>
System dynamics has shown that cause and effect are always closely related in time.	<input type="radio"/>	<input type="radio"/>
If the in-flow to a system is greater than the out-flow over time, then the stock may or may not increase over time.	<input type="radio"/>	<input type="radio"/>
In systems modeling, a "stock" is often referred to as the "noun" and the "flow" as the "verb." Although the flow rates usually determine the amount of the stock, sometimes the stock amount may change without a change in the flow.	<input type="radio"/>	<input type="radio"/>
System dynamics research has shown that small actions, even those that leverage existing systems structures, cannot result in large impacts.	<input type="radio"/>	<input type="radio"/>
A system's structure generates its behavior.	<input type="radio"/>	<input type="radio"/>
Because of the known facts about accumulations over time, a reduction in the in-flow should generate immediate change in the stock.	<input type="radio"/>	<input type="radio"/>
Systems modeling can be a tool to allow an increase in empathetic inquiry or changing one's perspective to stand in another's shoes.	<input type="radio"/>	<input type="radio"/>
In systems language, a Reinforcing Loop counters change in one direction with change in the opposite direction.	<input type="radio"/>	<input type="radio"/>
Systems thinkers speak of Unintended Consequences as unplanned and typically undesirable side effects of well-meaning intentions and actions, often occurring after a time delay.	<input type="radio"/>	<input type="radio"/>

The next series of questions are about facts that scientists have found in their study of the Climate. These are adapted from the NASA Earth Observing Website, the Penn State CLEAN project, and Project Drawdown.

25. What proportion of climate scientists has concluded that humans are the primary driver of today's climate warming?

- 34 percent
- 59 percent
- 76 percent
- 97 percent

26. If we stopped burning fossil fuels today, what would happen to the climate?



- Earth's average temperature would immediately cool.
- Temperatures would slowly cool over the next 5 years.
- Temperatures would fluctuate, but stay the same on average
- Temperatures would continue to rise for at least 10 years, and then would level off..

**27. Which country has emitted the most CO<sub>2</sub> over time? In other words, which nation has the most responsibility for the greenhouse gases that are currently residing in the atmosphere?**

- China
- USA
- Russia
- Saudi Arabia
- European Union

**28. How has the global average temperature changed since the Industrial Revolution?**

- Cooler by 0.1 degree C (0.2 degree F)
- The temperature has gone up and down, but remains overall the same
- Warmer by 0.1 degree C (0.2 degree F)
- Warmer by more than 1 degree C (2.07 degrees F)
- Warmer by almost 2 degrees C (3.6 degrees F)

**29. Modern instruments have only been around for a little over 100 years. So how do we know what greenhouse gas concentrations (and temperature) were in Earth's past?**

- Air bubbles trapped in ice cores provide detailed records of what the atmosphere was like in the past.
- Examining organisms in marine sediments can tell us what the temperature was like in the past.
- Pollen in lake beds shows what plant species have lived there during different times. Different plant populations are associated with different types of climates.
- Tree rings show the history of drought, fire, and other environmental variations.
- Glacial moraines show when and where previous episodes of glaciation occurred.
- All of the above

**30. How does the rate of today's warming compare to previous episodes of rapid climate change on Earth?**

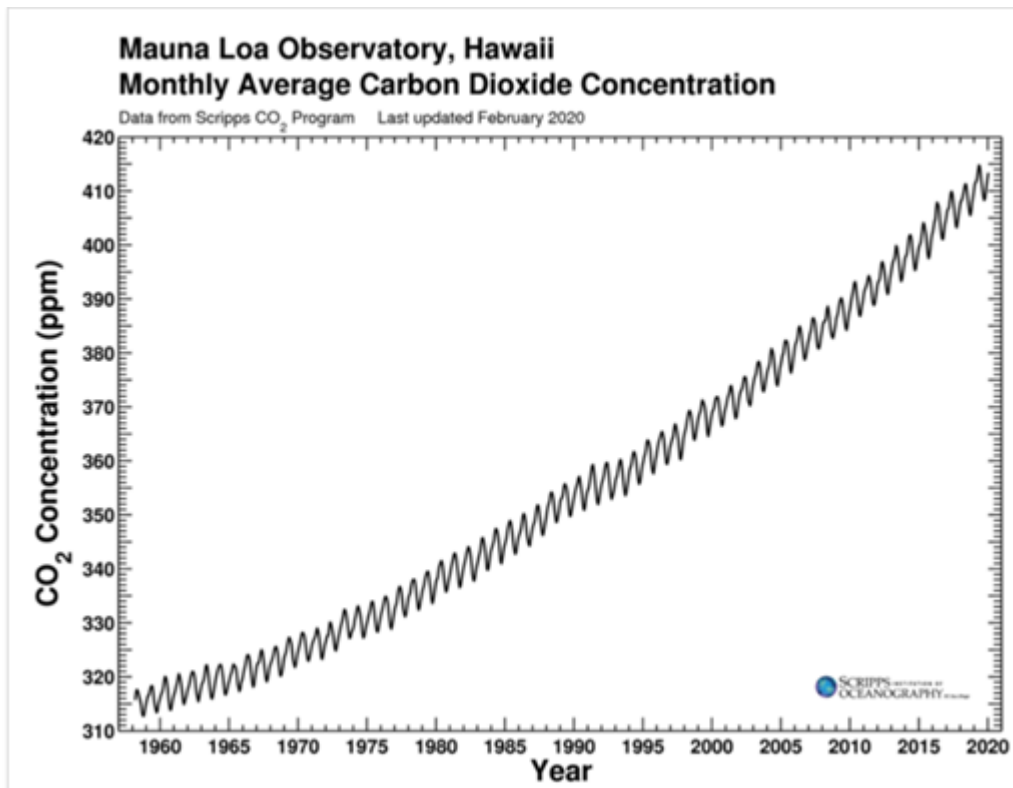
- Today's climate warming is about as fast as the temperature swings that have happened in Earth's past.
- Past changes in the climate have been faster than the changes we're seeing today.
- Today, the Earth's climate is changing much faster than it has changed in the past.

**31. How much has CO<sub>2</sub> in the atmosphere increased since the Industrial Revolution? In the 10,000 years before the Industrial Revolution in 1751, carbon dioxide levels rose less than 1 percent. Since then, they've risen by:**

- 11 percent
- 46 percent
- 62 percent

32. When was the last time in Earth's history that CO<sub>2</sub> was as high as it is now?

- This is the highest it's ever been
- CO<sub>2</sub> was at least this high during the warm periods between the ice ages
- CO<sub>2</sub> has not been this high for almost one million years.
- The last time CO<sub>2</sub> was this high was 3 million years ago.



33. This is a graph of carbon dioxide in Earth's atmosphere, measured since 1958. There are two patterns in this data. One is the dramatic increase over time and the other is the annual up and down seasonal variation. What is the cause of the seasonal variation?

- People use more energy in the winter
- Plants take up more CO<sub>2</sub> during the Northern Hemisphere summer
- Oil refineries are shut down periodically in the summer
- During the Southern hemisphere's winter, strong winds circulate CO<sub>2</sub> down into the Southern Hemisphere

34. List five actions that can be taken to avoid worst-case climate change scenarios.

35. A popular resource among climate scientists entitled Project Drawdown calculates and ranks the positive impacts of currently-available global climate solutions. Select the statement below that expresses a widely held belief about solving climate change:

- If we only reduced food waste, ate plant-based diets, better managed refrigerants, restored tropical forests, and increased the use of wind turbines, we would meet international climate goals.

- While some solutions have a stronger climate impact, we need to implement a combination of many solutions in order to meet international climate goals.
- We could meet international climate goals if each person made individual lifestyle changes to reduce their carbon footprint.
- If only China, India, and other developing countries reduce their emissions, we would meet international climate goals.

**36. The primary source of energy in the Earth's Climate is**

- Industrial activity
- Geothermal activity
- The sun
- Weather

**37. Burning fossil fuels is the major source of human induced climate change. What is the second largest source?**

- Deforestation
- Volcanic Activity
- Cow Belching

**38. Most scientists believe**

- There is more than enough energy from the sun to power the entire USA.
- While solar power is useful it cannot power large areas.
- The price of solar energy is likely to remain too expensive to use.
- In this country we already use all of the available solar energy.

**39. Please respond as honestly as possible. There are no right or wrong answers!**

	Strongly agree	Agree	Not certain	Disagree	Strongly disagree
I'm doing a good job of learning in school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often feel like I have little control over what happens to me in school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It doesn't matter whether or not I learned from an assignment, as long as I get a good grade on it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my opinion, what is taught in my classes is not worth learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often worry that I am not very good at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I sometimes get to make choices about what and how I learn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The only reason I try to do well at school is to please my teachers or parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most of what I'm learning at school is important to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At times I feel that I'm not good at anything at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When I try hard, I do well on my schoolwork.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to learn as much from my schoolwork as I can.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School is usually boring.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I always need help with difficult schoolwork.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It doesn't matter how much effort I put into my schoolwork, because I get the same grades whether I try hard or not.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not want to learn a lot of different things in school. I just want to learn what I need to get a good job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm usually interested in what I'm learning at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel good about my ability to do schoolwork.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At school, I have many questions I don't get to ask.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do my schoolwork so my teachers or parents don't get mad at me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Going to school is a waste of time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>