Nova Scotia Climate Change Education Project: In-service Teachers

Q1: Informed consent: Please read the following statement and choose the appropriate button below to indicate whether you consent to participate in this study.INFORMED CONSENT FORMProject Title: Climate change knowledge and attitudes of Nova Scotia teachers: An assessment of educator readiness and needsYou are invited to take part in a research study being conducted by Jason Loxton, a graduate student at Dalhousie University. Your participation in this study is voluntary and you may withdraw from the study at any time. Your academic (or employment) performance evaluation will not be affected by whether or not you participate. The study is described below. This description tells you about the risks, inconvenience, or discomfort which you might experience. Participating in the study might not benefit you, but we might learn things that will benefit others. You should discuss any questions you have about this study with Jason Loxton. Purpose of the study: The Nova Scotia government has set the goal of including climate change into the provinces K-12 education system. The goal of this study is help determine what teachers and teachers in training currently know about climate change, how climate change is or could be included in lesson plans, and what resources teachers need to help them teach climate change in their classrooms. This information will be used to guide efforts to increase support and create resources for Nova Scotia teachers. Study design: This study uses a short, anonymous online questionnaire to collect information from teachers in Nova Scotia. The questionnaire consists of mostly short answer questions (multiple choice, T/F, etc.), as well as a couple of questions that invite participants to provide brief written responses. A summary of results from this study will be available to NS teacher education institutions and NS Education. Who can participate in the study: You may participate in this study if you are currently a pre-service teacher at one of Nova Scotias teacher education institutions (Acadia, St. FX, CBU, or MSV). Who will be conducting the research: Jason Loxton, a Ph.D student in Dalhousie Universitys Earth Sciences Department, and Jillian Baker, a certified NS elementary teacher, are the primary researchers on this project. Dr. Michael Bowen (MSV), Dr. Katarin MacLeod (St.FX), and Dr. Patrick Howard (CBU) are project partners. What you will be asked to do: As a participant in this study, you will be asked to complete the online questionnaire. You are free to complete the questionnaire when and where you like, provided that you do not consult with anyone or any resources while completing the questionnaire. Completion of the questionnaire will require approximately 10 - 20 minutes of your time. Possible risks and discomforts: Participants will be anonymous, and the information provided will not be used to judge personal teaching effectiveness. However, there is a slight chance that some participants may experience minor discomfort or anxiety while completing the questionnaire if they feel unhappy with their performance. To minimize this risk, participants have the option of skipping questions. Participants may also withdraw anytime before submitting the completed questionnaire. Possible benefits:Participants may benefit from increases in teaching support (e.g., new Nova Scotia-specific climate change resources, professional development opportunities, etc.) to improve educator confidence when dealing with climate issues in the classroom. Your participation may also benefit students in the longterm by helping ensure that they will have access to quality climate change education. A summary of the results of the survey will be available to your school following the end of the study.Compensation/reimbursement:You will not be compensated for your participation in this study. However, after you have completed the anonymous questionnaire you will have the option of entering a draw for a cash prize of \$500 a thank-you from the research team. Confidentiality and anonymity: As a participant in this study, your responses will remain anonymous. The survey software will be set to full anonymity and will not record IP information. Email addresses provided for the cash lottery are not connected in any way to the questionnaire answers. Once the recipient of the cash prize is determined, all email addresses will be deleted. All completed questionnaires will be grouped together, and there will be no way for the researchers to retrieve the identity of individual respondents. Questionnaire data will be stored on a secure, password-protected Dalhousie University server. The data will only be used for the purposes stated in the research description. Questions: If you have any questions about this study, please feel free to contact Jason Loxton by email at jason.loxton@dal.ca, or by phone at 902.217.4895.Problems or concerns: If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, you may contact Catherine Connors, Director, Research Ethics, Dalhousie University by email at ethics@dal.ca or by phone at 902.494.1462. I, the research participant, have read the explanation about this study. I hereby consent to take part in this study. However, I realize that my participation is voluntary and that I am free to withdraw from the study at any time before I submit my questionnaire.

Q2: No problem.	Thanks	anyway!
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Note: if you have answered/chosen item [2] in question 1, skip the following question

Q3: Choose your area of specialization:				
O Elementary O Secondary				
Note: if you have answered/chosen item [2] in question 1, skip the following question Note: if you have answered/chosen item [2] in question 3, skip the following question				
Q4: Click the grade range where you have spent the majority of your time teaching:				
O Pre-P-2 O 3-5 O 6-8				
Note: if you have answered/chosen item [2] in question 1, skip the following question Note: if you have answered/chosen item [1] in question 3, skip the following question				
Q5: Choose your primary teaching subjects (click all that apply):				
English French Mathematics Science Social Studies Physical Education Technology Education Fine Arts Other: Other: Science Science				
If you have chosen "other", please specify:				
Note: if you have answered/chosen item [2] in question 1, skip the following question				
Q6: Number of years of classroom teaching experience:				
O Less than 5 O 5 to 10 O Greater than 10				
Note: if you have answered/chosen item [2] in question 1, skip the following question				

Q7: Did you complete your Bachelor of Education in Nova Scotia?

O Yes O No

Note: if y	ou have	answered/	chosen it	em [2] in	n question	1, skip	the following	question
Note: if y	ou have	answered/	chosen it	em [2] in	question	7, skip	the following	question

Q8:	Choose the institu	ition where you o	comple	ted your B	achelor of	Education :	•			
000	Acadia Other:	O Mo	unt St.	Vincent	0	Cape Breton	n Univers	sity C) St. Fr	ancis Xavier
If yo	ou have chosen "oth	er", please specif	y:							
Note	r: if you have answere	d/chosen item [2] ii	n questic	on 1, skip the	e following a	question				
Q9:	Gender:									
0	Female () Male	0	Other	0	No respons	e			
Note	: if you have answere	d/chosen item [2] ii	n questic	on 1, skip the	e following a	question				
Q1(): What is your hig	hest level of edu	cation?	•						
0	Bachelor's) Master's	0	Ph.D						
Note	r: if you have answere	d/chosen item [2] ii	ı questic	on 1, skip the	e following a	question				
Q11	: What was your u	undergraduate d	egree c	oncentrati	ion?					
000	Science Business	O Social sc O Other:	ience	O H	Humanities	0	Fine ar	ts	0	Engineering
If yo	ou have chosen "oth	er", please specif	y:							
Note	:: if you have answere	d/chosen item [2] ii	n questic	on 1, skip the	e following o	question				
Q12	2: If you had a seco	ondary concentra	tion, w	hat was it	?					
000	Science Fine arts No secondary cor	centration	000	Social sci Engineeri Other:	ence ng		00	Humani Busines	ities s	
If yo	ou have chosen "oth	er", please specif	y:]					

In the following section you will be a asked a few general science questions.

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q13: The center of the Earth is very hot					
0	True	Ο	False		
Note:	if you ha	ve ans	wered/chosen item [2] in question 1, skip the following question		
Q14:	All rad	ioacti	vity is man-made		
0	True	Ο	False		
Note:	if you ha	ve ans	wered/chosen item [2] in question 1, skip the following question		
Q15:	Lasers	work	by focusing sound waves		
0	True	Ο	False		
Note:	if you ha	ve ans	wered/chosen item [2] in question 1, skip the following question		
Q16:	Electro	ns are	e smaller than atoms		
0	True	Ο	False		
Note:	if you ha	ve ans	wered/chosen item [2] in question 1, skip the following question		
Q17:	The co	ntinen	ts have been moving their location for millions of years and will continue to move		
0	True	Ο	False		
Note:	if you ha	ve ans	wered/chosen item [2] in question 1, skip the following question		
Q18:	It is the	e fathe	er's gene that decides whether the baby is a boy or a girl		
0	True	Ο	False		
Note: if you have answered/chosen item [2] in question 1, skip the following question					
Q19:	Antibio	otics k	ill viruses as well as bacteria		
0	True	0	False		
Note:	if you ha	ve ans	wered/chosen item [2] in question 1, skip the following question		

Q20: Does the Earth go around the Sun, or does the Sun go around the Earth?

Q21: A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child with an inherited illness. Does this mean that if their first child has the illness, the next three will not?

O Yes O No

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q22: Does this mean that each of the couple's children will have the same risk of suffering from the illness?

O Yes O No

In the following section you will be asked a few questions about climate change.

Q23: How knowledgeable do you consider yourself about climate change:

Ο	1 (Very little knowledge)	$\bigcirc 2$	O 3
Ο	4	5	0 6
Ο	7	0 8	0 9
\bigcirc	10 (Very knowledgable)		

Q24: How concerned are you personally about climate change?

0 1 (Not at all concerned)	$\bigcirc 2$) 3	\bigcirc 4
\bigcirc 5	6	07	0 8
O 9	0 10 (Very concerned)		

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q25: As a result of climate change, temperatures in Earth's northern and polar regions will increase:

More than the global average will Less than the global average will

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q26: How certain are you about your answer to the question above?

1 (Very uncertain)	$\bigcirc 2$	O 3	O 4
5	6	0 7	0 8
9	0 10 (Very certain)		

Note: if you	have answered	chosen item/	[2] in	question	1, skip t	the follov	ving c	question
			1-1	1	-,			1

Q27: The thinning of the ozone layer:

- Has contributed significantly to the greenhouse effect
- Has not contributed significantly to the greenhouse effect

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q28: How certain are you about your answer to the question above?

O 1 (Very uncertain)	$\bigcirc 2$	O 3	O 4
5	6	0 7	0 8
0 9	0 10 (Very certa	uin)	

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q29: The greenhouse gas methane is produced: O Both by agricultural activities and fossil fuel use O Primarly by burning fossil fuels

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q30: How certain are you about your answer to the question above?

O 1 (Very uncertain)	$\bigcirc 2$	O 3	O 4
5	6	0 7	0 8
9	0 10 (Very certa	ain)	

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q31: The idea that global average tempertures are increasing, and that humans are mostly responsible for that warming is supported by:

Ο	Less than half of all climate scienstis	0	About half of all climate scientists
\bigcirc	Almost all climate scientists		

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q32: How certain are you about your answer to the question above?

O 1 (Very uncertain)	$\bigcirc 2$	O 3	O 4
5	6	0 7	0 8
O 9	10 (Very certai	in)	

Q33: If the world's rate of production of greenhouse gases was stabilized at today's rate, Earth's average temperature would:

4

8

- Level off at 1°C higher than it is at present
- Continue to rise by several degrees more this century

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q34: How certain are you about your answer to the question above?

O_1	(Very uncertain)	Ο	2	O 3	Ο
0 5	(Ο	6	0 7	Ο
O 9		Ο	10 (Very certain)		

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q35: Earth's oceans and forests:

Ο	Continually exchange carbon dioxide with the atmosphere
\bigcirc	Interact very little with carbon dioxide from the atmosphere

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q36: How certain are you about your answer to the question above?

O 1 (Very uncertain)	$\bigcirc 2$	O 3	O 4
5	6	0 7	0 8
O 9	0 10 (Very certa	ain)	

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q37: For most countries in the world:

The economic benefits of climate change will outweigh the costsThe costs of climate change will outweigh the economic benefits

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q38: How certain are you about your answer to the question above?

O 1 (Very uncertain)	$\bigcirc 2$	O 3	O 4
O 5	6	0 7	0 8
0 9	0 10 (Very certai	n)	

Q39: The greenhouse effect:

- Is a natural phenomenon, but is enhanced by greenhouse gases released by human behaviour
- Solution Is solely the result of human behaviour (there would be no greenhouse effect if humans didn't exist)

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q40	: How certain are you ab	out yo	our answer to the question	n above?	
000	1 (Very uncertain) 5 9	000	2 6 10 (Very certain)	\bigcirc 3 \bigcirc 7	$\bigcirc 4$ $\bigcirc 8$
Note	if you have answered/chosen	item [[2] in question 1, skip the follo	owing question	
Q41	: Climate and weather:				
0	Mean the same thing	0	Mean different things		
Note	if you have answered/choser	item [[2] in question 1, skip the follo	owing question	
Q42	: How certain are you ab	out ye	our answer to the question	n above?	
000	1 (Very uncertain) 5 9	000	2 6 10 (Very certain)	\bigcirc 3 \bigcirc 7	$\bigcirc 4$ $\bigcirc 8$

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q43: Below average temperatures next winter would be evidence that climate change is not happening:

\bigcirc	True	\bigcirc	False
\smile		\cup	

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q44: How certain are you about your answer to the question above?



Q45: Which of the following are res	sponsible for sea-level rise a	associated with climate chan	ge? (Choose all that apply)
Melting of the world's glaciersSea water increasing in volume a	as it gets warmer	Melting of sea ice in the Melting of ice caps on G	Arctic Ocean reenland and Antarctica
Note: if you have answered/chosen item [2] in question 1, skip the followi	ing question	
Q46: How certain are you about yo	ur answer to the question a	bove?	
1 (Very uncertain)05090	2 (6 (10 (Very certain)) 3) 7	\bigcirc 4 \bigcirc 8
Note: if you have answered/chosen item [2] in question 1, skip the followi	ing question	
Q47: Which of the following are lik	ely direct consequences of o	climate change? (Choose all	that apply)
More extreme weather eventsMore earthquakes	More skin cancer None of the abov	e Inc	reased acid rain
Note: if you have answered/chosen item [2] in question 1, skip the followi	ing question	
Q48: How certain are you about yo	ur answer to the question a	bove?	
$ \begin{array}{c c} & 1 (Very uncertain) \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ $	2 (6 (10 (Very certain)) 3) 7	\bigcirc 4 \bigcirc 8

Q49: How much do each of the following contribute to present day climate change?

	Not at all	Very little	Moderately	Considerably
Pollution of rivers and lakes	0	0	0	0
Radioactive waste from nuclear power plants	0	0	0	0
Burning coal and other fossil fuels	0	0	0	0
Holes in the ozone layer	0	0	0	0
Littering	0	0	0	0
Methane produced by farm animals	0	0	0	0
CFCs released by aerosol cans	0	0	0	0
Deforestation	0	0	0	0

More sunlight reaching the Earth	0	0	0	0
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Q50: How certain are you about your answer to the question above?1 (Very uncertain)2345678910 (Very certain)8

The following section will ask you about what you think about climate change and climate change education.

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q51: Indicate the extent to which you agree with the following.

	Strongly disagree	Somewhat disagree	Neutral/ uncertain	Somewhat agree	Strongly agree
Individual actions, such as walking instead of driving or turning down your thermostat, can significantly reduce greenhouse gas emissions.	0	0	0	0	0
Government-led actions are effective and necessary in responding to climate change, e.g., regulations limiting emissions from vehicles.	0	0	0	0	0
Businesses and consumers can decide themselves how best to deal with climate change (without government interference).	0	0	0	0	0
Money would be better spent on researching new technologies than trying to change human behaviour.	0	0	0	0	0

Money would be better spent					
on adapting to climate					
change, rather than trying to	0	0	0	0	0
reduce greenhouse gas	•	-	•	•	-
emissions.					

Q52: How important do you think the following actions are as part of the response to climate change?

	1 (Not at all important)	2	3	4	5 (Very important)
Walking, biking, or using other forms of active transportation	0	0	0	0	0
Recycling	0	0	0	0	0
Planting more trees	0	0	0	0	0
Hanging dry your clothes and washing with cold water	0	0	0	0	0
Buying local products	0	0	0	0	0
Turning down heat in homes and offices	0	0	0	0	0
Using less water	0	0	0	0	0
Switching to organic food	0	0	0	0	0
Installing energy efficient appliances	0	0	0	0	0
Creating community adaptation plans	0	0	0	0	0
Cleaning up polluted lakes and rivers	0	0	0	0	0
Renovating your home to make it more energy efficient	0	0	0	0	0
Educating people about climate change impacts	0	0	0	0	0

Helping workers in affected industries	0	0	0	0	0
Reducing the amount of time watching TV	0	0	0	0	0
Protecting species at risk	0	0	0	0	0

Q53: Where do you get your information about climate change? (Click all that apply)

Books
TV news
Newspapers and magazines
Blogs
Talk radio
Personal communication
University classes
Professional development
Websites (e.g., Wikipedia), exluding gov't. and university sites
Documentaries
Official government communications
NGOs and environmental organizations
Other:

If you have chosen "other", please specify:

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q54: How important do you think it is that Nova Scotia students learn about climate change in school?



Q55: Do you teach about or discuss climate change with your students?

Yes, formal lessons

Yes, informal discussions

I do not plan to teach about climate change

Note: if you have answered/chosen item [2] in question 1, skip the following question Note: if you have answered/chosen item [3] in question 55, skip the following question

Q56: Do any of the following limit the amount of time that you spend teaching about climate change? (Click all that apply.)

I do not feel comfortable enough in my knowledge of climate change
The science is too unsettled to teach right now
I worry climate change might scare students
I worry about negative feedback from parents
I worry about negative feedback from other teachers/school administrators
I worry about negative feedback from students
It is not part of the curricula
I have little time to devote to the topic
I don't have access to lesson plans or support material
It is not relevant to the classes I teach
Other (Explain):

If you have chosen "other", please specify:

Note: if you have answered/chosen item [2] in question 1, skip the following question Note: if you have answered/chosen item [1, 2] in question 55, skip the following question

Q57: Why don't you teach about climate change? (Choose all that apply)

I do not feel comfortable enough in my knowledge of climate change
The science is too unsettled to teach right now
I worry climate change might scare students
I worry about negative feedback from parents
I worry about negative feedback from other teachers/school administrators
I worry about negative feedback from students
It is not part of the curricula
I do not have time
I don't have access to lesson plans or support material
It is not relevant to the classes I teach
Other (Explain):

If you have chosen "other", please specify:						
Note: if you have answered/chosen item [2] in question 1, skip the following question						
Q58: Which classes do you think are appropriate places to teach about climate change in Nova Scotia schools? (Choose all						
that apply)						
Social studies Mathematics Science Geography History Language arts Visual arts Other: Other: History						
If you have chosen "other", please specify:						

Q59: A small number of vocal scientists remain skeptical about whether human-caused climate change is happening or poses any risk. Do you think that their perspective should be included in lessons?

- Yes. Their views are valid and their arguments should be heard.
- Yes. But only as an exercise in critical thinking.
- No. Climate change instruction should only involve consensus science.

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q60: Rank how useful access to the following would be in terms of helping integrate climate change into your teaching?

	Not useful 1	2	3	4	Very Useful 5
Pre-made climate change- specific lesson plans	0	0	0	0	0
Web-based student activities	0	0	0	0	0
Web-based teacher resources, e.g., tutorials or background information	0	0	0	0	0
Print-based teacher resources, e.g., tutorials or background information	0	0	0	0	0
Climate change-specific professional development opportunities	0	0	0	0	0
Qualified guest speakers	0	0	0	0	0

A guide to existing teaching resources	0	0	0	0	0

Q61: Are there any additional resources not included in the previous question that would be useful in helping integrate climate change into your classroom now or in the future?

Note: if you have answered/chosen item [2] in question 1, skip the following question

Q62: That's it. Thanks so much for your participation!After you hit 'finish' you will be directed to a separate link where you can enter the draw for \$500.

If you have any comments you would like to make, please feel free to use the space below. Thank you very much for your time!