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The following provides a sample plan for a 50-minute lecture period that introduces students to climate variability and change using the article online: [Climate Forecasting and Adaptation Through the Ages](http://serc.carleton.edu/itgstu/climate_change/unit1_article1.html)

In class, you will need:

 A white-board or chalkboard

 Large paper and pens for students to write on

~5 min: If this unit will be the first in the *Climate of Change* module, spend some time introducing students to the overarching module goals or unit goals.

~15-20 min: Student discussion of *Climate Forecasting and Adaptation Through the Ages*.

Students will break into groups of 3-5 and do a [gallery walk](http://serc.carleton.edu/introgeo/gallerywalk/index.html) while considering questions from the article. If time is short and the class is large, allow each group to visit and discuss three or four questions for 3-4 minutes each. After students have had a chance to visit questions, discuss a selection - or all - of the questions. This could be completed as a jigsaw in a smaller class. In a large class, ask each group to put a \* next two one or two items on their poster that they would like to share with the rest of the class. Have each group choose a reporter who will share this with the class.

~15-20 min: Follow the gallery walk with an interactive lecture/discussion summarizing student comments, and focused on the following questions (ask students these questions as prompts).

1. **Do you think the Incas, the Mayans, and the Vikings were responding to short-term or long-term climate change?** (*Students might say that the Incas are responding to short-term (annual) changes, and the Mayans and Vikings are responding to longer term changes because they were forced to leave their homes*)
2. **What is climate?** (*Avg over how long?)* What fields are used to describe climate (*temp & precip*)
3. **What is the difference between short-term and long-term climate change? What time frame do we use to distinguish short-term and long-term?** (*These questions can lead into some lecture/discussion about how we must specify a time-frame when we talk about climate. In the 21st century, when we discuss the climatology of a location, we are considering a 30-year average of weather (1981-2010). There are no specific time frames to distinguish between ‘short-term’ and ‘long-term’. Given the typical human lifespan of ~100 years, we think of ‘short-term’ as something happening over the course of a few years, and ‘long-term’ as something that is happening over a few decades. But what about climate variability that happens on the order of a few centuries, or a few millennia?)*
4. **Are there differences in the types of climate changes that affected people in low vs. high latitudes?** (*At least in the stories students have read, people in the low latitudes are most impacted by changes in precipitation. In the high-latitudes, people are most impacted by changes in temperature.)*
5. **What affects climate in a particular location?** (*This is a good question for a student brainstorm. Things to consider: Proximity to oceans, latitude, elevation, mountains, land surface type, regularity of precipitation, wind, etc...*)
6. **What determines global average climate? In other words, what things are external to the climate system?** (*Brainstorm: Earth’s orbital configuration, solar output, volcanic activity, asteroid impacts, anthropogenic forcing (questionable as to whether humans are ‘external’ to the climate system. Some students might point out ocean circulation or the presence of ice and snow might affect climate – but the question needs to be asked: What changes ocean circulation or the presence of ice and snow in the first place?)*
7. **What are internal factors affecting climate? HOW do they affect climate?** (*This is where to list the factors that affect climate, but are initially driven by some external forcing: ocean circulation, glacial and sea ice…mention that these can have an amplifying or negating effect on changes in temperature: i.e., ‘feedbacks’)*

~5 min: Introduce the concept of feedback (this will take the rest of the class, if you're not already at the end!)

Definition of a feedback: A feedback is a process responding to some initial forcing that will either amplify the initial effect of the forcing (positive feedback) or negate/reduce the initial effect of the forcing (negative feedback).

~5 min: After learning about the concept of 'feedback', ask students to ‘think-pair-share’ to come up with their own example of a feedback (any process) => Perhaps do this as a short homework assignment if there is not enough time.