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## Defining climate literacy: Developing a working definition on what it means to be climate literate

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The need for a climate literate public in the face of anthropogenic climate change is an increasingly urgent and necessary task. Defining what it means to be climate literate is situated between divisions of science communication and science education. On one side, the humanist perspectives of anthropogenic climate change i.e., science risk communication (threats, impacts, and consequences) and, on the other, understanding and sharing in scientific knowledge i.e., science education (the physical and chemical mechanisms that describe Earth's climate system in equilibrium). The USGCRP/NOAA defines climate literacy (CL) as "an understanding of your influence on the climate and climate's influence on you and society" and a "climate-literate person understands the essential principles of Earth's climate system" and, while this CL definition is useful in that it encapsulates the complexity of climate change, drawing in interactions between human actions and the climate system, it positions anthropogenic climate change ahead of the physical science of Earth's climate. Prima facie, the initial emphasis on anthropogenic climate change seems inconsequential. However, efforts in the public education classroom also frequently prioritise or focus on the threat of impacts and consequences, rather than the physical science mechanisms that drive the climate system, and this focus may have serious implications for improving climate literacy in the broader public arena. Communicating climate change initially as a threat or as a responsibility, especially to children and adolescents, can have undesirable and polarising psychological effects and may negatively influence other mental health disorders. Psychological effects, such as fear or stress, are known to promote apathy, despair, and feelings of helplessness which undermine collective efforts to address climate change. Recent research suggests, however, that providing young people with a solid understanding of the physical science basis of Earth's climate system prior to teaching them about anthropogenic climate change provides them with a context for coping with climate change as they are better able to construct solutions and perceive the climate dilemma as a 'system' rather than as a nebulous, looming threat. This paper, therefore, proposes a related, but specific, definition for climate science literacy (CSL) that is scoped to the physical processes that are fundamental to, and underpin, the mechanics of anthropogenic climate change that can be utilised in the classroom. In this way, we are anchoring the physical processes of climate change, and – distinct from broader climate literacy – scoping out the complex, dynamic and oftentimes emotive dimension of human influence on the climate system within a knowledge deficit context. We propose, therefore, that the physical science mechanisms that describe Earth's climate system form the foundation of all climate literacy programmes. We further propose that the CSL definition for the classroom "is a

systematic and integrated understanding of how the natural climate system works in equilibrium, including drivers of natural variation, which forms a foundation for considering the roles of feedback systems and anthropogenic emissions in driving climate change and, therefore, your influence on the climate and climate's influence on you and society".