Breakout 6A

Essential Principle: The atmosphere constantly interacts with other components of the Earth system.

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Introduction: Hello, online participants. My name is Kristin Conrad, and I will serve you as group 5A's Online Participant Liason (OPL). I will both capture the gist of the discussion, and will relay selected comments from online participants, back to members of this breakout session. We hope that you will enjoy and participate in this important discussion.

NOTE: Please refresh your browser (PCs use F5 key; Macs use function+F5) every 30 - 60 seconds to view the most recent comments.

BEGIN BREAKOUT SESSION REPORTING

The group is now going to brainstorm ideas for Fundamental Concepts for this Essential Principle - The atmosphere constantly interacts with other componenets of the Earth system.

- weathering and erosion - soil loss a huge issue, globally
- water cycle and movement of water
- carbon cycle
- geochemical cycles - nitrogen, carbon, potassium --- list 3 or 4 major ones
- heat transfer/energy transfer (ocean)
- solar energy transfered through many different spheres -- (discussion: this may go under the "solar" EP; don't make it specifically "solar" - just "energy")
- Nature of "systems"
    - prediction is difficult without using a system approach (ocean affects atmosphere)
    - previous history can change the system behavior
    - both negative and positive feedbacks are key
    - emergent features appear as systems interact
- from a geoscience standpoint, a system is the interaction of 2 or more processes (we are discussing the word "system")
- how does the atmosphere work with regard to the overall earth system?
- atmosphere exchanges mass and energy with other parts of the Earth system - we are talking about what is going back-and-forth. This is under EP #3, though it can be in both places
    - these interactions lead to feedback that can amplify or dampen change
- biogeochemical cycles, el nino, enso, polar amplification cycles come into play
- important for population to understand the "system" in order to understand the problem. This is difficult due to complexity of information. Requires a serious investment in rational thinking and teaching
- Need for teaching a "systems course" -- This is now done in medical training
- Need to understand what we mean by the "earth system" and interaction issues...
- Do we NEED to think about this within a systems context?
- Need to mention what these other Earth systems are, since it is mentioned in the EP title.
    - need to look at the other systems to understand the effects they have on the atmosphere
- One suggestion change to the EP: The atmosphere is an intergral part of the Earth system and constantly interacts with these other systems. (feels the atmosphere sounds too separate from the other systems)
- The atmosphere is the most temporally dynamic of the Earth system components
- The atmosphere is affected by the biosphere, oceans, etc and... (there is now an attempt to simplify the language of how to explain these systems interaction)
- "Atmospheric processes interact with other components of the Earth System"
- "Atmospheric processes transfer energy and mass among other components of the Earth System"
- fold all of the things that are interacted WITH into one fundamental concept and then listing specifics...
- Feedback processes within the Earth system can amplify or dampen
- these interactions lead to unanticipated or unknown behaviors in the system
- emergent phenomena...
- "Interactions can lead to unknown behaviors of the Earth system and can lead to emerging phenomena."
- average citizen won't understand, "emergent phenomena" term
- predictions require and earth system approach and understanding of the components of the system
    - requires understanding of the interactions, as well
- "our atmosphere is constantly interacting" -- is this statement at a lower level -- requires concept of understanding the earth system
- Earth system approach is essential for understanding this EP
- there are many cycles on our planet that interact in an integrated way, the understanding of which is important to understanding our Earth system
- discussion of using the term "spheres" in context of explaining interaction of systems. People misunderstand the word and group wants to avoid it
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The group is now going to work on the draft Fundamental Concept statements...

Draft Fundamental Concepts

1. Atmospheric processes interact and transfer energy and matter with other components of the Earth system such as: water, ice, land, and living things. For example, the exchanging of energy between oceans and atmosphere in hurricane formation.

2. Prediction of atmospheric phenomena requires knowledge and understanding of components of the system.

3. The interaction of components of the Earth system produce (emergent) phenomena unique to the system. For example, abrupt climate change. (A different example could be the ozone hole)

4. Life forms on planet Earth cannot be maintained without humans changing their interactions with the Earth System. (this statement might need to move to EP #7 -- included as potential FCs)

5. Within the atmosphere there are biogeochemical cycles which vary across time scales.

6. Historical interactions between the atmosphere and other systems affect current behavior of the atmosphere.

Final comments: FCs 5 and 6 are potentials that were not thouroughly discussed, or may need to be moved.

Online Viewers: Please use the "Add Comments" button below to add your comments and suggestions.