



Cloud Identification Exercise

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Chickering & Gamson (1991) state that one of the tenets of good practice in undergraduate teaching is *encouraging active learning*.

In this exercise, the *active* in active learning takes on two meanings - students actively apply information regarding nomenclature used in cloud classification they have recently learned in lecture, and they have an opportunity to get active in the classroom. This exercise is intended for **introductory meteorology courses**, and can be scaled for use in small class sizes as well as very large classroom settings (over 100 students), as long as there is room to move inside, or outside the classroom. With some organization before class, this exercise can also be easily adapted to accommodate students with varying degrees of mobility.

Interested in using this in your class? Access instructions and template (with sample images) here → or: <http://goo.gl/YjEHCM>



Before Class...

Print a selection of 8-10 clouds (on a color printer) to make enough for each student in the class. Adding a bank of cloud names and classifications.

In Class...

Lead students through a brief introduction of terms used to identify clouds, according to height and Latin terms for texture, and show students a simplified outline of the activity.

- 1) Pass out individual cloud pictures (in random order) to each student in the room
- 2) Students are asked to **use their newly-acquired meteorological terms to describe their clouds**, and identify them (individually, in writing)
Students who were at first unfamiliar with new terms navigate upward through the lower levels of Bloom's Taxonomy (Krathwohl, 2002) as they *recognize* structures in their cloud image, then attempt to *classify*.
- 3) Ask students to **get up from their seats to find others with the same cloud** to form small groups

- 4) In small groups, have **students come to consensus on their cloud type, write down their reasoning**, and select a group speaker

As students discuss their classification, they will be *comparing* their observations (higher-order thinking in Bloom's Taxonomy)

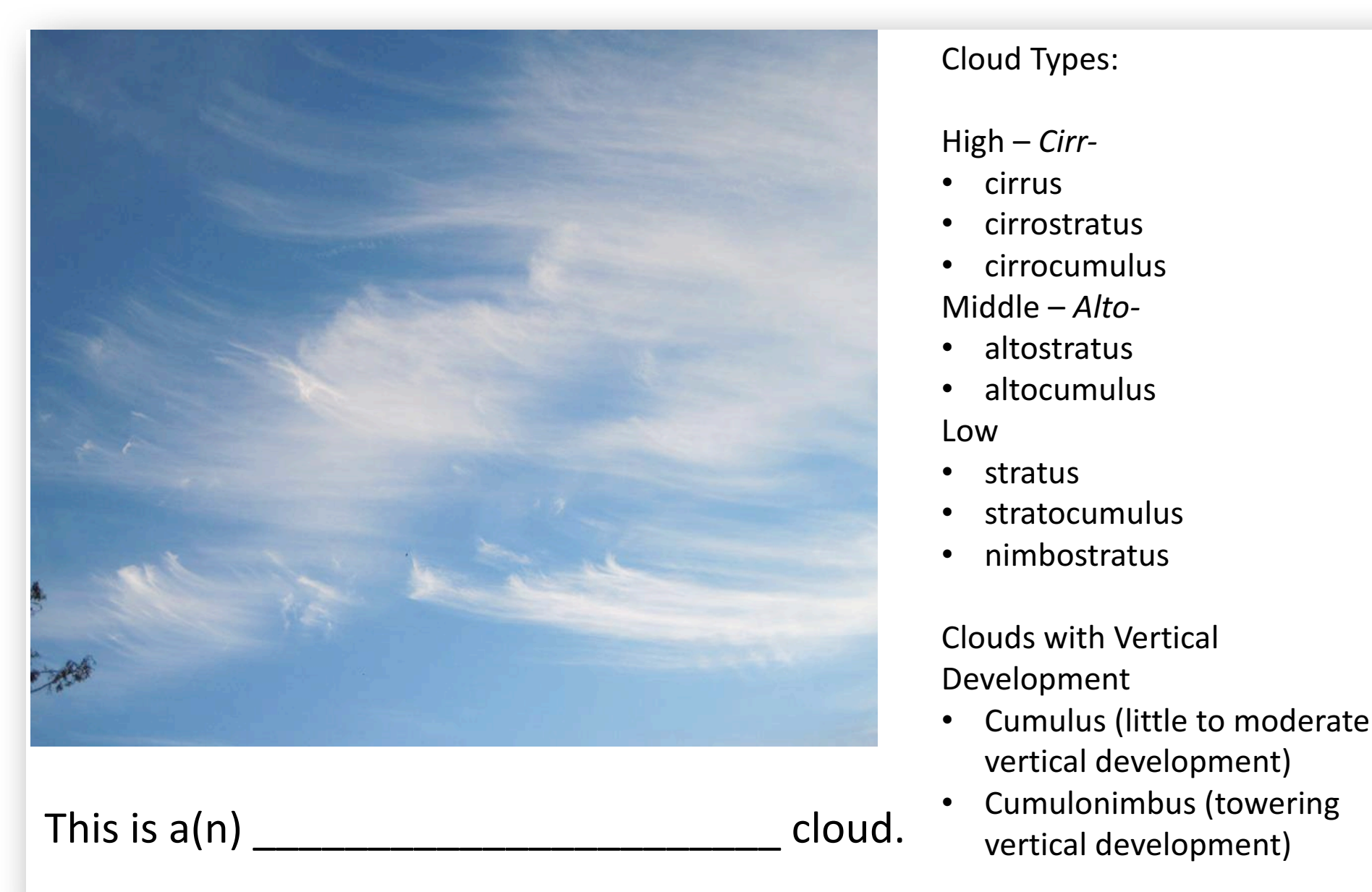


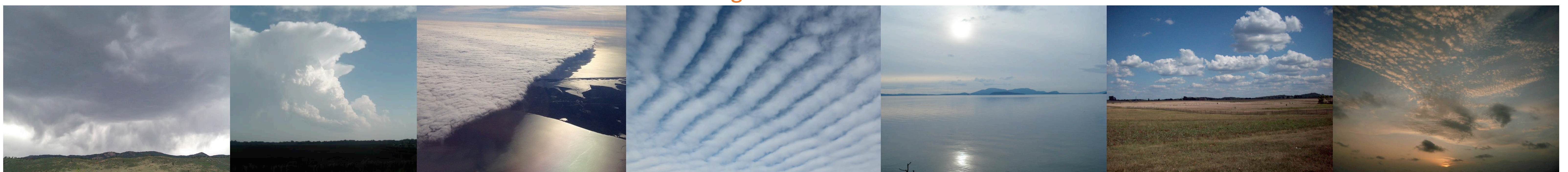
Figure 1. Sample of cloud picture students receive in this activity

- 5) Visit each group to provide **assistance**, resolving disagreements by referencing cloud characteristics
- 6) When all groups have identified their cloud type, **have groups rearrange themselves** so the they are organized left-to-right from low-to-high clouds (and vertically developing clouds where appropriate)
- 7) After ensuring they have arranged themselves in the right order, **have the group speaker announce the cloud type** for each group
- 8) Students return to their seats

- 9) Show projected images of each of the cloud types to the entire class in order, and **have each group speaker state their cloud type and explain their classification using meteorological terms**

As an *active* part of the *organization*, students understand the classification system

What's the cloud with the lowest base here? Highest?



Cumulonimbus or Nimbostratus?

Do these clouds have vertical development?

After Class...

Provide solutions to the cloud activity online or distributed to the class (excellent study materials)

Other useful cloud identification resources online for further student application and practice:

PBS – Nova, “The Cloud Lab”
Cloud Community Atlas (Facebook, Wiki)
WMO International Cloud Atlas

In summary, This activity requires little preparation, guides students upward through levels of Bloom's Taxonomy in an engaging way, helps students “personalize” what can otherwise be rote memorization, and once set up, is easy to use year after year.

References:

Chickering, A., & Gamson, Z. (1991). Seven principles for good practice in undergraduate education. *New Directions for Teaching and Learning*, 47, 63-69, 76-83 .
Krathwohl, D. (2002). A revision of Bloom's taxonomy: an overview. *Theory Into Practice*, 41(4), 212-218.
McKeachie, W. J. (2002). *Teaching tips: Strategies, research, and theory for college and university teachers*. Boston: Houghton Mifflin.

Acknowledgements: All cloud images from the Cloud Community Cloud Atlas (Guy & Rowe 2014) and student submissions.

Guy, N., & Rowe, A. (2014). The Community Cloud Atlas – Building an Informed Cloud Watching Community. *AGU Fall Meeting Abstracts*, Fall 2014.