Lesson Design: Preparing for a Class Period
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With material from Heather Macdonald, Rachel Beane, Josh Galster, and David McConnell

• Elements of lesson design
• Lesson planning activity
• Framework for review

What did your favorite teachers include in their lessons that helped you learn?

One Approach to Lesson Design

1. Start your planning

• Importance: Why should students care?

• Prior knowledge: What knowledge do students bring to this lesson (from this course and from other experiences)?

• Goals: What should students know/be able to do by the end of the lesson?

2. Continue your planning

• What activities will be in your lesson?

• How will you assess student learning?

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<th>Example verbs for writing lesson goals</th>
<th>Cognitive Dimension (version of Bloom’s Taxonomy)</th>
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<td>(Students will be able to...)</td>
<td>Knowledge Dimension</td>
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Examples of Interactive Activities

- Project
- Gallery Walk
- Think-pair-share
- Lecture Tutorial
- Debate
- Jigsaw
- Concept Map
- Discussion
- ConceptTest (group)
- ...

3. Outline your lesson

- Beginning – “Hook”
- Middle – interactive activity
- End – students discuss/synthesize/reflect

4. Review your lesson plan

Will students/learners...
- see a clear framework?
- use & be assessed on prior knowledge?
- investigate/explore science through an activity?
- interact with each other?
- reflect on their learning?
- be listened to and responded to?

Review your lesson plan

- Is the framework clear to students?
  (Question of day, outline, learning outcomes, concept map ...)
- Does the lesson use/assess prior knowledge?
  (brainstorm, everyday experiences, ConceptTest, previous lessons ...)
- Is there an activity that allows students to explore or investigate?
  (predict, hypothesize, assess, represent/interpret data ...)
- Will students interact with each other about course content?
  (Think-pair-share, gallery walk, jigsaw ...)
- Are students asked to reflect on their learning?
  (minute paper, concept map, how do you know? ...)
- Will you have an opportunity to listen & respond?
  (question-response, listening to discussions, ConceptTests ...)

Class Prep as the Blob

- Class prep will expand to fill whatever time you allow it: one more image, one more example...
  - Limit prep to a set time.
- Try not to over-prepare: have confidence!
  - Allows for creative class discussions and unexpected directions
  - Including interactive exercises easier than lecturing
- Powerpoint is not always your friend

Sample lecture notes on surface runoff

- Runoff: utilization over time curve, when does runoff happen?
- Infiltration rates constant?
- Recall:
- Information
- Thoughtflow
- Review
-凡事影响渗透能力。

- Runoff:
- Infiltration
- Thoughtflow
- Review
- Runoff:
- Infiltration
- Thoughtflow
- Review
- Positive feedback cycle of channel development
- Discharge: volume per time
- Different ways to measure discharge
- Discharge: volume per time

- Channel and subsurface losses:
- Hydrograph: depth or discharge over time
- Runoff

- Flow:
- Rills
- Channelized flow
- Sheetwash
- Overland flow
- Water:
- Erosion:
- Movement of material
- Best shear stress dependent on depth and slope
- \( \tau = \rho g \theta \)
5’ Paper: Reflecting on Lesson Design

• What is the most important concept that you learned?

• What aspect of this session was most helpful for your learning?

• How will you approach planning for your next class?