How is myDalite used?

Teachers can use myDalite to fill in different pedagogical purposes. The purpose of an assignment will affect how to select questions, and what settings should be used. Here are a few examples.

Usage of myDalite	**Purpose**	**Questions chosen should:**	**Assignments setting:**
Pre-instruction as standalone	● Off-load some concepts to the myDalite assignment, freeing class time. ● After answering the questions, students attain the (mini)-learning objectives, without need for a follow up in class, instead the class will build on the concepts.	● Use the *peer instruction* mode. ● Focus on fundamentals. ● Not be trivial and must elicit physically insightful rationales. ● Should be answered correctly by a large proportion of students.	● Marks awarded for correct answers. ● Students see the expert answer and rationale in the end.
Pre-instruction as reflection	● Off-load some concepts to the myDalite assignment, freeing class time. ● Get students to reflect independently on topics covered before class through a reading or a video. ● Students' rationales give insights on tricky portions of the material and can be used to prepare class or follow up to the assignment.	● Use the *rationale only* mode. ● Be reflective and open-ended. ● Offer students a way to interact with the teacher. ● Often offers multiple good answer choices.	● Marks awarded on effort only. ● Students do not see the right answer until they review the question in class.
Pre-instruction to ‘prime the pump’	● Get students to start reflecting on topics before class, drawing out their misconceptions. ● Questions are brought back in class for group discussion/peer instruction.	● Use the *peer instruction* mode. ● Focus on complex/challenging concepts. ● Higher level of difficulty. ● Hopefully, peer instruction causes many students to go from wrong to right.	● Marks awarded on effort only as students did not have formal instruction yet. ● Students do not see the right answer until they review the question in class.

	• Rationales can be used to prepare class by identifying common misconceptions.		
Pre-instruction to prepare for complex in-class activity	• Prepare students for a complex class activity such as a case study or a lab. • The question includes some preparatory work, off-loading reading and transfer of information to before class.	• Use either the *peer instruction* mode or the *rationale only* mode. • Emphasis on writing the rationale.	• Marks often awarded on quality of rationale for case studies. Providing a grading rubric and samples for the rationales is helpful.
During instruction for live peer instruction	• Get immediate feedback of students' understanding during class. • Use peer instruction and solicit discussion amongst peers.	• Use Blink - the no rationale mode. • Be at the right difficulty level for students.	• Use Blink. • No grading, answers submitted anonymously.
During instruction for small groups collective answers	• Use peer instruction and solicit discussion amongst peers. • Focus on writing rationale as a group, using peers to increase the quality of the rationales. • Students benefit from taking a minute to answer individually before working in groups.	• Use the *peer instruction* mode. • Be at the right difficulty level for students.	• Graded or not.
Post-instruction for consolidation	• Pursue further learning started during class time. • Expecting students to answer with high quality rationales.	• Use the peer instruction mode. • Focus on complex/challenging concepts • High level of difficulty • Must elicit physically insightful rationales, not be formulaic or unexplainable.	• Marks awarded for correct answers. • Students see the expert answer and rationale in the end.
Post-instruction for review before	• Give opportunity to students to practice writing explanations to conceptual questions before evaluations.	• Use the peer instruction mode. • Be at a difficulty level that corresponds to questions in the evaluation.	• Marks awarded for correct answers.

evaluation with peer instruction			
Post-instruction for review before evaluation with Blink	• Give opportunity to students to practice answering conceptual questions.	• Use Blink- the no rationale mode. • Be at a difficulty level that corresponds to questions in the evaluation.	• Use Blink. • No grading, answers submitted anonymously.

Best practices when writing peer instruction questions on myDalite

- Articulate clearly the objectives of the question along two axes:
  - What is the pedagogical goal of the question (how will it be used)
  - What discipline specific learning objective will be covered in the question.
- Make questions worthy of students' time.
  - Ask questions that will generate rich rationales.
  - Avoid trivial questions.
  - Avoid questions with formulaic or unexplainable answers.
  - Use classic students' misconceptions to elaborate the decoy choice(s) or ask the question as an open question first to populate good decoy choices.
  - Favor questions requiring critical thinking such as error detection, ranking, contrasting, etc.
- Write good rationales to seed the question
  - Make sure that the expert rationale for the right answer is well written and clear.
  - Take the time to write at least one rationale for each answer choice.
- Formatting
  - Make the question as short as possible.
  - Use formatting to make it pleasing and easy to read. Not just a big chunk of text.

    - Make sure to use images free of copyrights.
    - Avoid acronyms and terminology that are not standard to your discipline. (This makes it easier for other teachers to reuse your questions.)
- Choose a very explicit title
    - The title should help other teachers to classify the question at a glance.
        - e.g.: *Mechanics - 1d kinematics - Velocity vs time graphs*
    - You have 100 characters to do so.
- Finish your question with a prompt to encourage students to write richer rationales.Prompts could take many forms.
    - General prompts reminding the expectations.
        - *Explain your choice in your own words, not relying on numerical values.*
        - *Select the best option and explain why you made that choice.*
    - Prompts that focus students to a key aspect of the question.
        - *In your rationale, make sure you explain how you analyzed the two magnetic fields to find your answer.*
        - *Your rationale should include the word 'momentum'.*
    - Prompts that constrain the approach to the question.
        - *Explain your choice by using energy methods.*
- Think carefully about the wrong choices you will present.
    - Some students might game the system. The way myDALITE is built, if a student chooses an incorrect answer, they will be presented with the correct choice in the second round.
    - It is often better to leave out choices that are clearly wrong even if it means having less answer choices.

Research that could influence how questions should be written:

- Compare quality of rationales for question stems that use passive vs. non-passive voice (e.g., "you," "Pat," "An electron is moving at….")
- How best to seed rationales (voice, level of writing, quality of right answer rationale, details in rationale for decoy choices)
- What questions generate many changes of choices from wrong to right?
- What questions and uses of questions generate LESS 'Stick to my own rational'?
- Should we model how to write rationale? Or discuss our expectations. (Phoebe Jackson is currently exploring that aspect.)

Interrogations:

- Does students’ writing thoughtful rationales for wrong answer choices reinforce their misconceptions?

To add

- Learning can happen at different stages: while writing, while reading other rationales, while reading the expert rationale, in class during debrief. When writing the question you can decide on how good are the sample rationales for the good answer choices. Better rationales might be more convincing to students.
    - While individually answering question *(provide more prompting, context, hints... anchor to the reading?)*
    - When reading peers' rationales *(prompt rationales: e.g., "In your rationale, make sure you....)*
    - While reading the expert answer *(What makes an expert answer good / readable / stick?)*
    - Later in class? *(What activities can we use for this? Don't make expert rationale available right away?)*

- When developing a question, keep in mind that you should be able to write good rationales for all choices. Good exercise for teacher to think about student misconceptions.
- Are we reinforcing misconceptions with cleverly sneaky rationales.