

**Supplementary:** *Example 1.* Self-generation prompt.

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### *Educated guesses*

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Think about what educated guesses you can make about the research question [3 min]



My educated guess No. 1:

My educated guess No. 2:

Try to justify them with the knowledge you already have about water fleas. Afterwards, commit yourself to one educated guess. (Mark the one you choose with a cross). [3 min]



My justification for Educated Guess 1:

☐

My justification for Educated Guess 2:

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Example 2. Feedback given in the research workbook.

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### *Educated guesses*

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Compare your educated guess with Ellie's and Tom's. Select one educated guess with appropriate justification.



#### Ellie's and Tom's educated guesses:

Tom: "But Ellie, it doesn't make any sense at all for water fleas to avoid the light! Water fleas eat green algae. And that only grows in water layers with more light. Why should water fleas prefer darker water layers, where there is no algae for them to feed on?"

Ellie: "But light is so harmful for water fleas. Don't you know that they have a transparent shell? They can't protect themselves at all from UV light, and plus, fish and other predators hunt for water fleas in the lighter water layers. They can recognize their prey much better in the light! So there's a double

Revise your educated guess and expand on your justification:

[2 min]

#### Revised educated guess with justification:



Each of you should present your revised educated guess to the rest of the group. As a group, agree on a single final educated guess:

[5 min]

#### Group educated guess with justification:



*Example 3. Instructions given by the supervisor.*

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*Educated Guesses*

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Think about what educated guesses you can make about the research question.

[ 14 min in total]

**Hypothesis and justification:**

- The students collect these
  - Working individually (*generating*)
  - Working individually (*feedback*)
  - Working *as a group*

Do not give any content-related input; however, the students should be made aware that they need to formulate both a hypothesis and a justification! The difference should be clear! A hypothesis must be present!

**READ ALOUD:** “You should first each come up with two educated guesses independently. Think about a possible answer to your research question and then try to find a second answer.” (*Students write down two educated guesses independently.*)

“A good researcher doesn’t just take shots in the dark! As researchers, you need to use your prior knowledge to justify your educated guesses as best you can.” [*Envelopes with cards on the table*] “Only justifying both educated guesses should you pick one and mark it with a cross.”

Try to justify them with the knowledge you already have about water fleas. Afterwards, commit yourself to one educated guess. (Mark the one you choose with a cross).

**READ ALOUD:**

“Now read through two other educated guesses and then revise your own educated guesses!

Briefly present your educated guesses to your group and agree as a group on one educated guess that you will work together to test in an experiment.”

*The supervisor pays close attention to ensure .... that both phases are filled out correctly,*

*that the hypotheses are actually given justifications, and*

*that the alternative hypotheses are read and considered.*

Students’ content-related questions should not be answered in this phase (e.g. Can water fleas see?, What do water fleas eat? etc.)! Incorrect hypotheses should not be corrected!!



Example 4. Self-generation prompts in a cloze section.

[5 min]



I learned that water fleas' migration serves to \_\_\_\_\_ predators like \_\_\_\_\_ as well as harmful \_\_\_\_\_ in the higher, lighter water layers.

The reason for this is that water fleas are not protected from the intense \_\_\_\_\_ in the \_\_\_\_\_ layer by their \_\_\_\_\_. At the same time, they can be \_\_\_\_\_ by their \_\_\_\_\_ during the day in the light water layer. This is why they only come back to the fertile layer \_\_\_\_\_ in order to look for food - \_\_\_\_\_ - there. These need \_\_\_\_\_ to grow and therefore can only be found in water layers with enough \_\_\_\_\_.

