

Facilitating Inquiry-Based Learning via Questioning

Educators:

This guide is intended to be a tool to help you facilitate inquiry-based learning by providing questions to ask students while they complete steps of the inquiry process. It can be used with any inquiry-based lesson or experiment. This framework was designed for use with *Gedanken*, a product of The Wrinkled Brain Project. *Gedanken* is a low-cost, simple to use, teaching tool with the goal of building students' critical thinking skills.

To learn more or purchase *Gedanken*, please visit us at:
www.wrinkledbrainproject.org

While implementing an inquiry-based lesson, you may ask your student to complete some or all of the “student tasks” below. While they are completing a “student task” (e.g. making observations on a discrepant event presented in class), use the “educator facilitation questions” (and other questions that arise) in order to help your students further explore their own thinking.

Student Tasks and Questions:

Student Task: make observations

• Educator Facilitation Questions:

- What just happened?
- What did you notice?
- What did you see? hear? smell? feel?
- What stood out to you?
- Did you notice something you didn't expect?
- Did you experience something that is new to you?
- Did you notice something you have seen before?
- Did you notice something you have never seen before?
- Did you see any patterns?
- How would you write down or explain what you experienced?

Student Task: locate background information

• Educator Facilitation Questions:

- Has anyone ever studied this topic before?
- What did researchers learn about this topic?
- How did researchers study this topic?
- Are there any organizations that study this topic?
- What websites should we visit to learn more about this topic?
- Where in the library could we go to learn more about this topic?
- What sources could be unreliable in our search?
- What keywords or phrases should you use when searching online to get information on the topic?
- Is there anyone you could interview about this topic?

Student Task: ask a question

• Educator Facilitation Questions:

- What do you want to know?
- What would you like to learn about this?
- What seems strange to you?
- What aspect of your observations is most interesting to you?
- What do you think we could try to test?

Student Task: choose a question that can be tested

• Educator Facilitation Questions:

- Are there any questions you couldn't answer by searching online?
- Are there any questions you couldn't answer by asking an expert?
- Are there questions you should eliminate because they can be solved with an internet search?
- Are there any questions you should eliminate because they would be impossible or very hard to answer?
- Are there any questions that you should eliminate because you could never answer them conclusively?

Student Task: write a hypothesis

- **Educator Facilitation Questions:**

- Can you think of a possible answer to your question?
- On what evidence are you basing your hypothesis?
- On what background information are you basing your hypothesis?
- Is there another possible answer to your question?
- Does anyone in your class or group agree or disagree with you? Why or why not?

Student Task: write a procedure

- **Educator Facilitation Questions:**

- What should you do to test your hypothesis?
- How much would it cost to test your hypothesis? Is that reasonable?
- How many times would you do that?
- What do you need to test your hypothesis?
- How long will it take to test your hypothesis?
- What kinds of observations and measurements are you making?
- How will you analyze your data?
- Where will your research take place?
- Are you missing any steps in your procedure?

Student Task: Improve the procedure

- **Educator Facilitation Questions:**

- Is there another way to test your hypothesis?
- Is there a better way to test your hypothesis?
- If someone else read your procedure, would that do everything the same way you would?
- If someone else was asked to write the procedure, do you think they would do something different?
- How will you get all the materials you need?
- How many people will you need?
- Do the people on the research team need to have any particular skills?
- Is it safe for the researcher and for others?

- What technology would you need?
- Does that technology exist today?
- How is your procedure similar or different from ones used in past research projects?
- Are all parts of your procedure legal?
- Are all parts of your procedure ethical?
- How will you know if you've fully answered your research question?

Student Task: make a conclusion

- **Educator Facilitation Questions:**

- What new information did you learn about your topic?
- Did you prove or disprove your hypothesis?
- What broader implications does your conclusion have?
- Do your conclusions give you any ideas for additional experiments?
- What new information can you share with other researchers?
- How can you share this information with other researchers?