1. What kind of knowledge results from a tinkering process in your experience?

Tinkering, as I have learned during this course is really about 'doing'. Actively doing something and often creating something physical. I think the most important knowledge gained is experience with something. A big part of tinkering is trying out something new and being creative.

2. Tinkering with classical materials like clay, paper, colour, textiles is more related to craft. How does tinkering work with digital and electronic media?

The lectures have mostly focused on physical touchable tinkering. In the digital world, tinkering is still possible, but less tangible. Instead of clay to knead, code can be kneaded into a certain structure. This can also involve creative thinking. Code and circuits require technical scaffolding, but it is still exploratory.

3. One basic characteristic of science is reproducibility. Is that possible with tinkering? Or do we want that at all?

Reproducability is not always possible in tinkering. Part of the fun of tinkering comes from creating something new and being creative. Materials and combinations that are used are not always easily recreated. Usually elements within a tinkering product can be recreated.

4. Design practice changed during the past years, from long design phases to short, iterative processes, due to the availability of new prototyping technologies. Is this iterative process of prototyping qualitatively different from the cycles we do in tinkering?

There are similarities and differences. Iterative processes follow a structured plan and the goals are usually clear. Tinkering is often more open-minded and exploratory. A final product might not even be the aim of the tinkering session. They can be used for different purposes which makes it difficult to say whether the prototyping quality is different.

5. Can a co-design session be described as a tinkering session as we treat it in our course?

I don't see why not. A session where multiple people work together can definitely be seen as a tinkering session. If a co-design session attempts to solve a problem, it can be seen as a tinkering session.

6. The choice of materials (seed, tools, scaffolding, facilitation) has an effect on the outcome, the knowledge and products made in a tinkering session. How can we use that in a co-design session? Can we really influence the kind of results here, and do we want that?

I think the lecture session where we saw different scaffolding materials was a good example of how multiple materials can be used for tinkering. It is obvious that different materials lead to different results. The used materials influence the outcome of the session. It is also important not to influence the results too much. It is nice to still have sufficient room for creativity.

7. In "research through design" can tinkering fill in the design part?

Yes, tinkering can definitely fill in the design part. Or at least part of the design part. Tinkering helps to do something rather than only conceptualize. This aligns with the reflective nature of research through design.

8. Are there design questions where tinkering is not a possible or useful approach?

Yes, there are specific questions where tinkering is not a possible or useful approach. In the reflection of session two I also wrote about this. Fields where mistakes are dangerous often don't use tinkering. A brain surgeon is not going to tinker around when doing a surgery. Tinkering can be too risky in situations where safety is more important.

9. How to balance real-world (criticality) with the fruitful mindset of tinkering?

I like chess, so I will use it as an example. There is a balance between critical thinking where you deeply go into certain lines and look for all possibilities. And at the same time there is a lot of room for creative thinking. Every chess game is different. This concept also applies for real-world critical thinking vs tinkering. Critical thinking and explorability should be balanced.

10. What is the critical impact your tinkering exercise could have? (on you, your design/engineering practice or problem, both positive and negative)

A positive impact could be that tinkering encourages me to have an exploratory mindset. Instead of following a set path or a standard tutorial, tinkering really invites you to think for yourself and create a solution to something.

Tinkering can also have a more negative impact where tinkering is used in situations where a trial-and-error situation is not desired. An extreme example would be a doctor that tries out something new on a patient. On the one hand it's good that tinkering happens here and maybe the doctor invents a novel approach to helping the patient. But often in these situations where safety is important, tinkering is not the first framework to grab.

11. What is the impact your session have regarding (more) stuff, ecological footprint and impact on our planet (i.e. how can you avoid that STEM workshops with waste material result in more waste material?)

Being resourceful and good for the world is always important. When tinkering with materials try to limit your material to the minimum. For my building block I used the laser cutter. I tried fitting my whole design in a relatively small area. New people in the field of tinkering should be taught not to waste resources. It is nice to use recycled or reusable materials.

If the concern is that STEM workshops waste materials, it should be made sure of that the STEM workshop is deemed useful.