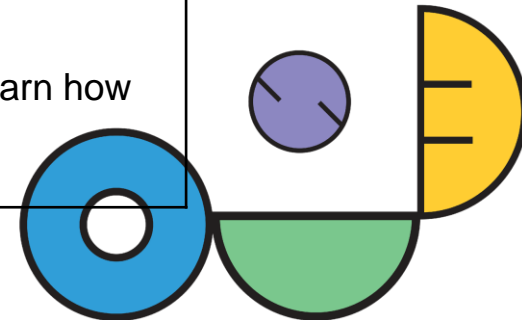


Authentic practises: design & inquiry

Description of the activity:	In this powerpoint you will learn about the differences between design and inquiry and how they are integrated and come together in a STEAM activity
Target group(s):	Primary and secondary schools
Keywords:	Design, Inquiry, optimization,
Duration of activity:	45'
Description of activity environment and materials needed:	<p><u>see also the handbook on content integration 'design and inquiry'</u></p> <p>What do we exactly mean by "Inquiry", "Design", "Optimization"?</p> <p>We learn about the underlying principles and models of STEAM education, and learn how to integrate it in STEAM activities.</p> <p>We use a concrete STEAM activity to explain the models: Shadow Art</p>



STEAM is ...

Within good STEAM education, everything starts from **problems** which are situated within **relevant (authentic) contexts**.

In order to **solve these problems** the content and skills which are related to the different STEM disciplines are **integrated** (=iSTEAM) and used in order to find answers and solutions for these problems.

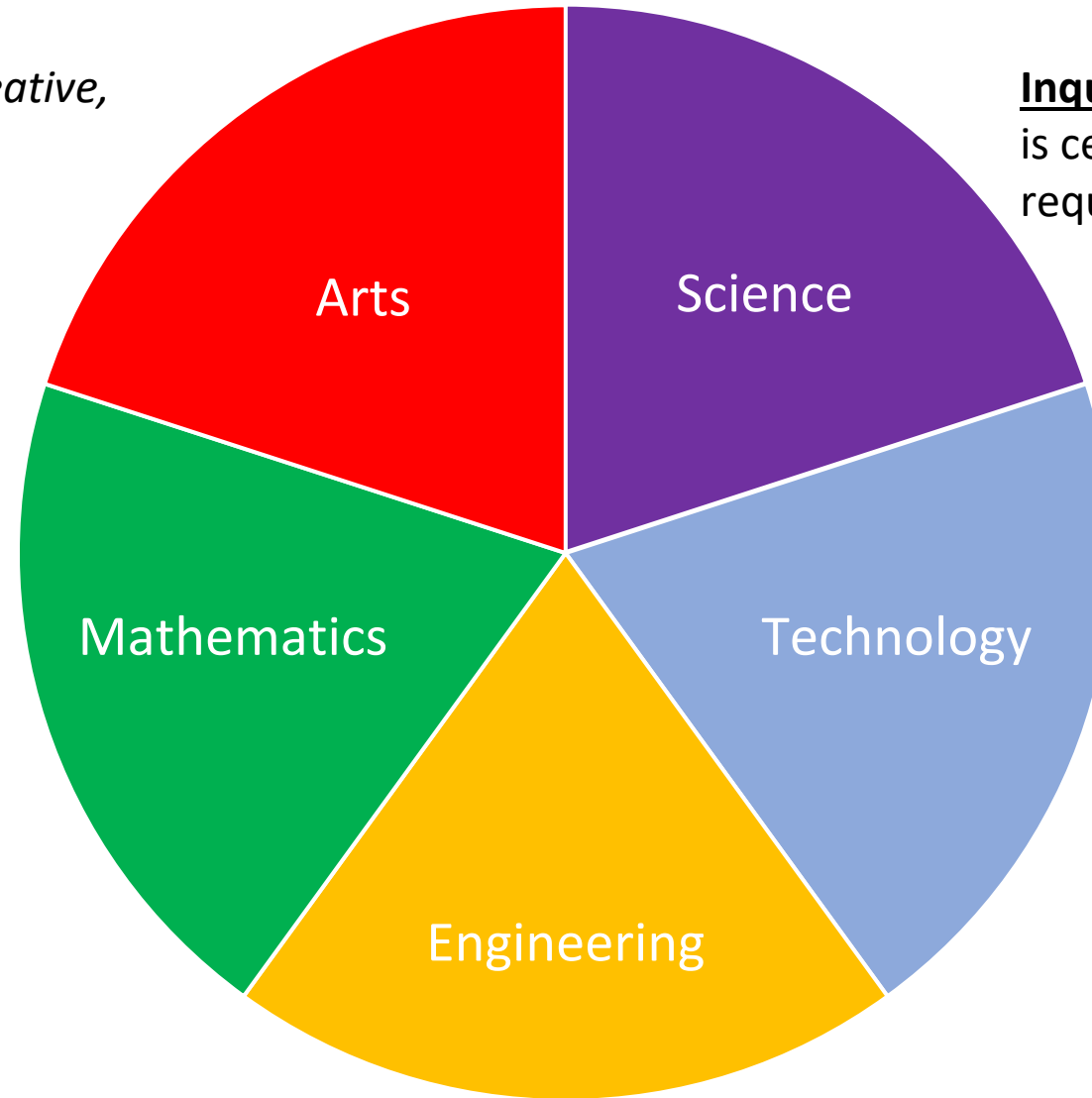
This happens **in an iterative process in which Inquiry, Design and Optimization** are central elements.

But what do we exactly mean by “Inquiry”, “Design”, “Optimization”?

Underlying principles, models: *ISTEAM*

The **application** of *creative, critical thinking and analytical skills*

Inquiry of *scientific concepts* is central. Inquiry skills are required for this.



The **application** of *mathematical concepts* is central. Ex. relationships, analysis, volume, scale calculation, area calculation, Collecting and representing data, graphs,...

The design and **making** of *technical systems* is central.

Optimizing design and process is central. Design and research go hand in hand

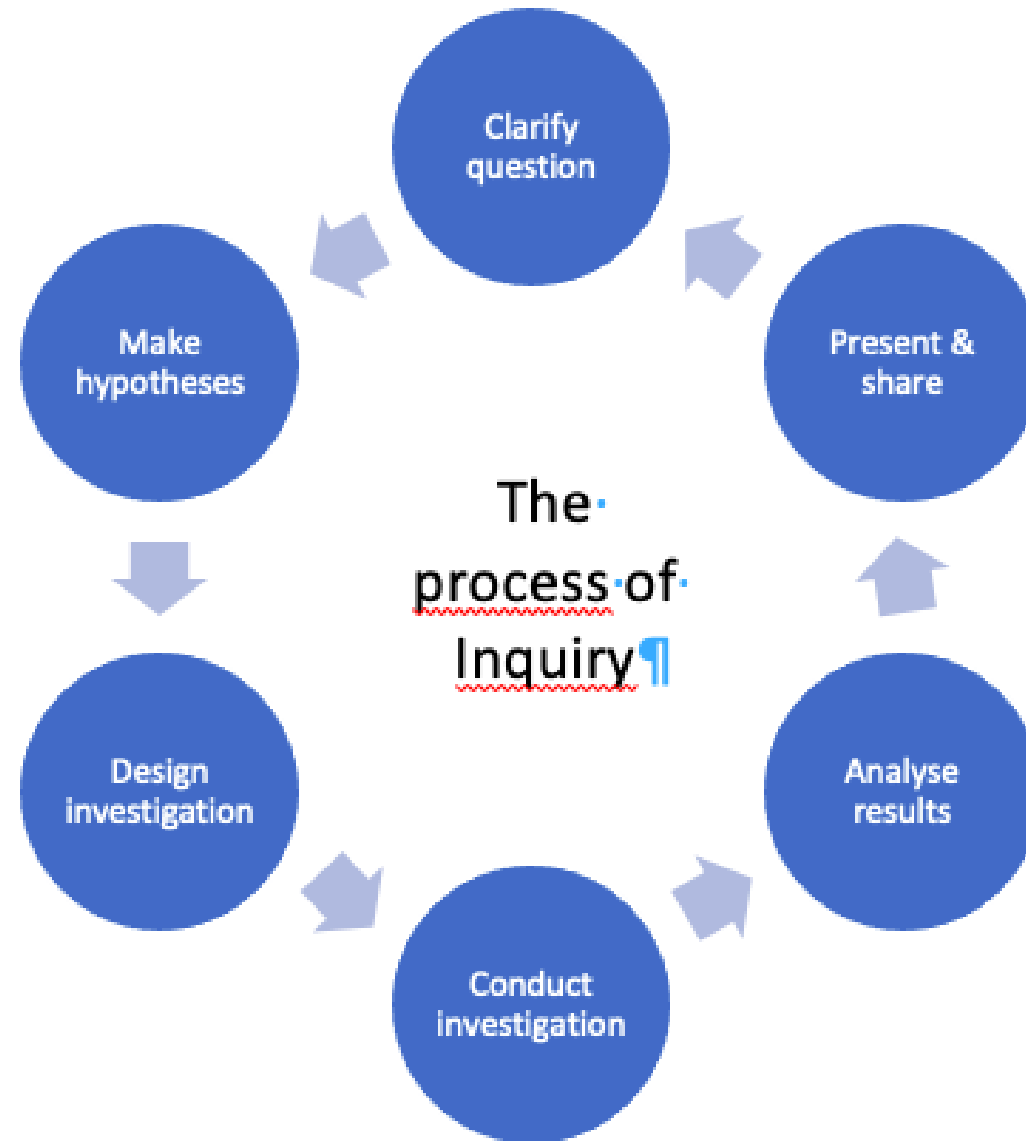
INQUIRY

Elements of inquiry:

(E.g. in the example: Shadow Art: NEED TO KNOW how shadows are formed)

- Searching for an answer for a scientific question related to scientific concepts (creating shadows)
- Through the process of inquiry. (inquiry circle)

INQUIRY



Van Graft & Kemmers, 2007; Kolodner et al., 2003;

DESIGN

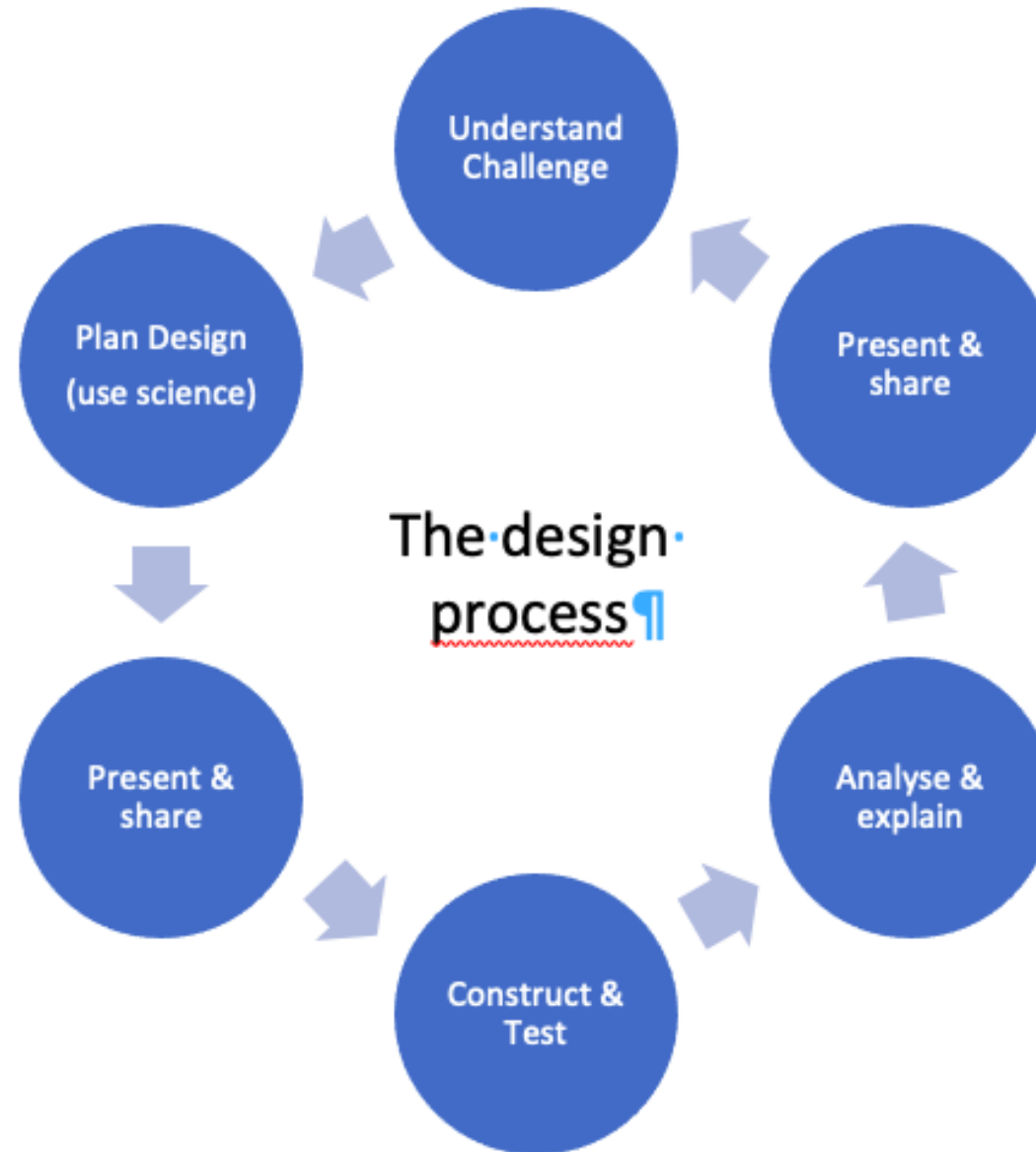
Similar to ‘inquiry’, a systematic process orientated approach is needed for “designing” (design circle). But there is a different goal and another finality.

The goal of inquiry is finding answers to scientific questions and the answer is an explanation based on scientific concepts.

**The goal of design is finding answers in order to fulfill material needs.
Therefore something will be designed and made.**

Different results / constructs are possible as outcome of the ‘design’ process, while the result of the ‘inquiry process’ is one theoretical explanation.

DESIGN



OPTIMIZATION

In the 'Shadow Art' activity we also used criteria so that children had to take into account certain elements while constructing their piece of Art.

As a teacher, setting criteria, helps you to coach the activity.

Based upon the criteria you can do some intermediate evaluations and stimulate children **to optimize** their construct based upon the criteria.

In fact in a STEAM activity “Design & Inquiry” interact with each other

