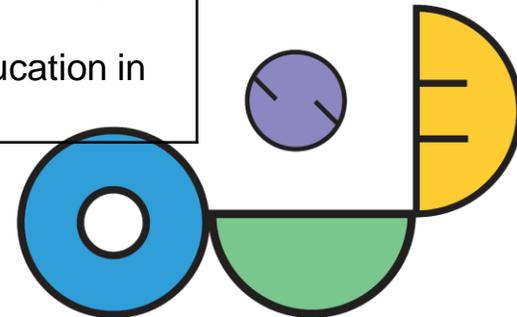
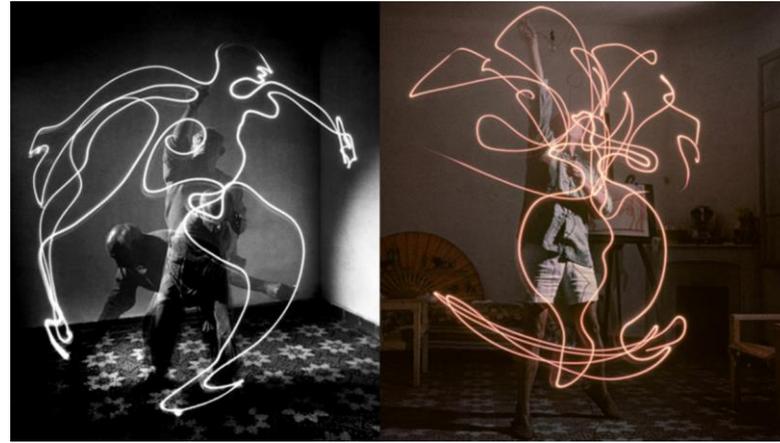
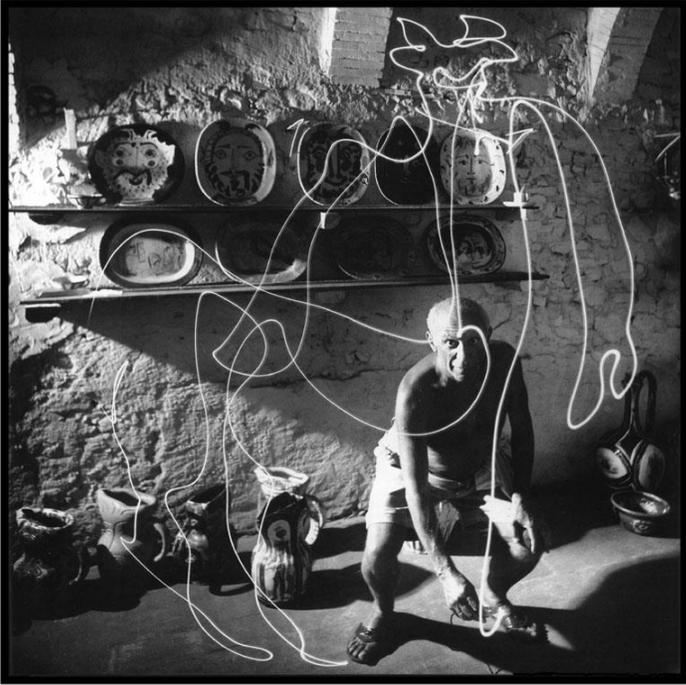


STEAM activity: Light Graffiti

Description of the activity:	Hands on activity on Light Graffiti, as an example on how the process of inquiry and the design process are integrated.
Target group(s):	Primary teachers
Keywords:	Underlying principles, models, template STEAM activity
Duration of activity:	90'
Description of activity environment and materials needed:	Reading through this powerpoint provides tools to carry out a real STEAM activity with your pupils in primary school. It also shows you the underlying principles and models on integrated STEAM education in order to reflect upon the activity.



Light Graffiti



An example of a STEAM activity for primary education

Materials needed:

- 5 artworks with light graffiti
- Camera with adjustable shutter speed or I pads / I phones with the app "slow shutter" (one for two groups)
- Lights (pointers, bicycle lights, flashlights, light on a mobile phone, ... (with thinner light beams clearer drawing) (several per group)
- Different colors of crepe paper
- By holding crepe paper in front of the light source, you can vary the colors of the light
- Some pieces of paper and writing materials

The students discover how to create art by using light graffiti. In the first phase, the students explore the possibilities and points of attention when creating a light graffiti work by doing small tasks. In a second phase they make a story based on 4 photos.

Problems to be tackled:

- Students discover musical domains, their working methods and design tools, they choose purposefully and combine them in order to express themselves expressively
- Students can think logically and algorithmically
- Students develop digital audiovisual skills
- Students can technically use the audiovisual media to realize a product

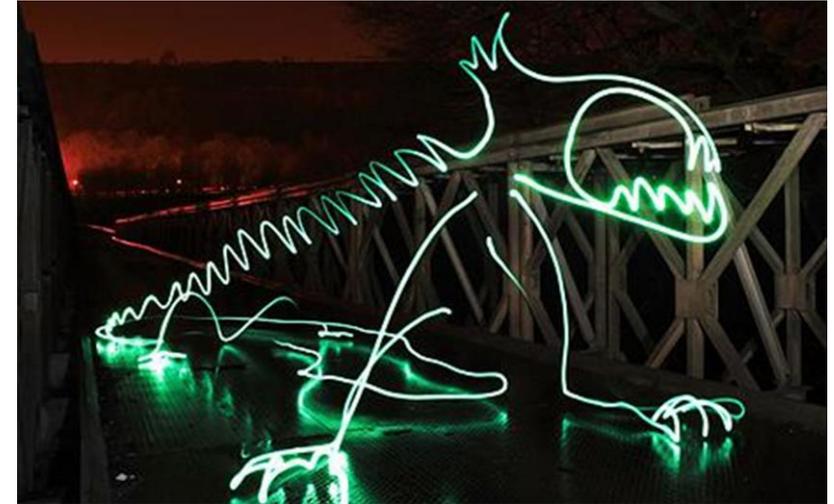


Engage

Museum...

To begin with, students discover a number of existing artworks of light graffiti in a pop up museum in class.

You can add a number to each work of art. The students are allowed to visit the museum in silence for 5 minutes to view the artworks. They also have to choose a favorite and memorize the number. Then a class discussion follows.





Investigate

How does light graffiti work?

First, the students get an explanation of how a camera works exactly.

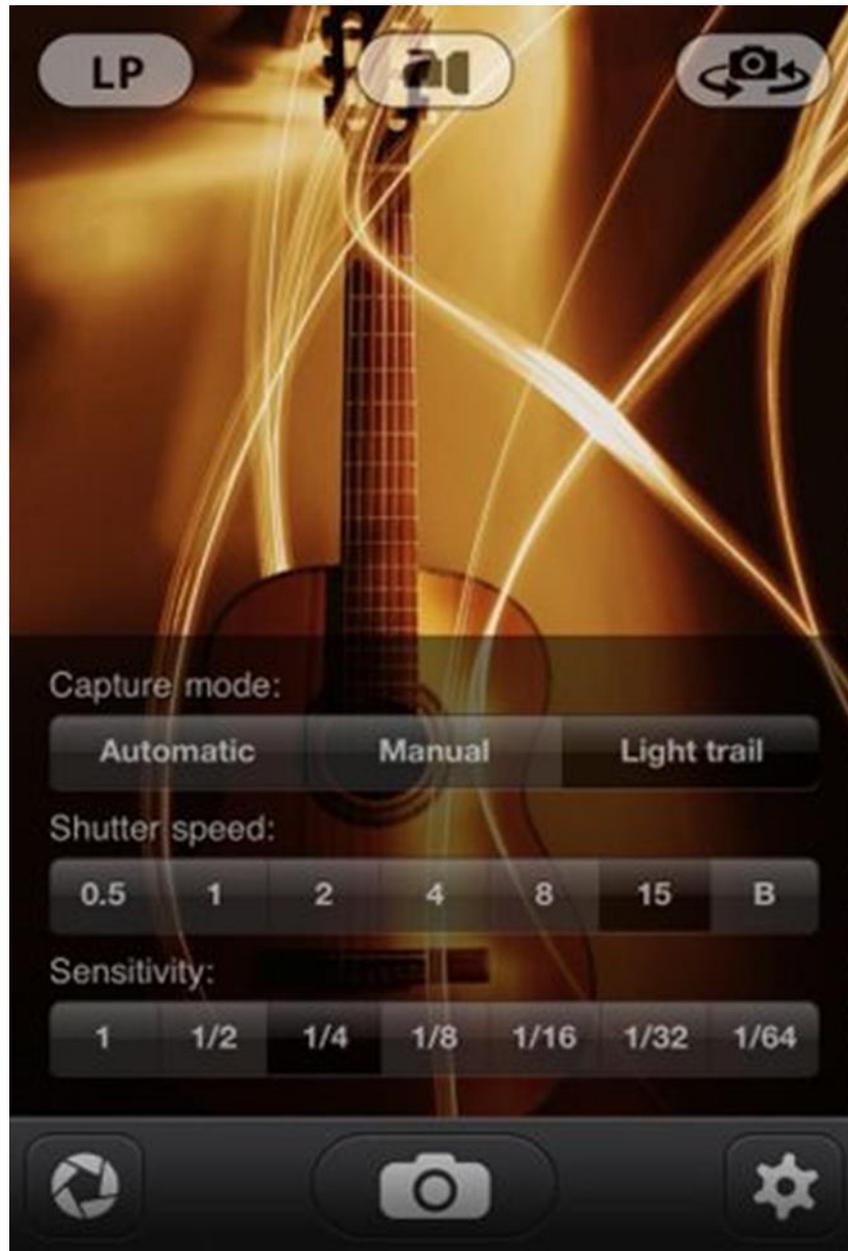
In this explanation, the teacher explains that a photo is taken by opening and closing a lens.

Variables in this:

- shutter speed (+effect)
- Diafragma (+effect)
- Sensitivity (+effect)

Students experiment with these variables by taking pictures, and analyse the effects.

(e.g. 'app' slow camera)



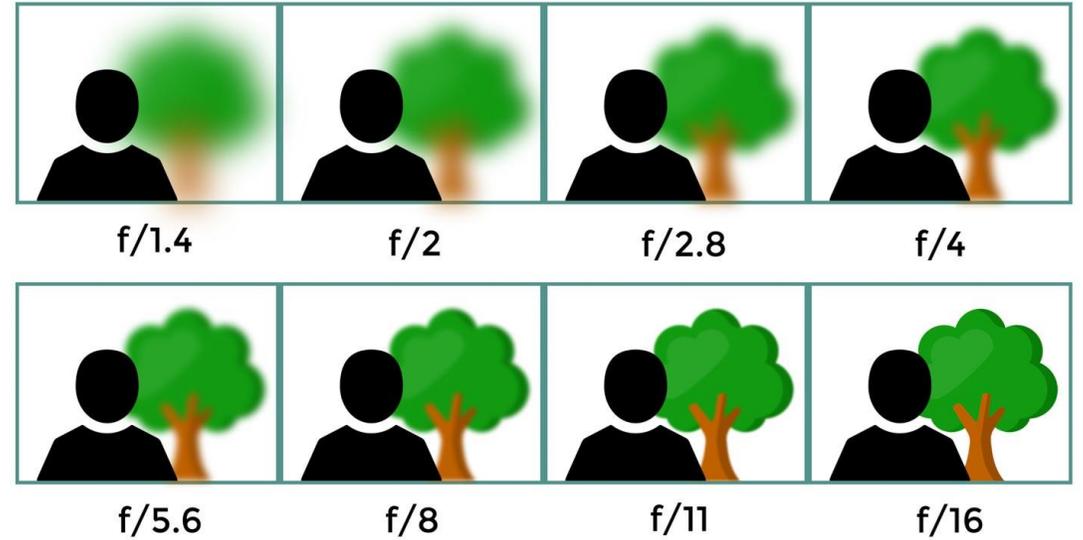
SLOW CAMERA



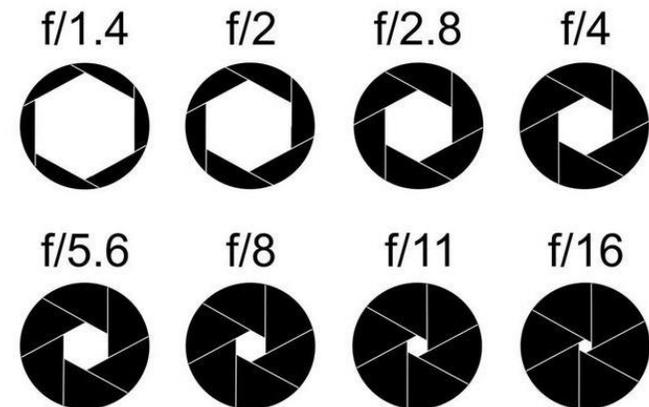
Conclude



Effects: shutter time



Effects:
Diafragma



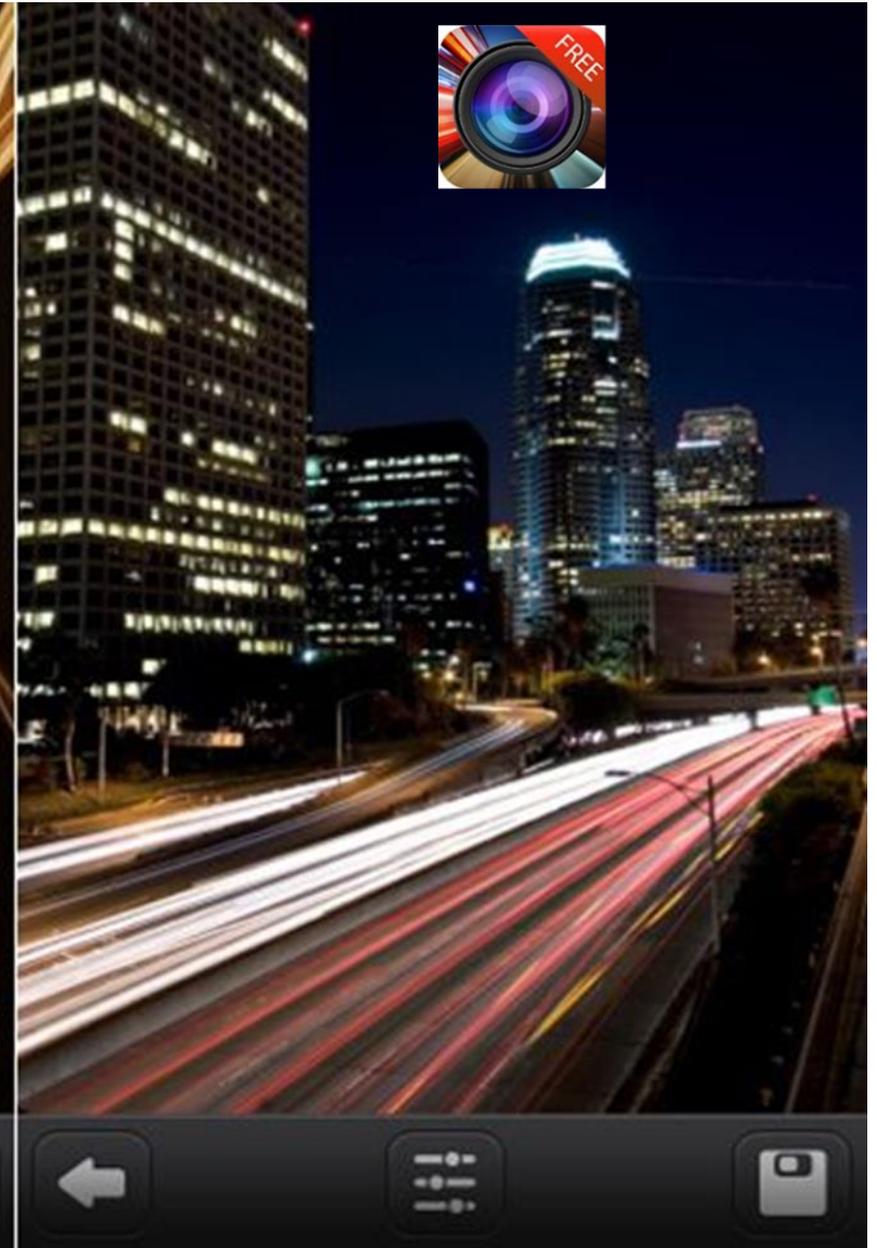
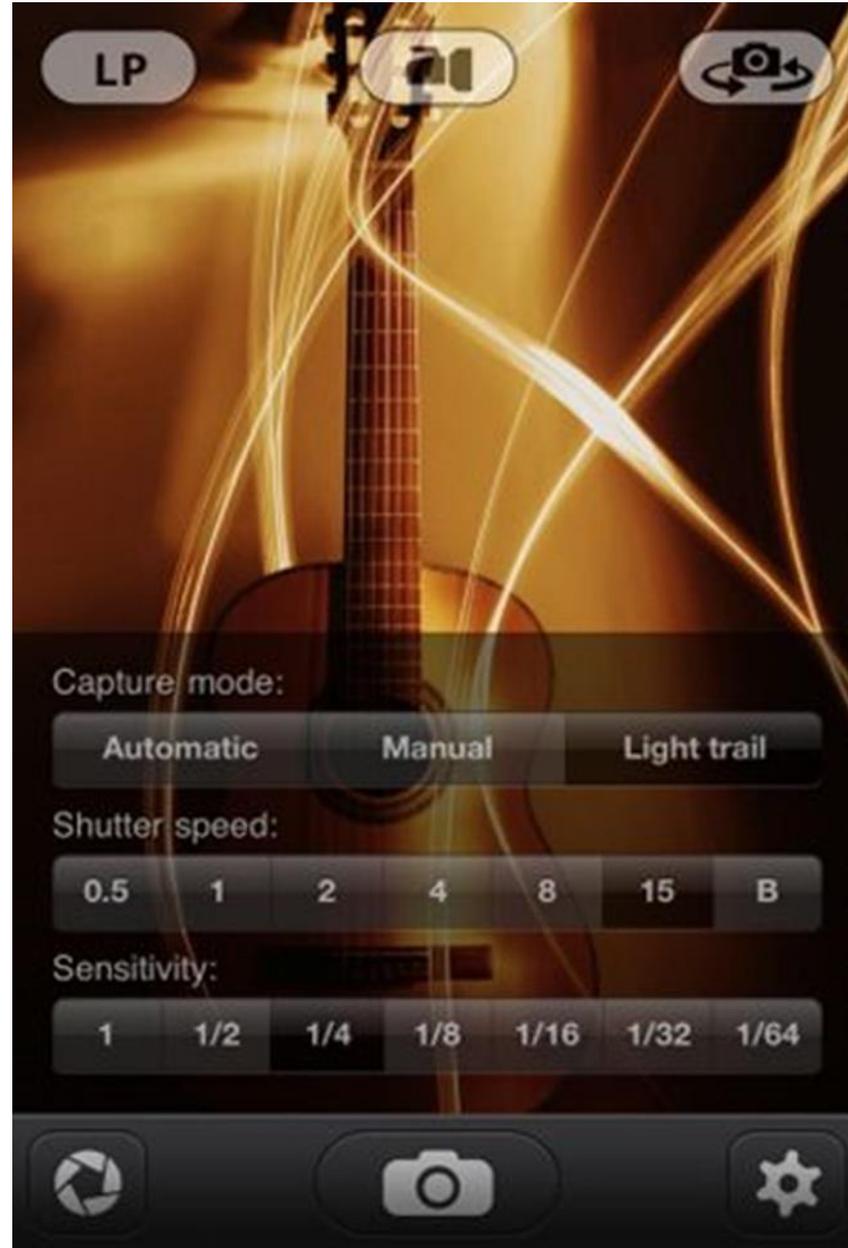


Investigate

How does light graffiti work?

In case of light graffiti, this lens is kept open longer so that everything that comes in from light is registered.
(e.g. with the 'app' slow camera: choose 'capture mode': Light trail)

SLOW CAMERA





Investigate

To discover the art of light graffiti

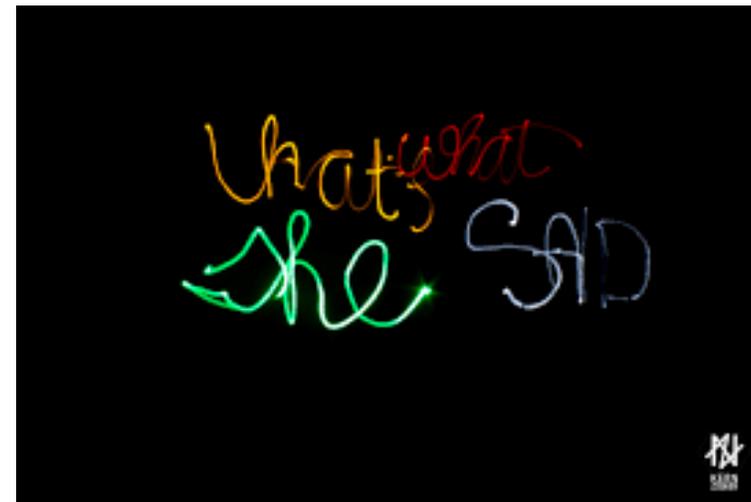
The class is divided into groups of 4-6. There are two groups per camera. There is always a group in front of the camera and a group that operates the camera.

The students are always given a small assignment that they have to draw. The groups alternate each time and all carry out the assignment once. If a particular assignment did not go well, the groups can get a second chance.

The students draw:

- a circle
- a square
- bars
- a person
- the first letter of their name
- their full name

They will discover some difficulties and will have to optimize.

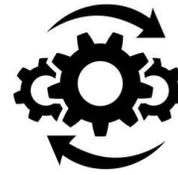




Investigate



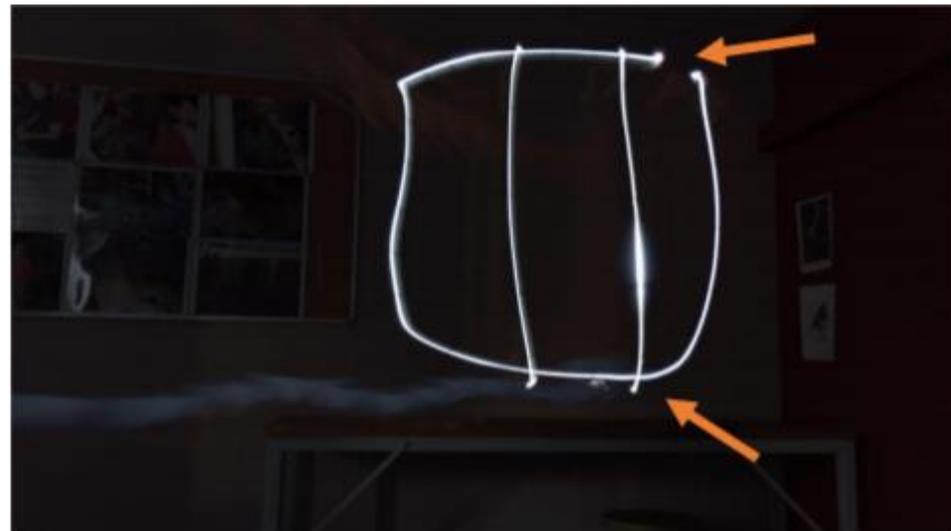
Conclude



Optimize



- "Is this a perfect circle / square? What could be better about our circle? " Answer: It is not closed.
- "How come it is not closed in the right place?" Answer: We didn't know where we had started exactly.
- "How can we make sure we know where we started?"
- Answer: By putting our free finger there.



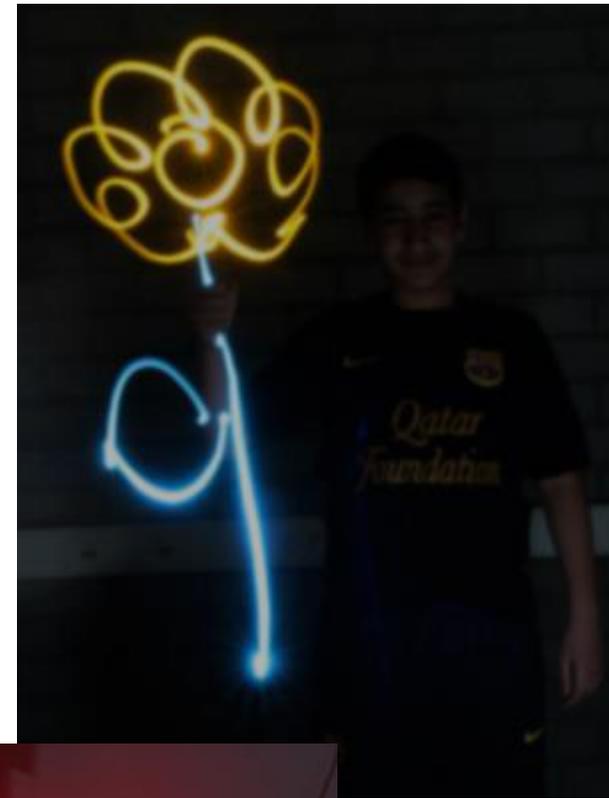
Mirror writing!!



Create

Guess our design

The students make a design of a specific situation in group. They draw these on a piece of paper and then they can draw them for the camera. The intention is that the other group(s) must guess what the design wants to represent.





Plan

Tell a Story ...

The students are going to make a story with light graffiti on the basis of 4 photos.

The story can go as follows:

Starting moment

e.g. man watches TV

Problem

e.g. TV explodes

Solution

e.g. TV is extinguished or man goes to the library

Final moment

e.g. man reads book

First, the students in a group draw their story on an A3 sheet. ...



Create

.....

Then they practice the different situations and agree on who will do what.

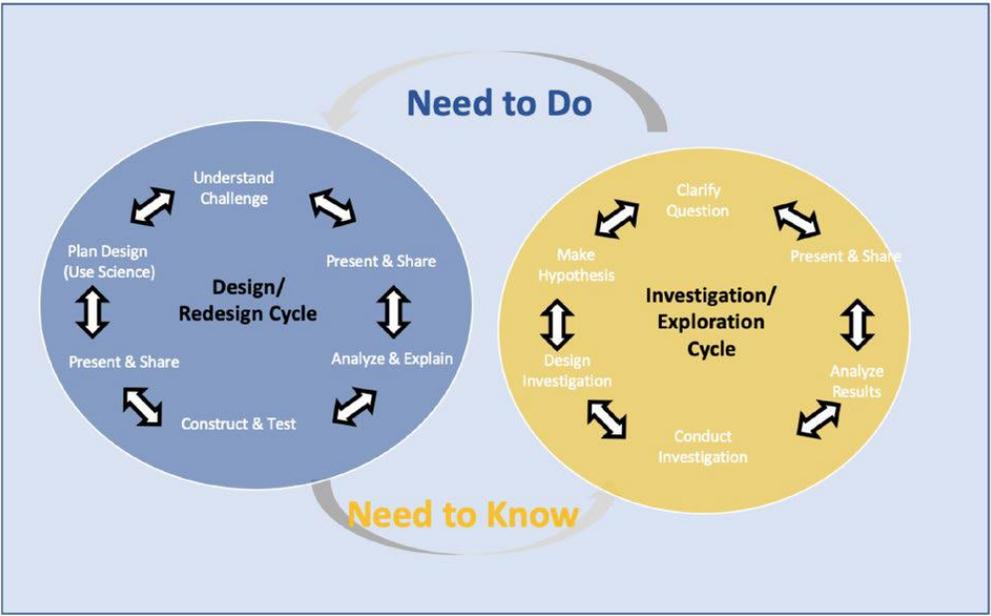
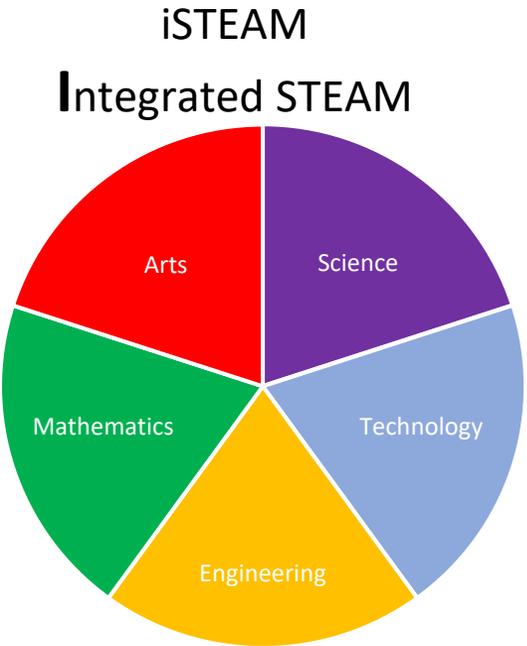
Finally they have to draw the 4 pictures one after the other.



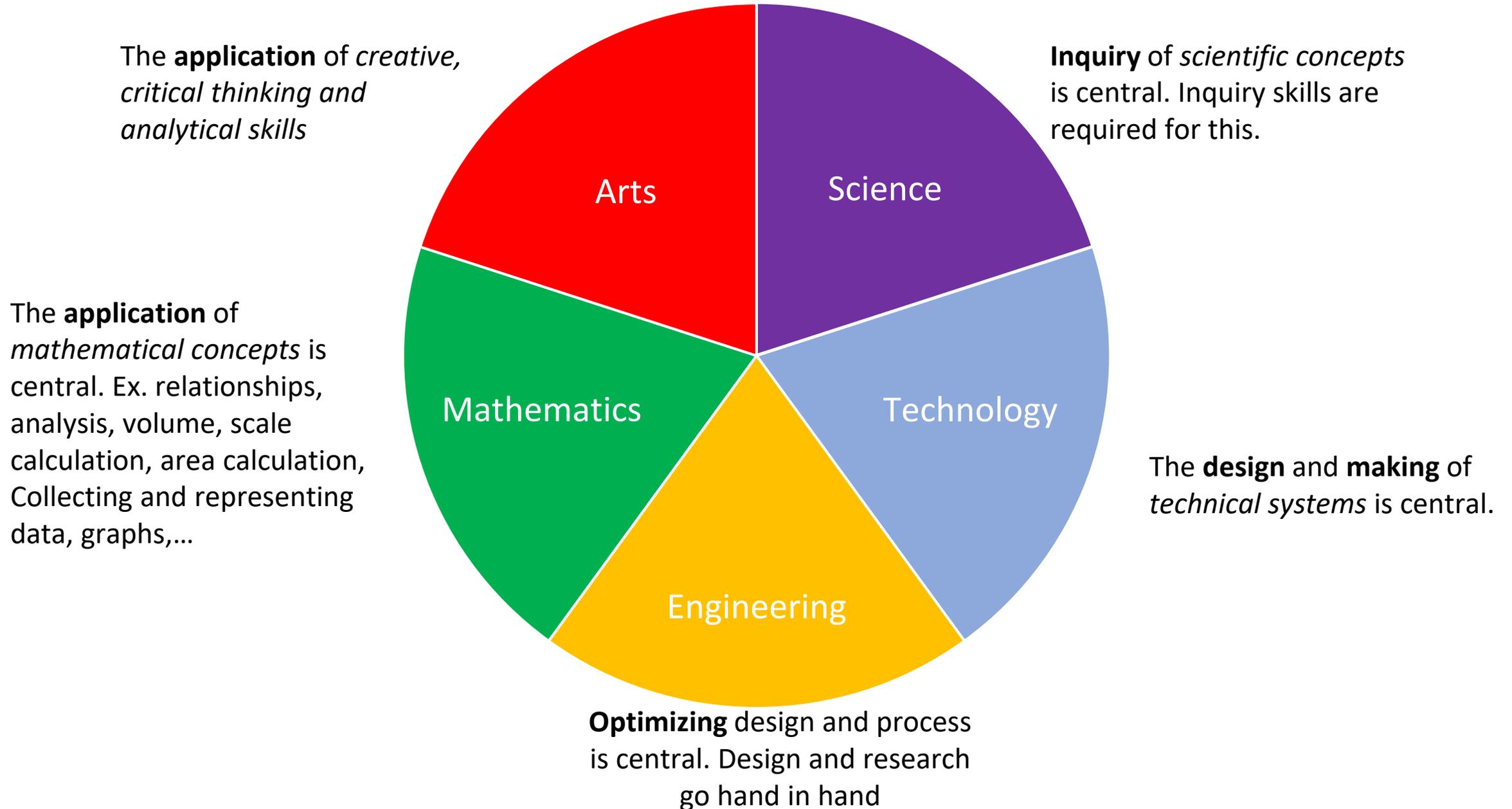
Conclude

Discuss with the students what they learned, what went well, where they had difficulties and how they resolved them.

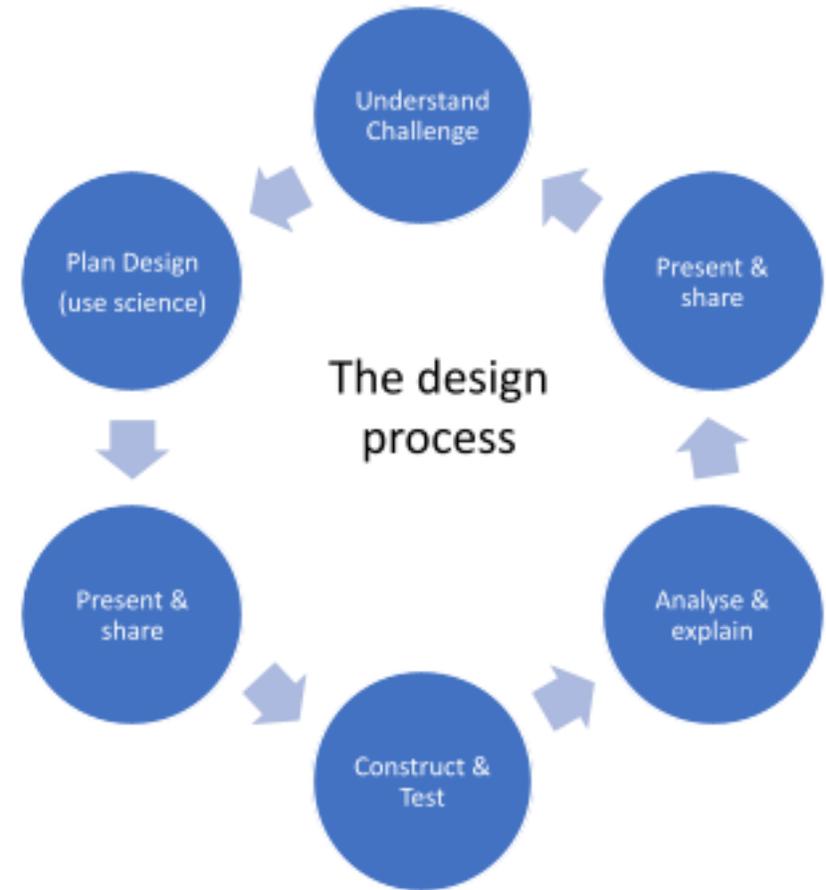
Underlying principles, models



Underlying principles, models: *ISTEAM*



Underlying principles, models: *ISTEAM*



Underlying principles, models: *ISTEAM*



Kolodner et al. (2003); Vossen (2019)

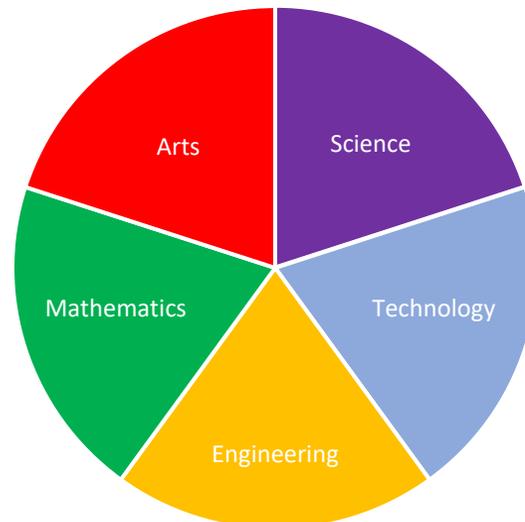
Reflection

First, discuss the following questions:

1. What have you learnt during the activity?
2. Did you use mathematics? When? Examples?
3. What did you do very well? Why?
4. What went wrong? Why?
5. What will you do differently next time?

Reflection

- Did you recognize elements of the different STEAM disciplines? Where did you use elements of 'science', 'technology', 'engineering', 'mathematics', 'arts'?
 - Use the *iSTEAM model* to formulate your answer and use terms such as 'inquiry', 'design', 'make', 'optimize', 'apply', 'create' ...



Reflection

- Did you apply elements of the inquiry cycle and design cycle? Use the model below to explain

