

STEAM Recipe

Theme	State of matter and the phase transition
Target Age Group	9 – 10 years
Duration of Activity	2 hours
Resources/Materials Needed (exact details required)	<p><u>Different objects for the first step (everyone gets one object)</u></p> <ul style="list-style-type: none"> • 1 empty bottle • 1 bottle filled with water • 2 other drinks • 1 balloon • 2 stones • 1 ball • 1 bottle olive oil • 1 pencil • 1 pen • 1 chalk • 1 scissor • 1 gum <p><u>Materials for the experiments</u></p> <ul style="list-style-type: none"> • A few (+- 3) cups • Empty bottle • Balloons • 1 cooking pot with cover • 1 electric stove • Water • 1 bowl • 1 lighter • 1 candle • 1 mirror • A few (10) ice cubes <p><u>Materials for the last activity</u></p> <ul style="list-style-type: none"> • A computer or a smartphone • Stop Motion app on a smartphone or computer • Papers in different colors • Pencils in different colors • Pens in different colors <p>Possibly:</p> <ul style="list-style-type: none"> • A camera • A (desk) lamp
STEAM Components	Science, technology, art

SPACE

STRATEGIC PARTNERSHIP

AGENTS OF CHANGE IN EDUCATION

WHY	Goals/Objectives/Targets/ Aims	The students can: <ul style="list-style-type: none">• Divide substances and objects from their environment into three groups: solids, liquids and gases.• Name the characters of solids, liquids and gases.• Sum up some solids, liquids and gases that they see in their direct environment.• Describe the terms solid, liquid and gas.• Explain that heating and cooling are at the base of the transition from one phase to another.• Explain the terms melting, freezing, evaporating and condensation.• Note their observations.• Follow the different steps of the natural science method by the effect of the experiments.• Search for a solution for a problem.• Can make an own interpretation of the phase transition by making a stop motion video.• Learns to work in group.
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HOW

Method/Activities (i.e step by step instructions for teacher)

State of matter

1) Intro

The students get one object. They have to bring all the objects together and sort them in three groups. They have to explain why they have sorted them like that.



It's important that everyone listens to each other.



The role of the teacher is here to be a supervisor. He ensures that everyone listens to each other and that there won't be a big discussion. The students must lead the conversation

entirely themselves.

When the students think they have found the solution, they have to explain to the teacher why it's that way.

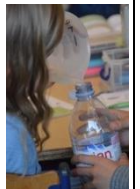
Together with the teacher there will be a conversation about the different objects. The teachers will tell the students the names of the groups they made: solid, gas and liquid.

2) Transport

The students are sitting in small groups. They have to think of different ways to transport the different objects (gas, liquid and solid).



Then they have to try them out to see if they work.



3) The form

The students are experimenting with the form of the objects. Does the shape of the objects change if you push on it?



Phase transition

The students carry out some experiments with the whole class.

Experiment 1

What happens when you hold a mirror above boiling water?



Experiment 2

What happens when everyone holds the same ice cube? One student takes an ice cube and gives it to student two, student two gives it to student three ...

What is the difference between the ice cube that is held by student 20 and the ice cube that student 1 held?



Experiment 3

What happens with an ice cube if you are holding it above boiling water?



Experiment 4

What happens when you light a candle? You get candle wax.

The teacher lights a candle. One student is holding the candle. When there is a good amount of wax,

the student tips the candle up and pours the wax into a cup of water. It's also possible to pour it onto someone's hand.



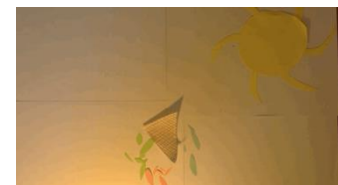
Stop motion

The students will divide in small groups (4 – 5 students / group). Every group gets one phase transition. They have to sketch the initial situation, i.e. what is there when there isn't yet a transition. They can draw something or portray it (drama).

Then they have to think about how the phase transition takes place. What needs to happen so that there is a phase transition?

Then they also have to work out the result, i.e. what will be left once the phase transition has taken place.

When they have made these three scenes, they take a picture of each scene and put it in the app of Stop Motion.



**DID
IT
WORK**

**Reflection/Evaluation
(where applicable)**

Evaluation for the students:

The students show their results to the class. The other students who didn't work with that video have to say what happened on the video.

I tried these lessons. The students were really motivated to rehearse a science problem by making a creative thing. I think they will remember the facts better.

space

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		<p>The students really needed more questions and steps to make a good stop motion. Most of my groups didn't manage to finish the video. So it's important to write the different steps down with a lot of questions. Maybe a time frame for every scene will help them to work better.</p>
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