

STEAM Recipe

Theme	Watercycle (evaporation-condensation-rain) + awareness that melting ice will raise sea levels AND increase rain
Target Age Group	9 to 11 years
Duration of Activity	50 minutes
Resources/Materials Needed (exact details required)	<ul style="list-style-type: none"> • 1 plastic resealable bag or bottle with cap per duo/group • Coloured permanent markers per duo/group • Water • Hot water or heating gun (short lesson) – stuff to attach the plastic bag or bottle on a window exposed to solar light (long lesson)
STEAM Components	<p>Science: meteorological phenomenon Technology: heating gun or sunlight acting as energy Engineering: scaled down version of atmosphere Art: indication + decoration of sea-level (shore+land), evaporation, condensation (clouds), rainfall Mathematics: measurement - 1/3 of bag must be filled with water.</p>

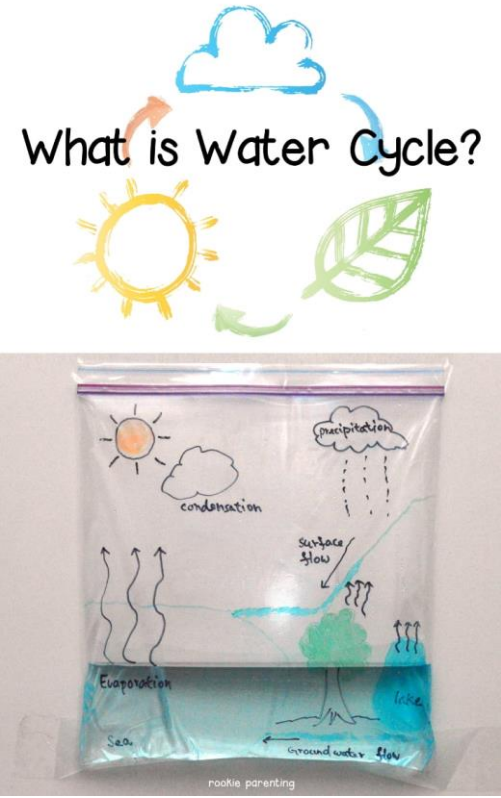
WHY	Goals/Objectives/Targets/Aims	<p>Goals:</p> <ol style="list-style-type: none"> 1. pupils understand and can explain physical phenomena such as rain. 2. pupils understand physical change of state and/or effects like evaporation and condensation. 3. Pupils can test a physics phenomenon under supervision by means of a test with a hypothesis. 4. Pupils can work with a basic set of materials
HOW	Method/Activities (i.e step by step instructions for teacher)	<ol style="list-style-type: none"> 1. Teacher can give brief introductory explanation on the cycle of water by showing this video: https://youtu.be/ZzY5-NZSzVw. 2. Teacher divides class in smaller groups (2-4 children per group) and provides all necessary material (plastic sealable bag or bottle, permanent markers, water, ruler,..)



STRATEGIC PARTNERSHIP

AGENTS OF CHANGE IN EDUCATION

3. The pupils get a closable container such as a plastic bottle with cap or resealable plastic bag per group.
4. On this container they draw a horizontal line with the help of a ruler at $\frac{1}{3}$ of the bag representing the sea-level.
5. They also draw an outline of a sea/ocean, shore and landmass with a mountain and a river flowing back to the sea. As such they implemented the most important elements of the water cycle as it manifests itself in our own atmosphere. Different artistic approaches or materials can be used here.
6. Teacher helps the pupils to fill the bottle/bag with hot water to the line/sea-level indicated on the bottle. Either the teacher uses hot water or cold water with the addition of a heating gun or solar energy (short lesson). The bags can be attached to windows exposed to direct sunlight (longer lesson)
7. With the instruction of the teacher they indicate with arrows the different elements of this watercycle: sea level, evaporation, condensation, rain (precipitation), river flowing into the sea.
8. The evaporation / condensation is already visible in the bag.
9. After a while the pupils see that, after the water has cooled down, at the top of the container larger water droplets will form that roll downwards back into the water. If using a bottle, the teacher can additionally place an ice cube on the opened bottle to create a cloud in the bottle.
10. Teacher elaborates on climate-change: he/she indicates that this water cycle is in fact a closed cycle. If global heating results in more melted ice, more water is induced in the cycle and more rain will occur.
11. If pupils ask questions like 'How come global drought is a thing then?', teacher can elaborate on the Gulfstream or other global water/wind-currents explaining that some places on Earth will become dryer and other places will become more humid.

		<p>Example:</p>  <p>What is Water Cycle?</p>
<p>DID IT WORK</p>	<p>Reflection/Evaluation (where applicable)</p>	<p>My pupils had a great time doing this experiment. For practical reason I chose the short version (hot water and/or a heating gun). The evaporation of the water in the form of miniscule droplets was almost immediately noticeable. After while the condensation (formation of bigger droplets) was clearly visible. The pupils can accelerate this process by tapping gently on the bag where the condensation is taking place. The bigger droplets sliding down on the inside of the bag leave a clear path so the pupils have a very decent insight in the formation of rain. All separate phases in this experiment are easily attainable and have a very small risk of failure. It is a very easy and practical experiment.</p>