3-5 years

pri-sci-net

inquire
investigate
evaluate
connect

Science Content:
Physical Science, Design and Technology

Target Concepts/Skills:
Wind can make things move, the effect of a counterbalance on the flight path of a balloon

Target Age group:
3-5 years

Duration of activity:
2 hours divided in different sections

Summary:
This is an activity where learning science meets technology and (re)designing. It's an activity of teaching scientific concepts through technology. The children are asked to make a flying balloon with a tail which can fly high and for a long time. This activity consists of different smaller activities to be carried out (in small groups). The first step involves constructing a tail for the balloon, it then moves on to focus on applying, debating and evaluating which 'flying balloon with a tail' flies better. This involves children in experimenting with different variables which are believed to have an impact on the flying of the balloon with a tail. Children can investigate how the flight of a balloon changes if the tail is made longer or heavier. This will allow the children to redesign their own flying balloon in order to make it fly higher or longer.

Objective:
By the end of the activity children should be able to:

- Undertake practical exploration for the purpose of achieving a desired effect:
- Construct "a flying balloon with a tail" that can fly high or long;
- Apply, debate and evaluate the constructed "flying balloons with a tail"; and
- Redesign the tail by optimizing the variables believed to make the "flying balloon with a tail" fly better.
- Investigate the impact of variables for the purpose of achieving scientific understanding by:
- Experimenting and manipulating with different variables believed to make "the tail" fly better (higher, longer, further, ...); and
- Drawing conclusions about the variables/ the causes which makes the flying balloon with a tail fly better.

Resources:

- Strips of cardboard (3 cm wide) and variable lengths (e.g. 3 cm, 5 cm, 7 cm);
- Strips of light paper such as crepe paper, cellophane, ... (1cm broad and ± 30 cm long);
- Balloons of different sizes;
- Part of an electric tube or other material that can be used as a mould
- Stapler, adhesive tape; and
- Knitting needles and mats to prick the carboard.

Flying balloon with a tail

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European Commission

CAPACITIES

Flying balloon with a tail

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1. Engage (Forming hypotheses)

Decide which question to investigate (= the challenge)
What do children already know? What are their ideas? (make the question to investigate meaningful for the children)

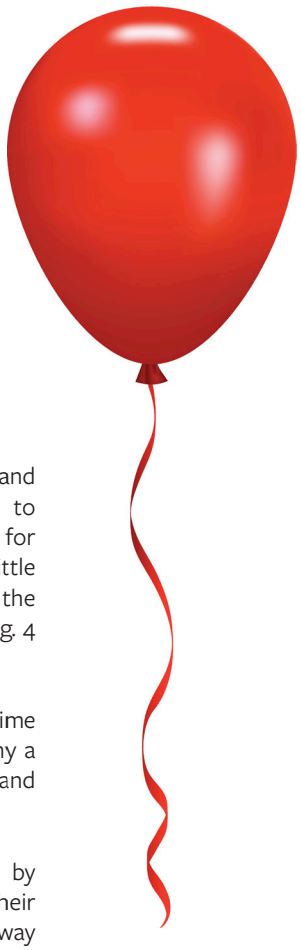
Depending on the central theme in the kindergarten (e.g. "wind", "flying", ...), the teacher introduces the following task:
We want to make a "flying balloon with a tail" that can fly very high and long. (Technology -> we want to achieve a desired outcome)

Those materials are available:

- Strips of cardboard (3 cm wide) and variable lengths (3 cm, 5 cm, 7 cm)
- Strips of light paper such as crepe paper, cellophane, ... (1cm broad and ± 30 cm long)
- Balloons of different seizes
- Part of an electric tube (to be used as a mould)
- Stapler, adhesive tape, ...
- Needles and mats to prick

The children make their own "tail" by

- Choosing a strip of cardboard and drawing a circle of about 1.5cm in diameter using an electric tube/pipe as a mould (the circles can be provided ready for the children);
- On a piece of mat, they prick the circle out with the knitting needle.
- They choose 3 strips of light paper and staple them at the other end of the cardboard.
- They choose a balloon and put the opening of the balloon through the hole they made in the cardboard



2. Inquiry (Designing and running experiments and observations)

Plan and conduct investigations in order to collect data

In this part of the activity the children will apply, debate and evaluate the constructed flying balloons with a tail. Every child is given some time to experiment with the balloons and the tail he or she made, to look at the balloons with a tail of their fellows, ...

Ask questions to stimulate children to think and to make children tell about their (previous) experiences, such as

- Why is the air coming out of the balloon?
- Which flying tail is moving a long way?
- Do you know other things that are moved by (the) wind?
- Are the strips of light paper well connected to the tail? How could we improve this?
- What does happen when the hole in the cardboard is too big? Why does this happen?
- ...

After some time, it is discussed in little groups (± 4 pupils) which tails fly 'better' than others and what possible reasons there are.

The teacher is responsible to keep the testing and argumentation going on by asking the children to compare which flying balloon flies higher and for a longer period. This could be organised as a little contest between the different flying tails using the same balloon and approximately amount of air (e.g. 4 times of blowing air in the balloon by the teacher).

The children rank the tails from flying a short time to flying for a long time. The children discuss why a certain balloon flew high and for a long time and others did not.

Then the teacher could challenge the children by asking which action they will undertake to make their balloon fly high or for a longer period. In this way children are encouraged to talk and compare the balloons with a tail they have constructed in terms of their facility to fly high and for a long time. It might be a good idea to ask each child to change one aspect. This could be drawn on a small paper (and used afterwards: see 'evaluation').

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E.g.

(drawing of a balloon filled with a small amount of air)	(drawing of a balloon filled with a lot of air)
(drawing of a balloon with a tail with many strips of paper)	(drawing of a balloon with a tail with only a few strips of paper)

One can focus on

- the length of the tail
- the weight of the tail
- the kind of cardboard used (small strip or a larger one)
- the kind of balloon used

Note: the smallest balloons will be too small which causes the balloon releases its tail by flying. If this experience happens to one of the tails, the teacher can ask the child how they could solve this problem

- the amount of air blown into the balloon
- ....

3. Evaluation (Evaluating evidence)

Conclusion: use data to construct knowledge and generate evidence.
Demonstrate understanding of concepts and/or ability to use inquiry skills

Now the children are asked to adjust/redesign their tail by optimizing the variables believed to make the "flying balloon with a tail" fly better.
It is important

- to ask the children for the reasons of the adjustments they make.
- To give the children the opportunity to test the adjusted design again and make conclusions about the impact of the variables they changed.

After (individually) exploring and testing the variables believed to make the "flying balloon with a tail" fly better, a new contest (in small group) is organized and a new ranking of the balloons with a tail is made.

Finally the teacher guides the children in drawing conclusions about the variables which makes the balloon with a tail fly better. The little cards with changes in variables drawn before can be organized in the template below:

	(drawing of a balloon filled with a lot of air)	(drawing of a balloon with a tail with only a few strips of paper)			
	(drawing of a balloon filled with a small amount of air)	(drawing of a balloon with a tail with many strips of paper)			

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