Dear Teacher,

This is our introduction to the teacher with a teaching plan for how PlanetCards can be used in the class room. Feel free to give us feedback and help us improve its applicability.

The cards look as shown in the picture. The game exist in English, German, Danish, and Norwegian. Basically, they look like 'TopTrumphs' with planets and an illustration on the left side that tells you where the globe is placed in the Solar System. There are four different types of cards: Planets (red), Moons (blue), Asteroids (green) and Comets (yellow). There is also an info card which is used to get an overview of which globes are in the game.

Teaching plan

PlanetCards can be used in teaching science in 3rd - 6th grade. It has been tested in Denmark, and was sold in four editions by Schoolbook publishers from 2006–2016. This guide shows how you may use it for introductory teaching for 2 x 45 minutes lessons. You will need approximately 7 decks of PlanetCards in a class of 28 students.

Today's plan:

15 min: Brief introduction:

20 min: Game 1: Battle of the Globes [Top Trumphs]

5 min: intro2

15 min: Solitaire

20 min: Game 2: Build the Solar System

10 min: Quiz

5 min: end

Brief Introduction

Silence

The students sit in groups of 3 and each group gets a deck of cards.

Each group takes the “Info card” card from the deck.

We will learn about the planets of the Solar System - what they look like.

There are planets (red cards)

moons (blue card)

asteroids (green cards)

comets (yellow cards)

The Sun is a star and is taken as a red card.

We start by playing a game which is played like "Top Trumphs".

[Here the student will learn about the physical properties of the individual globes, how big, heavy, dense, fast, hot the globes are in relation to the others.]

Game rules: Battle of the Clodes

Shuffle the PlanetCards and deal them into piles so that all players have an equal pile.

All players must hold their deck of cards in their hand so that they can only see the top card. The top card is kept hidden so that the others cannot see it.

The youngest player starts. He or she looks at his or her top card and reports a category and a value, e.g. "Surface temperature, 137 degrees celcius!".

All players throw their top card on the table and the player whose planet has the highest surface temperature wins all the cards. He or she places the cards at the back of his/her pile and is allowed to choose a category in the next round.

There are the categories: mass, diameter, density, orbital speed, length of day, surface temperature, and distance to the Sun.

If two players have the same value, there is a battle and their next card determines in the same category who wins all cards that have been in play.

The game continues in the same way until one player has lost all her/his cards.

The winner is the player who has the largest pile of cards when the game ends.

[When all groups have played at least once (and preferably twice), the class continues with a game where the student learns about the location of the planets in the Solar System. First, a solitaire is put together.]

Silence

Introduction Solitaire:

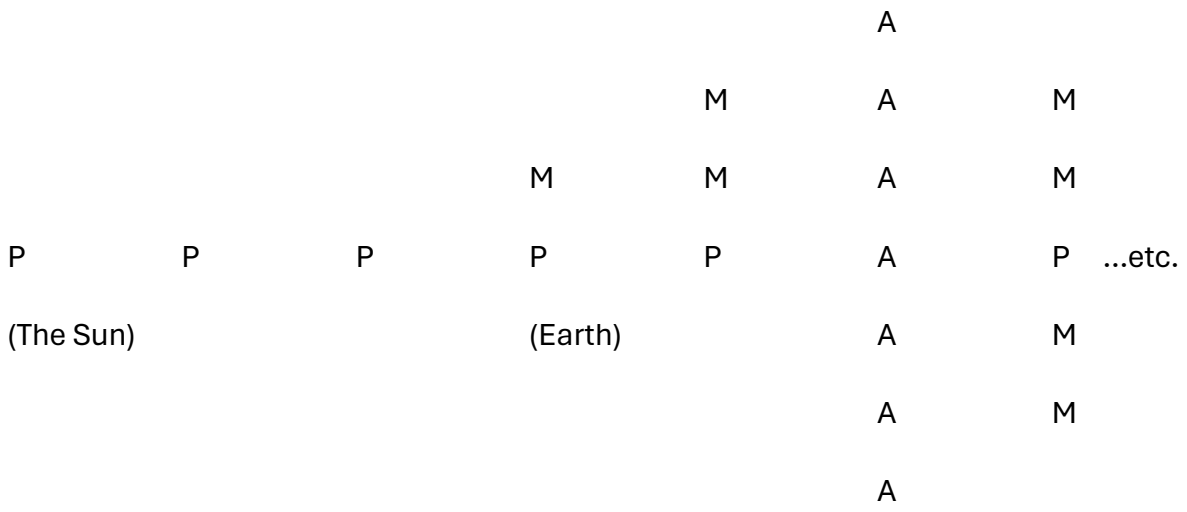
First, each group must be helped to put all the cards on the table so that you can see where they are in relation to each other.

Use the "InfoCard" to see which planet is closest to the Sun.

• First put all the planets next to each other on the table (left to right) in the order they come from the Sun.

ATTENTION! An asteroid is placed between Mars and Jupiter (it doesn't matter which one)

• When you have put all the planets, put in their moons across it (above and below). The remaining asteroids are also placed diagonally between Mars and Jupiter.



[This sketch is an attempt to know how the cards are laid out. The Sun on the left is followed by Mercury (which has no moons), Venus (which has no moons), Earth (1 moon), Mars (2 moons), asteroids, Jupiter (4 moons), etc.]

• In the end, you only have comets left.

Comets travel throughout the Solar System. Sometimes they are close to the Sun. As they are made of dirty ice, parts of them melt when they get close to the Sun (see e.g. the comet Hale Bopp, which has a long tail of ice…and a long tail of ions).

The next game involves putting the solitaire that you have in front of you.

Game Rules: Build the Solar System.

In the game you learn to "build" our solar system. The cards are shuffled. and put in a pile. All players draw 6 cards from the deck. The youngest player starts by placing a planet (a red card). If you cannot put it down, the turn continues clockwise and you draw a new card from the deck.

When a planet is on the table, you must place its neighboring planets next to it or one of its moons across from it, for example:

- Venus and Mars must be placed next to the Earth and the Moon across from it.

The Info card is used for assistance.

On each card, the illustration on the left side of the card is helpful. It indicates where in the Solar System the globe is located.

- Asteroids are placed between Mars and Jupiter.

Comets roam the solar system and therefore act as jokers: they can be placed in place of any other card.

Here are some examples:

Mars can be added to Earth, since they are next to each other in the planetary order.

Titan can be added to Saturn, since Titan is one of Saturn's moons.

You may not:

- Lay out a card if there is not already a "neighbor" on the table!
- Add two moons if they each belong to a neighboring planet. For example, one cannot add one of Jupiter's moons to one of Saturn's moons.

If a player cannot lay out a card, he must announce "Pass!", draw a card and the turn goes on to the next player.

How to win?

The winner of the game is the player who gets rid of all his cards first.

While the students are playing, you may tell them to read the text on the cards and learn cool facts to share with the other students at the table.

Quiz:

In the last 10-15 minutes, a quiz is given. Each group notes their answers on a piece of paper, which is then given to the teacher.

Quiz questions can be found online at www.ScientificPlayground.com