



## important hints:

- Watch movie from 5:00 AM and answer question until 23:00.
- Solution movie and points provided at 8:00 the next morning.
- Answer weekend questions until Monday evening.
- Answer **exactly once**. Answers cannot be changed.
- In case of questions, ask them **before** answering via contact form.
- Start with two jokers. Gain another joker by watching 10 solution movies. Jokers are played automatically in case of need.

## Shopping list for PiA – Physics in Advent 2018

[www.physics-in-advent.org](http://www.physics-in-advent.org)

- 1.)
  - 2 beakers or 2 glasses
  - baking powder
  - vinegar
  - beer mat or piece of cardboard
  - balloon
- 2.)
  - table tennis ball
  - 0,5 m sewing silk
  - adhesive tape
  - bowl or glass, about 20-30 cm wide and 20 cm high
  - water
- 3.)
  - bicycle
  - parcel string
- 4.)
  - moon in the night sky
- 5.)
  - two glasses
  - hot water from kettle
  - cold water that has been in the fridge for several hours
  - maybe some ice cubes
- 6.)
  - aluminium foil or black cardboard (5 cm \* 5 cm)
  - needle
- 7.)
  - smartphone app "PhyPhox"
  - refrigerator magnet is helpful, but not necessary
  - aluminium foil
  - AA battery
- 8.)
  - water
  - table salt
  - AA battery
  - adhesive tape
  - glass
  - aluminium foil



9.)

- water glass
- clear adhesive tape
- pen
- ice cube mould
- water
- table salt

10.)

- candle, e.g. tea light
- handkerchief
- a drop of water

11.)

- balloon
- PET bottle
- nail or scissors

12.)

- two glasses
- smartphone
- Install the app "LightMeter"
- Other free apps for brightness measurement are e.g.
  - Galactica Luxmeter
  - LightMeter
  - lux meters
  - Lux Light Meter
  - Sensor List

13.)

- jam jar
- straw
- nail
- hammer
- modelling clay/plasticine
- marshmallows

14.)

- smartphone with Phyphox app
- a friend with a second smartphone

15.)

- water-soluble black felt-tip pen
- pencil or coloured pencil
- paper handkerchief
- water and a glass
- adhesive tapes

16.)

- beverage can (food can also works)
- metal wire (about 30 cm)
- styrofoam plate (about 10 cm \* 40 cm)
- tinsel
- cotton cloth, e.g. tissue handkerchief
- plastic fork or PVC rod

17.)

- broom
- two chairs
- 1 Liter Tetrapack or carton of milk or juice
- pencil
- sewing thread
- parcel string

18.)

- two water glasses
- towels
- smooth shelf, best white
- kettle/ hot water or oven
- baking gloves

19.)

- 30 cm wood ruler (alternatively plastic ruler can also be used)
- a second ruler
- three 0.5-litre PET bottles



20.)

- cardboard
- scissors
- Needle or nail
- pencil or coloured pencil made of wood
- piece of straw

21.)

- Yo-yo, alternative: toilet roll and two CDs, sewing thread

22.)

- Coffee or Rooibos tea
- smooth table top

23.)

- paper clip
- household kitchen/paper towel
- tub or bowl
- water

24.)

- Hexagon nut size 8, 10 or 12 mm
- balloon