HOW THE CLIMATE IS GOING TO CHANGE IN THE NEXT CENTURY…

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Objective

Explain the uncertainty in the determination in the increase of temperature related to climate change. Students will be able to express the fact that random climate variability makes detecting climate change more difficult.

Field
Climate change modelisation
Uncertainty in climate predictions

Age group:

12-14 years

Duration of the activity:

Activity by itself: ~15 minutes.

[But it would be nice to have previously an introduction about climate and climate variability of ~20 minutes]

Materials

1) Panel with different prediction years (here, we proposed 3 years) and with the values of increase/decrease temperature related to each colored ball (see pdf document attached)
2) Small wooden or plastic balls of different colors. Proposal: blue, light blue, white, yellow, orange and red (see Table 1 for values related to each colored ball and the ratios for each year)
3) A piece of paper
4) 3 plastic boxes, labeled with the 3 years
5) 3 trays where the small balls will be placed, labeled too with the 3 years
6) A package of small round stickers or by default a felt tip pen

Table 1. Ratios of colored balls for each year to predict and the value of increase/decrease of temperature related to each color

Value	Colors	2005	2035	2065	Total
-4ºC	Blue	9	4	0	13
-2ºC	Light blue	25	15	11	51
0ºC	White	33	35	23	91
2ºC	Yellow	25	31	31	87
4ºC	Orange	8	10	20	38
6ºC	Red	0	5	15	20
	TOTAL	**100**	**100**	**100**	**300**

Proceeding

We can separate the class/group in three groups and each one will be responsible to count the increase/decrease of temperature for each year.

1) Shake all of the plastic boxes with the balls inside to get them well mixed
2) Each team takes from each box a total of 30 balls. This will represent an attempt to make a climate prediction for on year
3) Calculate the mean increase/decrease of temperature depending on the color of each ball (see Table 1)
4) Put the sticker in the corresponding place (year and increase/decrease of temperature value)
5) Discuss about the results

QUESTIONS TO DO DURING/AFTER THE ACTIVITY

1. Before taking 30 balls of each box ...

“Looking at the distribution of colors in each box, might you say anything about the mean temperature of that year?”

2. Just after taking the balls...

“And now, what is your opinion? Is the first idea that you had realistic?”

3. After have calculated the mean increase/decrease of temperature

“ What do you think about the number that the three groups get?”

After taking a look to the panel...

“Could you say something about the climate in the future?”

Some comments…

At the very beginning, it is difficult to draw any conclusions from an individual calculation. But it is nice, after some groups have already done it, to see the different stickers on the panel and to see that there is a mean increase of the predicted global temperature in time, but there is also an uncertainty in the prediction.

Note: The ratio of colored balls for each year is calculated in the way that uncertainty will be normal distribution.