

The following poll questions are based on the Planetary Defense Conference Exercise - 2021  
<https://cneos.jpl.nasa.gov/pd/cs/pdc21/>

### **Poll questionnaire**

#### *The 2021 PDC Hypothetical Asteroid Impact Scenario*

**IMPORTANT!!!** Although the following scenario is realistic in many ways, it is completely fictional and does NOT describe an actual potential asteroid impact. A summary of the scenario follows (please see the above link for further details):

**Hypothetical Warning #1:** ON APRIL 19, 2021 NEWLY DISCOVERED ASTEROID POSES A RISK WITH VERY LOW PROBABILITY OF IMPACTING EARTH.

#### **Details of Warning #1:**

- Apparent visual magnitude of 21.5, and the asteroid is confirmed the following day. It is assigned the designation "2021 PDC" by the Minor Planet Center.  
(Note: to reinforce the fact that this is not a real asteroid, we are using three letters in the designation, something that would never be done for an actual asteroid.)
- Currently, the trajectory is uncertain, but the probability of impact estimated to be low, about 1 chance in 2500 of hitting the Earth (0.04%).
- The asteroid's size, in particular, is highly uncertain. It could range anywhere from as small as 35 meters to as large as 700 meters, which could cause severe blast damage locally (tens of kilometers) or regionally (hundreds of kilometers).
- JPL's Sentry impact monitoring system and ESA's CLOMON system both agree that the most likely potential impact occurs on October 20, 2021 - just 6 months away.

#### **Poll Question #1: How do you react to this information?**

**A:** The impact is 6 months away and the probability is low. I am not worried about it. Even if it hits the Earth, it probably won't affect me personally.

**B:** I am somewhat worried, but I want to wait until the experts give us more information.

**C:** I am somewhat worried, but I'm not sure that I trust the experts and I would like to find out more about this on my own.

**D:** I am really worried. The impact is potentially only 6 months away and has a low probability of impact, but the asteroid's orbit is uncertain. I am losing sleep and this is affecting my daily life.

**Hypothetical Warning #2:** ON APRIL 26, 2021 THE ASTEROID'S RISK OF IMPACTING EARTH HAS CLIMBED TO ABOUT 5%.

### **Details of Warning #2:**

- Astronomers continue to track the asteroid every night after discovery, and the impact probability steadily increases.
- Based on its mean apparent visual magnitude, the asteroid's absolute (intrinsic) magnitude is estimated to be  $H = 22.4 \pm 0.3$ . If 2021 PDC's albedo (reflectivity) is 13%, a typical mean value, this H value implies a mean asteroid size of about 120 meters, but there is still a lot of uncertainty in the albedo and hence, its size.
- Space agencies interfacing with the international Space Missions Planning and Advisory Group (SMPAG).

### **Poll #2: How do you react to this news?**

**A:** The impact probability has only increased to 5%. I still think there is nothing to worry about.

**B:** I am a little more worried, but I still want to wait for more information from the experts.

**C:** I am worried, but I am becoming more skeptical because I keep hearing conflicting information in the news and online. I'm still trying to find out more about this on my own.

**D:** Now that the probability of impact has increased. I am very worried. We need to do something about this now!

**Hypothetical Warning #3:** THE ASTEROID'S RISK OF IMPACT IS INCREASING WEEKLY.

### **Details of Warning #3:**

- If the asteroid is on an impact trajectory, the probability will continue to rise, reaching as high as 30% by the end of the week, 70% by next week, and 90% during the following week.
- Little is known about other properties of the object, such as composition and density. As a result, the potential impact damage and population risk is also highly uncertain. Based on these estimates, the possible energy

released on impact could range from 1.2 Mt to 13 Gt (TNT equivalent), which is the equivalent of a nuclear weapon.

**Poll #3: With the probabilities of impact increasing, what do you think about spacecraft missions to deflect the asteroid?**

**A:** I think there is nothing to worry about. A spacecraft mission to deflect the asteroid will not be successful and it could be a waste of resources. We could use those resources instead to help people if the impacts does happen.

**B:** I am worried, I think we should try to deflect the asteroid and focus only of deflecting at this point versus beginning civil defense preparedness.

**C:** I am worried, I think we should try to deflect the asteroid, but we should also simultaneously prepared the possible areas of impact in case is needed. I want to find more information weekly.

**D:** We have much less then 6 months. At this point it is too late and a deflection won't work. We should prepare for the impending impact now!