1. What wikiHow article did you pick and why?

   I picked “How to Survive a Comet Hitting Earth”, because I’m curious whether people can survive and how, we know that dinosaurs didn’t make it. And I want to know if advanced technologies developed by people can help people survive in environmental disasters.

2. What portions of the article did you select to translate to PDDL?

   As we need at least 10 actions, I chose the whole steps from 1 to 5, which is very simple for each step.

   1. Pay attention to astronomers’ predictions on any possible collisions with earth.
   2. Move away from coastal areas.
   3. Move into a bunker or fortified structure and outfit it with an energy source.
   4. Purchase enough food, water, medicine, and other supplies.
   5. Buy weapons and ammunition for after the impact.

3. Give some examples of the actions, types, and predicates you used in your domain.

   The first example is from step3: Move into a bunker or fortified structure and outfit it with an energy source. With instruction: “the best ones for a comet impact will have an air filtration system and be made of strong material”

   I defined an **action** *check_bunker* to check if the bunker is good for sheiding. For this bunker it will satisfy two attributes (**predicates**), which are *(has_air_filtration_system ?bk)* and (has_strong_material ?bk). The **types** include in this action are *?bk - bunker* and *?p – player*. The **preconditions** are to check whether the player has already stored *enough_supplies* and *enogh_weapons* besides the above two attributes of the bunker. The **outcome** is *find_good_bunker*.

   Another action I would like to explain is step2: Move away from coastal areas.

   For this **action** *move_away*, I defined three specific **predicates**: *(in ?p - player ?c - city)*, a player is in a city distinguishing from at a place; *(coastal ?c - city)*, a coastal city; *(inland ?c - city),* an inland city. The **types** involve in are *?p – player*, *?c1 – city* and *?c2 – city*. To execute this action, one should be in a coastal city and knows an inland city. The **outcome** is the player move from a coastal city to an inland city.

4. Explain what goal you selected for your problem, and give the inital state and solution that you created.

   The goal is the player stores enough supplies and weapons, finds a good bunker and outfits it with heater. And lastly connect with family to inform them he/she is safe.

   Initial state and solution:

```
(:init
   (connected home west market)
   (connected market east home)
   (connected market west weapon_market)
   (connected weapon_market east market)
   (connected home north bunker1)
   (connected bunker1 south home)
   (connected bunker1 north bunker2)
   (connected bunker2 south bunker1)
   (has_air_filtration_system bunker1)
   (has_air_filtration_system bunker2)
   (has_strong_material bunker2)
   (in family Beijing)
   (at npc home)
   (has_pc npc)
   (in npc Philly)
   (coastal Philly)
   (inland Salt_Lake)
   (at food market)
   (at water market)
   (at medicine market)
   (at pistol weapon_market)
   (at ammunition weapon_market)
   (at heat market)
)
```

```
plan:
listen_to_astronomers_predictions npc home
move_away npc philly salt_lake home
go west npc home market
buy_supplies heat npc market
buy_supplies medicine npc market
buy_supplies water npc market
buy_supplies food npc market
go west npc market weapon_market
check_supplies food water medicine
buy_weapons ammunition npc weapon_market
buy_weapons pistol npc weapon_market
go east npc weapon_market market
go east npc market home
go north npc home bunker1
go north npc bunker1 bunker2
check_weapons pistol ammunition
check_bunker bunker2 npc
outfit_bunker_with_energy_source bunker2 npc heat
enjoylife bunker2 npc
connect_through_social_media_with_family bunker2 npc family salt_lake
```

5. What limitations of PDDL did you encounter that makes it difficult to precisely convert a wikiHow description into PDDL?

   This PDDL package:

   1. cannot deal with **numeric variables**(predicates). When I want to add number of items to indicate whether an item is enough, I can't do that.

   2. cannot represent some **logic relations** e.g. if, or, not equal to. I want to have player select one of inland city to move to and just test 'if' the player is in one of the inland cities, I don't know how to write it simply. And I want to ask the player to let family know if they are not in the same city. I can only use (in ?p ?c1) (not(in ?f ?c1)), I don't know how to write it as if c1!=c2.

6. Could your PDDL be used as an interesting challenge for a text-adventure-style game? If so, how? If not, what would needed to create an interesting challenge?

   I don't think it's a very interesting story. I can be interesting, I think. Then, 1. it should include more characters and objects (e.g. family members, friends, animals, buildings, farms…) that the player can interact with. 2. the plot should be more flexible and include more possible solutions. For example, I guess someone may build a Noah's Ark to save all human and animals.

7. Discuss how you might use GPT-3 to automatically or semi-automatically convert a wikiHow article to PDDL?

   Considering the strict format of PDDL, I would say a semi-automatic model generates the components of the PDDL would be more plausible. We can use GPT3 to generate initial states (could be before or just step1) and goal (could be wikiHow title) first. Then use these to generate actions (could follow the steps). Also we need to generate the types and predicates.