

ASSESSMENT PLAN

How do players progress through the game?

Players progress through the game by completing levels. The first levels focus on exploring the problems and knowing more about the tools that can be used to solve problems. **The final levels will focus on using the tools to create solutions.**

Assessments will grow from the low levels of Bloom's taxonomy (understanding) to higher levels of analyzing, synthesizing, and evaluating the best solutions to implement.

To explore problems, players will drive the test car and immerse in the environment while they receive information from aliens' conversations and feedback.

To know more about tools, players can experiment and observe and figure out how the vector velocity and V-T graphs work.

The final levels will include creating and evaluating solutions to improve traffic and green the city's counters.

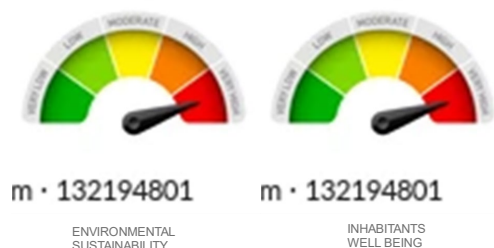
The scoring mechanism is made of 4 counters and levels to measure progress.

There are 2 "learning" counters: physical dexterity and physics skills.

- Learning assessment is formative and takes place during action within levels. The "Physical dexterity" is a completion counter based on task completion. Once completed, the player moves on to the next challenge within the same level. Without essential dexterity, players cannot succeed in solving puzzles. This is a pass/fail step. Fail offers links to more detailed instructions. A team of two alien tutors will provide guidance and feedback along the way.
- The "Physics skills" is a measuring counter related to how a puzzle was solved. There is a 70% pass threshold. **Players can review where they stand as a percentile among the community of players.** Below 70% is a fail. Fail remediation will be provided with links to video tutorials demonstrating how to succeed in more detail (this can be produced by the test team). It is a longer path than figuring out on its own, but players can learn from the tutorials and redo the task until they reach 70%. Feedback from an alien expert can also guide the players as needed. Solving puzzles is the path to the next level (as a summative assessment). Basic puzzles could be random from a database while and more sophisticated puzzles will provide opportunities for more than one solution. Players can evaluate the best solutions. **Players could share their final solutions with the community of players.**



There are 2 "outcome" counters: environmental sustainability and inhabitants' well-being. When players



solve higher-level puzzles, they can improve these counters. They can also analyze why these counters are red when observing the problems at stake in the first levels.

Players can only reach a higher level if they have completed the previous level. Therefore, passing levels is part of the assessment plan.

Aligning assessment with Player/learner persona

Having **tutors** and tutorials for guidance and remediation aligns well with the player/learner persona as they needed tutoring. Guidance and instruction are provided in an optional way. Players are not penalized for using them, but they may feel frustrated as it takes more time than figuring it out independently. Struggling players will feel relieved and empowered that help is available.

Understanding **abstract concepts** is prioritized (over procedural execution) to provide a sense of mastery and increase **self-efficacy and self-confidence** as players have to figure out things on their own and use their brain power to achieve tasks and solve puzzles.

Scaffolding could be implemented so the first tasks and puzzles will have a lower learning curve:

- For example, in level 1, we could have the first task of reaching the first scanning gate and returning to the park. The game will provide optional guidance on how to accelerate, turn, reverse, etc. After the learners receive rewards and feedback on dexterity obtained, then can embark on the entire tour of the city and mountain.
- The first matching puzzle includes more optional guidance and comments that will no longer be there for the following ones.

What are the achievements for accomplishing the learning goal?

Learners will see their "dexterity" and "physics" counter improving and reaching the highest levels. Learners can compare their performance within the community of players. They can replay until they get a percentile that satisfies them.

What are the rewards for accomplishing the game's goal?

Players will see the "environmental sustainability" and "inhabitants' well-being" counters improving and reaching the highest levels.

I would like to introduce a bit more role-playing, maybe having a team of human experts (non-alien) congratulating the player-learner student at the end. Because the student was hired by aliens in the first place, maybe having an encounter between aliens and humans where the student can feel their contribution valued?

Learning objectives: from lower to highest levels of Bloom's Taxonomy.

Rice (2007) provides a practical way to evaluate the game characteristics and its potential to provide learning opportunities at the highest level of Bloom taxonomy. I have used the cognitive viability index to rate my game (as it is now) and see where it stands.

1. Requires users to **assume a role in the game**, rather than simply play.
2. Offers meaningful interaction such as dialogue with NPCs.
3. Has a storyline.
4. Has a **complex storyline with characters users care about**.

5. Offers simple puzzles.
6. Has complex puzzles requiring effort to solve.
7. Uses three-dimensional graphics.
8. Allows multiple views or camera pans and the ability to zoom in and out.
9. Allows different ways to complete the game.
10. Simulates complex processes requiring adjustment of variables by users to obtain desired results or adjusting variables leads to different results.
11. Allows interaction through use of avatars.
12. Avatars are lifelike.
13. Requires interaction with virtual elements within the game.
14. Requires knowledge of game elements beyond mouse prompts, number entry (e.g., combining elements to create new tools, understanding complex jargon).
15. Requires gathering of information in order to complete.
16. Requires synthesis of knowledge in order to complete or successfully engage elements in the game.
17. Environment effectively replicates real world.
18. NPCs display AI characteristics.
19. NPCs display effective use of AI resulting in dynamic experiences for the user.
20. Offers replay ability with varying results.

I have highlighted in grey above the characteristics that my game may not be able to provide. I greyed the line when I was unsure if my game could provide the intended features either by design or due to technical limitations, which I anticipated could be too costly for me to implement.

Overall, my game could obtain a rating of 15 and has good potential, **assuming I can develop the highest levels in a way that provides opportunities for varying results.** This will make the most elevated levels more complex than I had anticipated, but it is also necessary if I want learners to use their knowledge of the velocity vector. The highest levels will not include only straight roads with a couple of intersections. Still, they will include a couple of turns to show how the velocity vector changes direction and how this also influences centrifugal acceleration felt by the driver (see image below).

The story can support this complexity. There will be a couple of alternative routes using different bridges and turns. It will not make the environment different but will reveal the power of vector models as players can elaborate different pathways to solve the traffic problem in various (but still simplified) ways.

