**Pop-Out Essential Question:** *How can we use engineering to provide more access for people with disabilities?*

The role of an engineer is to tackle some of the world’s biggest problems. In doing so, they have created technologies that have completely changed the world we live in. Some of these technologies can improve the way all of us live. However, some technologies specifically try to improve the lives of those with disabilities so they can do some of the same things other people do.

In this unit, you have been thinking about an activity that requires your body to make an object move. What about people who aren’t able to do this physical activity because of a disability? How can we make this activity accessible to as many people as possible? In this Pop-Out, you will research designs that engineers have come up with to make different activities accessible to people with disabilities. You’ll use these as inspiration to brainstorm ideas for your own activity.

**Engage**

When we think of engineers, we often think of adults. However, students can be engineers as well!

1. As a class, watch the following [video](https://www.youtube.com/watch?v=TwCL0BEUXjs) showing how a group of students engineered a solution for a child with a disability: <https://www.youtube.com/watch?v=TwCL0BEUXjs>. Then discuss with a partner:
   1. What need did Cillian have? What problem were the students trying to solve for Cillian?
   2. In what ways did this design solution make the world more accessible for Cillian? How might it benefit other kids and adults?
   3. In what ways do you think the students benefited, learned, or grew from this engineering experience?
2. For your culminating project, you picked an activity that also requires movements. With your group, discuss:
   1. In what ways might your activity be difficult or impossible for some people to do?
   2. Brainstorm some initial ideas of what you could engineer (design) so that more people could do this activity?

**Explore**

Engineers have been working for years to design solutions that make it easier for people with disabilities to do everyday activities, including those that involve moving objects. As a group,

1. Research examples of solutions that engineers have designed to improve the lives of people with disabilities. As you research, record notes in the table below:

|  |  |  |
| --- | --- | --- |
| **Solution** | **How does it help people with disabilities?** | **Would it help a person with a disability do your activity? If yes, how?** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Use your research as inspiration to brainstorm a potential solution to make your Culminating Project Activity more accessible to someone with a disability. Describe your solution below:

**Explain**

1. As a group, prepare a 1-2 minute presentation to share your solution with the class. In your presentation, include:
   * What your activity is
   * What might make this activity difficult for someone with a disability
   * What your solution is and how it helps to solve a problem
   * What research inspired your solution
2. Present to the class, making sure everyone in the group shares.
3. As a class, discuss how some of these solutions might be used for many different activities.

**Elaborate**

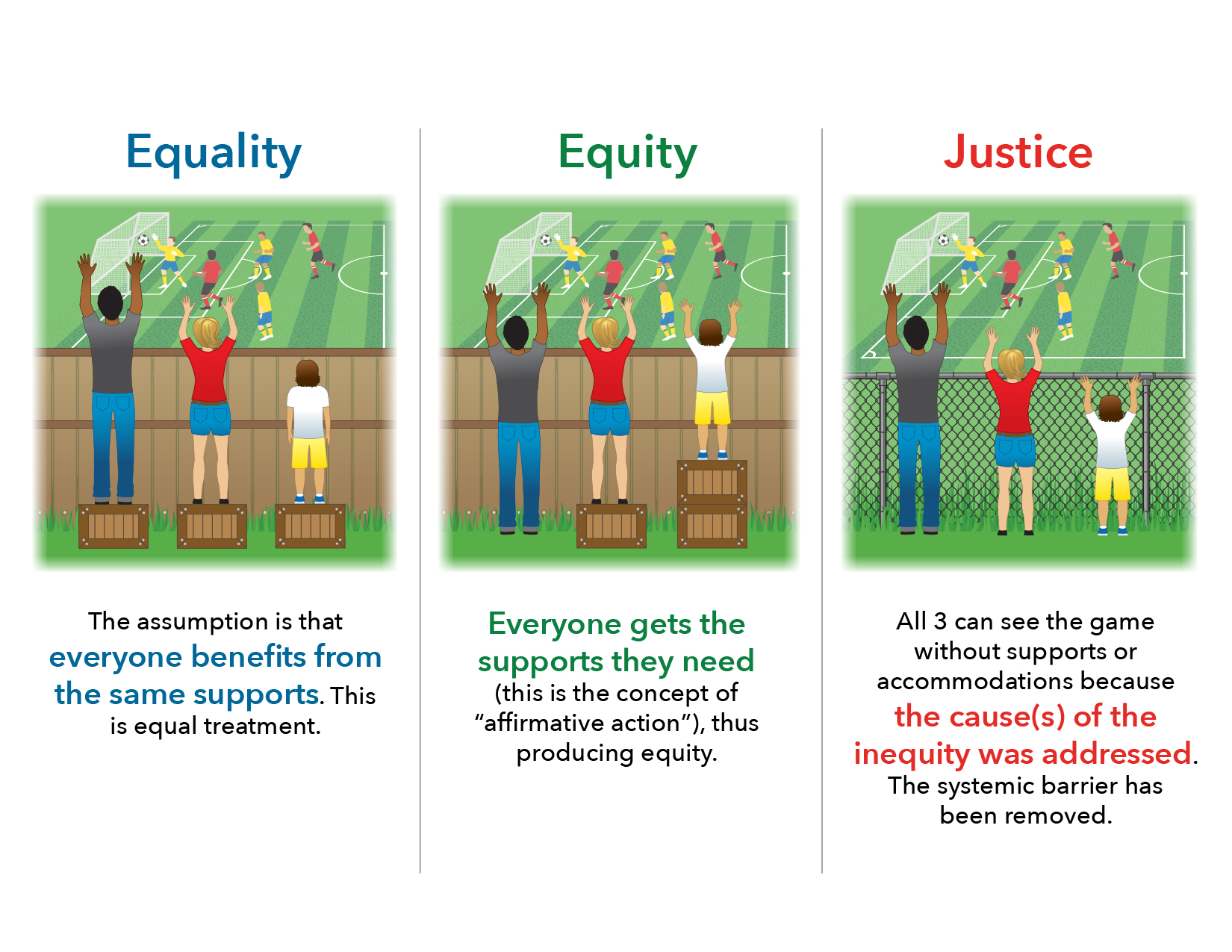
Many of the solutions you researched and presented were engineered to make an existing activity more accessible to people with disabilities. However, what if we instead decided to always try to engineer products and environments to be usable by **all** people from the very beginning?

1. As a class, watch the following video about a new approach to engineering called “Universal Design”: <https://www.youtube.com/watch?v=bVdPNWMGyZY> (5:05 – 10:10).
2. With a partner, discuss:
   1. Describe the example of Universal Design he used in the video.
   2. Can you think of another example you have seen in the world that not only works for people with disabilities, but also for everyone?
   3. Why do you think Universal Design might be a good idea?

**Evaluate and Reflection**

Individually, take a few minutes to think about what you learned in this Pop-Out. Then reflect on the questions below:

1. Look at the pictures and the captions below.



<http://agentsofgood.org/wp-content/uploads/2017/04/Equality-vs-Equity-Illustration3.jpg>

* 1. How do you think the photos show the difference between equality, equity, and justice?
  2. Look at the picture on the left: why can only practicing equal treatment sometimes be a problem?

1. Why do you think it is important for us to practice using equity or justice, instead of just equality?
2. How can engineering be used to promote equity and justice for all human beings?