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Driven by compassion. **Guidé** par la compassion.

CANCER TREATMENT BACKGROUND

MAKERSPACE CHALLENGE INFO SESSION

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Hospital d'Ottawa

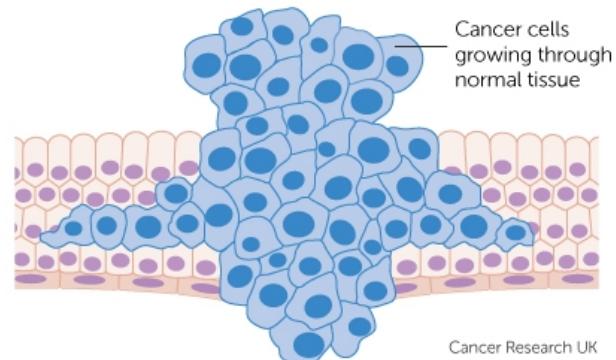
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WHAT IS CANCER

- ▶ Disease caused by uncontrolled division of abnormal cells in a part of the body
- ▶ Multiple random mutations in genes
- ▶ Many different causes (cell types, mutations, aggressiveness)
- ▶ Many different disease -> no one cure



Cancer Research UK

TYPES OF TREATMENT

- ▶ **Surgery**

- ▶ **Radiation therapy**

- ▶ **Chemotherapy**

- ▶ Immunotherapy
- ▶ Targeted therapy
- ▶ Hormone therapy

- ▶ Palliative vs Curative



PATIENT EXPERIENCE

- ▶ Cancer and cancer treatment is **scary**
- ▶ Stressful
- ▶ Uncomfortable
- ▶ Painful
- ▶ Uncertain



CHEMOTHERAPY



- ▶ Systemic treatment: kills cancer cells throughout the body
- ▶ Chemotherapy drugs administered by IV
- ▶ Different schedules: weekly, once, minutes, hours
- ▶ Nausea, hair loss
- ▶ Stressful, uncomfortable, boring

RADIATION THERAPY / RADIOTHERAPY

- ▶ Daily treatments of ionizing (high energy) radiation targeting tumours and avoiding normal / healthy organs
- ▶ 15-20 min per treatment, up to 43 times (usually less than that)
- ▶ Anxiety surrounding radiation
- ▶ Treatment position can be uncomfortable
- ▶ Claustrophobia
- ▶ Some patients require anxiety meds



RADIATION THERAPY / RADIOTHERAPY



VR AS AN EXPERIENCE IMPROVER

Strong body of literature to support use of VR therapy to:

► *Distract from pain/discomfort*

- Schmitt YS, Hoffman HG, Blough DK, et al. A Randomized, Controlled Trial of Immersive Virtual Reality Analgesia during Physical Therapy for Pediatric Burn Injuries. *Burns*. 2012;37(1):61-68. doi:10.1016/j.burns.2010.07.007.A
- Carrougher GJ, Hoffman HG, Nakamura D, et al. The effect of virtual reality on pain and range of motion in adults with burn injuries. *J Burn Care Res*. 2009;30(5):785-791. doi:10.1097/BCR.0b013e3181b485d3
- Kipping B, Rodger S, Miller K, Kimble RM. Virtual reality for acute pain reduction in adolescents undergoing burn wound care: A prospective randomized controlled trial. *Burns*. 2012;38(5):650-657. doi:10.1016/j.burns.2011.11.010
- Morris LD, Louw QA, Crous LC. Feasibility and potential effect of a low-cost virtual reality system on reducing pain and anxiety in adult burn injury patients during physiotherapy in a developing country. *Burns*. 2010;36(5):659-664. doi:10.1016/j.burns.2009.09.005
- Hoffman HG, Patterson DR, Seibel E, Soltani M, Jewett-Leahy L, Sharar SR. Virtual reality pain control during burn wound debridement in the hydrotherapy. *Clin J Pain*. 2008;24(4):299-304. doi:10.1097/AJP.0b013e318164d2cc
- Patterson DR, Jensen MP, Wiechman SA, Sharar SR. Virtual Reality Hypnosis for Pain Associated With. *Int J Clin Exp Hypn*. 2011;58(3):288-300. doi:10.1080/00207141003760595.VIRTUAL
- Li WH, Chung JO, Ho EK. The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer. *J Clin Nurs*. 2011;20(15-16):2135-2143. doi:10.1111/j.1365-2702.2011.03733.x

► *Reduce anxiety, phobias, PTSD*

- Freeman D, Beeve S, Robinson A, et al. Virtual reality in the assessment, understanding, and treatment of mental health disorders. *Psychol Med*. 2017;47(14):2393-2400. doi:10.1017/S003329171700040X
- Maples-Keller JL, Price M, Rauch S, Gerardi M, Rothbaum BO. Investigating Relationships Between PTSD Symptom Clusters Within Virtual Reality Exposure Therapy for OEF/OIF Veterans. *Behav Ther*. 2017;48(2):147-155. doi:10.1016/j.beth.2016.02.011
- Miloff A, Lindner P, Hamilton W, Reuterskiöld L, Andersson G, Carlbring P. Single-session gamified virtual reality exposure therapy for spider phobia vs. traditional exposure therapy: Study protocol for a randomized controlled non-inferiority trial. *Trials*. 2016;17(1):1-8. doi:10.1186/s13063-016-1171-1

CHALLENGE

Create a VR experience for cancer patients to use during treatment:

- ▶ Distract from discomfort, anxiety, pain
- ▶ Turn a difficult time and stressful treatment into a more positive experience
- ▶ Can target chemo treatment, radiation treatment, or both

CURRENT DESIGN CONSTRAINTS

- ▶ No artificial locomotion (VR head moves when real head doesn't and vice versa)
 - Induces nausea
- ▶ Chemo patients are sitting up and can move a bit, controller interaction is possible but they may want a more relaxing experience
- ▶ Radiation patients are lying down: can't look around that much. Small controller interaction (button pushes) are potentially possible → mobile form factors (eg. Oculus Go) may be more appropriate
- ▶ Scheduled focus group with cancer patients in early Jan. to provide more direct patient input which will be relayed

Github Repository

github.com/elishapruner/Makerspace-VR-Challenge

- Github repo has:
 - Source code for workshops
 - Powerpoint slides
 - Links to YouTube videos
 - Competition instructions

Slack Group

makerspacevrchallenge.slack.com

- Main communication platform for the competition
- Directly message me about questions
- I will be posting links for new workshop material
- The group can use it to share useful information with each other

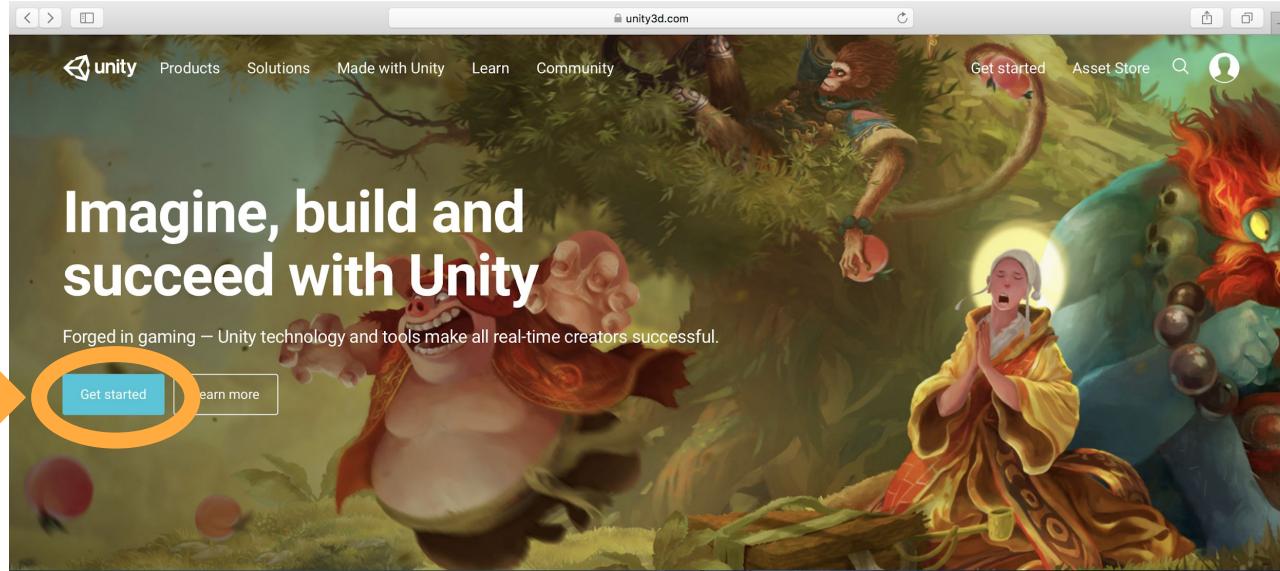
Doodle Poll

doodle.com/poll/uk2mtzqvxd62m8v6

- Poll the best weeknight or weekend time to hold the workshops
- Workshops will be recorded, if you are unable to attend
- Best if at least one member of the group comes to the workshops each week
- One-on-one help with mentors

Installing Unity3D

Go to [Unity3D.com](https://unity3d.com)
Click on “Get Started”



Click on “Try Personal”

store.unity.com

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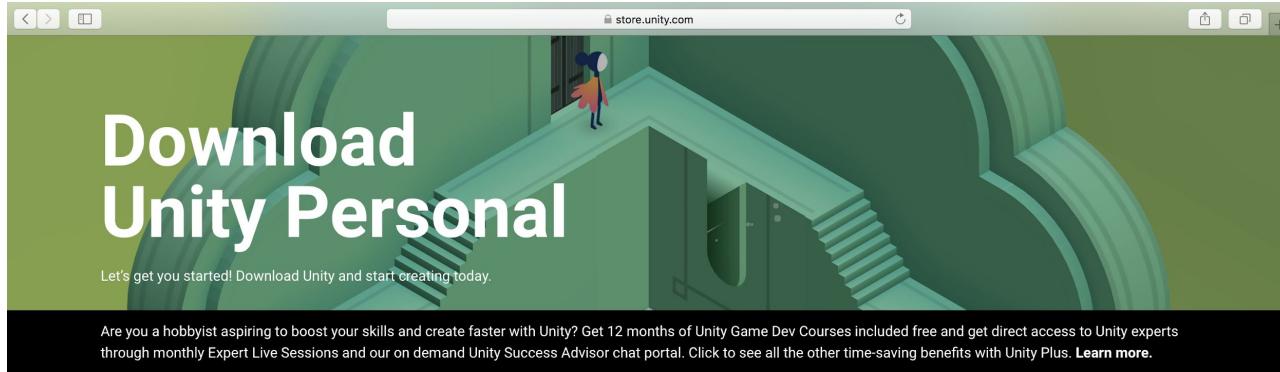
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Download Installer for Mac OS X

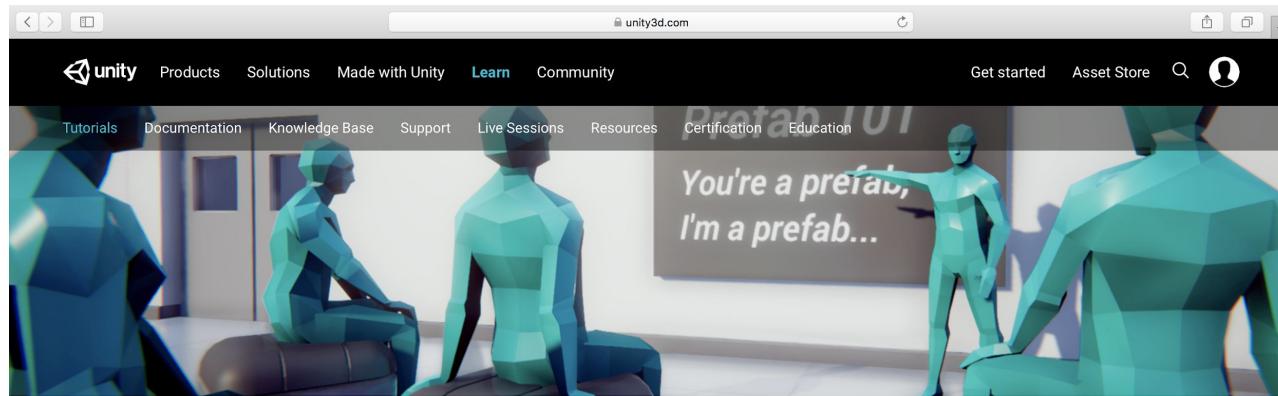
Download Unity Hub

First time using Unity? We'd love to hear about your experience with the Unity Editor.

Sign me up!

Holiday Learning
unity3d.com/learn/tutorials

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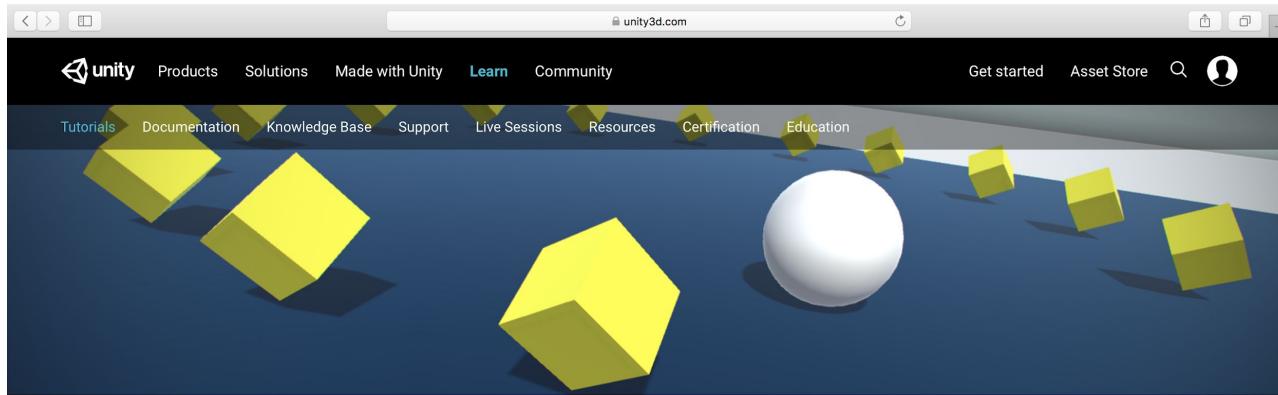
Tutorials > Interactive Tutorials

Interactive Tutorials

Take your first steps in Unity... inside Unity! Our Interactive Tutorial system is a panel inside Unity that teaches you and responds as you learn. These introductory lessons aim to get you familiar with the Unity interfaces and concepts such as Game Objects and Components. You will fix parts of a top down 3D puzzle game and help your character escape each level, learning Unity development as you go.

[Introductory Lessons](#)

unity3d.com/learn/tutorials/s/roll-ball-tutorial



Tutorials > Roll-a-ball tutorial

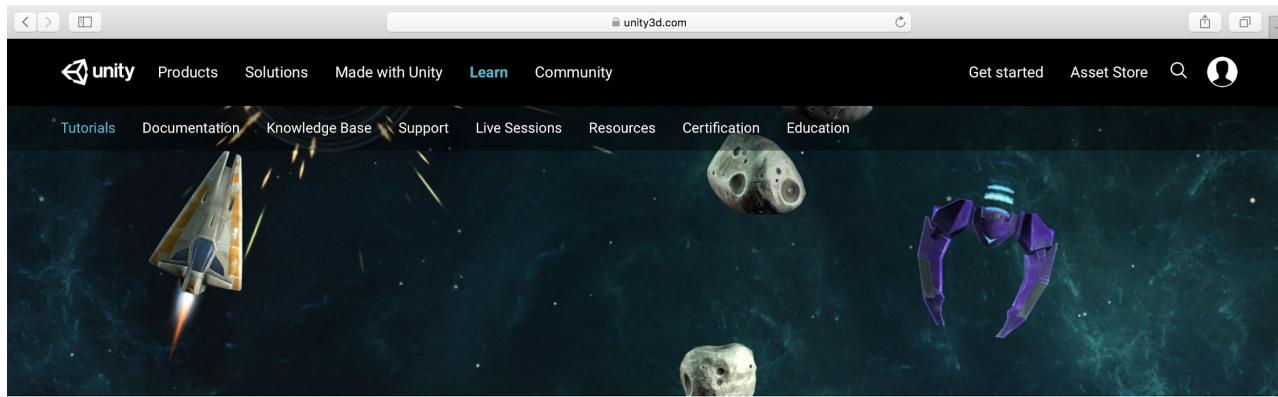
Roll-a-ball tutorial

Create a simple rolling ball game that teaches you many of the principles of working with Unity.

In your first foray into Unity development, create a simple rolling ball game that teaches you many of the principles of working with Game Objects, Components, Prefabs, Physics and Scripting. No asset download required.

Questions? [Ask in the official forum thread here.](#)

unity3d.com/learn/tutorials/s/space-shooter-tutorial



Tutorials > Space Shooter tutorial

Space Shooter tutorial

Expand your knowledge and experience of working with Unity by creating a simple top down arcade style shooter.

Using basic assets provided by Unity Technologies, built-in components and writing simple custom code, understand how to work with imported Mesh Models, Audio, Textures and Materials while practicing more complicated Scripting principles.

[Download the assets for free from the Asset Store here.](#)

[Download the Upgrade Guide to Unity 5 here.](#)

Questions? [Ask in the official forum thread here.](#)

Workshops Schedule

January

Workshops: Week 1

- Download and install unity on your laptops
- Two Popular VR Libraries
 - SteamVR
 - VRTK
- Build some simple interactions with the HTC Vive headset and controllers



Workshops: Week 2

- 3D modelling with SolidWorks
- Intro to modelling 3D parts in SolidWorks
- Exporting 3D SolidWorks models into Unity
- Apply interactions from Week 1 to newly created 3D objects

Workshops: Week 3

- 3D modelling with Blender
- Creating meshes in Blender
- Exporting 3D objects from Blender into Unity
- Apply interactions from Week 1 to newly created 3D objects

3D Modelling Mentors

- Are you a SolidWorks or Blender expert?
- Would you like to teach a tutorial session, or be available to other students as a mentor?
- Send me a message on Slack if you are interesting in helping out