RLP-GAMEB · RLP Video Game Design B — Playtesting, Levels, Launch and the Capstone

# Unit 3: Balance, Monetization and Getting Games to Players

Practice Workbook. The same problems, in the same order, as the Practice sections of the online lessons.

Name _____ Period _____

## Lesson 3.1 — Balance: Fairness, Difficulty and the Numbers Behind Fun

### FLUENCY

1. Symmetric, asymmetric, player-versus-environment or intransitive? (a) chess; (b) a game where each faction has different units; (c) rock-paper-scissors; (d) choosing how hard a boss should be for new players.

2. A weapon deals 20 damage every 0.5 s. Find its DPS, and the quick DPS estimate of time to defeat an enemy with 150 health.

3. Faucet or sink? (a) gold from defeated enemies; (b) paying to repair armor; (c) selling loot to a shop; (d) a fee to fast-travel; (e) a daily login reward.

## APPLICATION

4. The same weapon (20 damage every 0.5 s) attacks the 150-health enemy, with the first hit at 0 s. How many hits are needed and when does the enemy fall? Compare with the DPS estimate.

5. Enemies have 150 health. Find the breakpoints: the smallest damage per hit that needs 8, 7, 6 and 5 hits. Should a player upgrade from 20 to 21 damage?

6. Weapon A deals 30 damage every 1.0 s; weapon B deals 12 every 0.4 s. Show they have the same DPS, then find each one's time to defeat a 100-health enemy (first hit at 0 s). Which is faster?

7. In an online game, players earn far more gold than they can spend and rare items now cost millions. Diagnose the problem and suggest two fixes.

8. A player's power rises much faster than the challenge in the second half of your game. What will players feel, and what is the opposite problem?

### REVIEW

9. Review (Lesson 2.1): how does the sawtooth difficulty curve relate to balancing the player's power against the challenge?

## Lesson 3.2 — Build: A Tunable Health, Damage and Drop-Rate System

### FLUENCY

1. What does each do in the health component: *@export_range(1, 1000)*, *clampi(current - amount, 0, max_health)*, *died.emit()*?

2. A drop chance is 0.2. On average, one drop every how many enemies? What does *randf()* < *drop_chance* do?

3. Define a pity rule and explain what it changes and what it barely changes.

## APPLICATION

4. Health is 40 with max_health 100. What is current after take_damage(55)? Starting again from 40, what is it after take_damage(-80)?

5. With a 20% drop chance and no pity rule, what is the probability of no drop in 10 enemies in a row? About 1 player in how many sees that streak?

6. Code reading: with *pity_limit = 5*, what is the longest possible dry streak? Explain using the line *if misses >= pity_limit - 1 or randf() < drop_chance:*.

7. Find the bug. A student deletes *misses = 0* from the drop branch. What happens after the first time the pity rule fires?

8. A 1,000-trial simulation at a 20% chance gives 214 drops. The standard deviation is √(1000 × 0.2 × 0.8). Compute it and say whether 214 suggests a bug.

### CHALLENGE

9. Explain why exposing drop_chance and pity_limit with @export_range is better than typing numbers inside the function, and what professional teams do beyond that.

### REVIEW

10. Review (Lesson 3.1): an enemy has 100 health and the weapon deals 25 per hit. How many hits are needed, and is 25 a breakpoint for 100 health?

## Lesson 3.3 — Monetization, Loot Boxes and Fair Design

### FLUENCY

1. Name the business model: (a) pay once, own the game; (b) pay monthly for a library; (c) the game is free and sells cosmetic items and a battle pass; (d) pay later for an expansion; (e) a mobile game shows ads between levels.

2. Define loot box and dark pattern.

3. Match each action to its year: Belgium's regulator finds some paid loot boxes violate gambling law; the ESRB adds "In-Game Purchases (Includes Random Items)"; the FTC's settlements with Epic Games.

## APPLICATION

4. A box costs $1.50 and has a 4% chance of the item a player wants. Find the expected number of boxes and expected cost. Then find the chance of having the item after buying 25 boxes (use a calculator).

5. Using the lesson's example (a $2 box with a 1% chance), how much more does a 95% chance cost than a 50% chance?

6. The FTC's 2022 settlements with Epic Games totaled $520 million. Give the two parts, what each was for, and check they add up.

7. Write the strongest one-sentence case for loot boxes and the strongest one-sentence case against, each in terms the other side would accept.

8. A headline says "Study proves games change behavior." Name three questions the lesson says to ask before believing it.

### REVIEW

9. Review (Lesson 3.2): a pity rule caps unlucky streaks for free drops. Would adding a pity rule make a paid loot box fair? Use one fair design principle in your answer.

## Lesson 3.4 — Publishing and Marketing: Web Export, Ratings and the Store Page

### FLUENCY

1. Match each rating body to where it rates: ESRB, PEGI, USK, CERO. What does IARC do?

2. List three ways localization is more than translation.

3. What files does a Godot web export contain, and why does double-clicking index.html not work?

## APPLICATION

4. Check this zip against the host rules in the lesson (index.html at the top level, no more than 1,000 files, no more than 500 MB, no file over 200 MB): it holds a folder named mygame_web containing index.html and 1,240 files, total 380 MB, largest 210 MB. List every problem.

5. Your best screenshot is 1920 × 1080 and you need a 920 × 430 header. What crop size keeps the full width and the header's shape, and what scale factor then gives the exact size?

6. Which of these meet the Steamworks screenshot guidance in the lesson (at least 1920 × 1080, 16:9)? (a) 1280 × 720; (b) 1920 × 1080; (c) 2560 × 1440; (d) 1920 × 1200.

7. A streamer received a free copy of your game and a payment to play it. What must happen under the FTC's Endorsement Guides, and why does it matter to viewers?

8. Explain the roles of developer, publisher and platform holder, and what happens to a publisher's advance.

## CHALLENGE

9. A game's .wasm file is 36 MB. Using the Godot documentation's rule of thumb, about how big is it after gzip? Why might that not help on itch.io, and what should you do instead?

## REVIEW

10. Review (Lesson 2.4): list two accessibility features you would put in the store description, and why players need them listed.

## Unit 3 checkpoint

1. Enemies have 100 health. Which upgrade changes the number of hits needed?
   A. 13 to 14 damage
   B. 15 to 16 damage
   C. 19 to 20 damage
   D. 21 to 22 damage
2. A weapon deals 15 damage every 0.5 s, so its DPS is _____. Against 100 health it needs _____ hits.
3. True or false: Repair costs and shop purchases are faucets in a game economy.
4. Why does the health component emit signals instead of updating a health bar directly?
   A. Signals are required by Godot
   B. So any listener can react and the component can be reused anywhere
   C. To make health go down faster
   D. Health bars cannot read variables
5. With a 25% drop chance, the average is one drop every _____ enemies. With pity_limit 6, the longest possible dry streak is _____ misses.
6. True or false: A pity rule raises the average drop rate a great deal while leaving the worst case unchanged.
7. A $2 box has a 5% chance of the wanted item. On average it takes _____ boxes, costing $ _____.
8. Which is a fair design principle from the lesson?
   A. Hide the odds so players stay excited
   B. Target random purchases at children
   C. Show real prices and odds
   D. Punish players who do not pay
9. A release in the United States, Europe and Japan involves which rating bodies?
   A. ESRB, PEGI and CERO
   B. ESRB only
   C. USK only
   D. None for digital games
10. True or false: A Godot web export runs correctly when you double-click index.html.
11. A store wants 920 × 430 and you have a 1920 × 1080 screenshot. What should you do?
    A. Stretch it to 920 × 430
    B. Crop to the header's shape, then scale down
    C. Set 300 pixels per inch
    D. Upscale a small thumbnail