

R&D Capabilities at the UCIrvine Game Lab

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www.ucgamelab.net

Our Goal

- Explore and establish foundations for cooperative research and development partnership with DSC, UCI Game Lab, and Creative Kingdoms
- Starting with the DSC Dinosaur Game Exhibit and Online Interaction

Opportunity Areas

- Game R&D at UCI Game Lab
- Science Learning games and game-based exhibits at the Discovery Science Center

UCI Game Culture & Technology Lab

- Established in 2002.
- Laboratory devoted to exploring alternative applications and contexts for computer gaming
- Affiliated with Calit2, UCI's largest interdisciplinary institute devoted to inventing the next generation of the Internet and its applications
- Focusing on collaborative game play giving rise to persistent online communities of practice

UCI Game Lab People (Faculty)

- *Arts*: Robert Nideffer, Antoinette LaFarge, Chris Dobrian
- *Computer Science*: Paul Dourish, Magda El Zarki, Dan Frost, Gloria Mark, Bonnie Nardi, Andre van der Hoek
- *Engineering*: Tara Hutchinson, Falko Kuester, Joerg Meyer
- *ACE*: Simon Penny, Bill Tomlinson
- *Humanities and Social Science*: Tom Boellstorff, Peter Krappe
- *ISR*: Walt Scacchi, Celia Pearce

Game Lab People

- [Sky Frostenson](#): Art, Computation & Engineering (ACE)
[Adrian Herbez](#): Art, Computation & Engineering (ACE)
[Eric Kabisch](#): Art, Computation & Engineering (ACE)
[Eric Cho](#): Art, Computation & Engineering (ACE)
[Derric Eady](#): Studio Art
- [Nick Urrea](#): Information and Computer Science
[Kenny Lai](#): Information and Computer Science
[Mirko Kiric](#): Information and Computer Science
[Alex Szeto](#): Information and Computer Science
[Dan Repasky](#): Studio Art
[Andrew Khoury](#): Information and Computer Science
[Young Kang](#): Information and Computer Science
[James Jennings](#): Information and Computer Science
[Annie Jiu](#): Information and Computer Science
- UC San Diego Supercomputer Center
[Steve Cutchin](#): Visualization Services Manager
[Natalie Rubin](#): Game Grid Website Developer
[Tak \(Sunny\) Chu](#): Game Grid Lead Programmer

Game Lab Partners

- California Institute for Telecommunications and Information Technology at UCI--*Cal(IT)*²
- Center of Graphics, Visualization, and Imaging Technology (Center of GRAVITY at UCI)
- Institute for Software Research at UCI
- Center for Educational Partnerships at UCI
- San Diego Supercomputer Center
- Discovery Science Center
- Digital Industry Promotion, Daegu, Korea
- Sun Microsystems
- Butterfly.net (now Emergent Game Technologies)
- and others

Current Lab Projects

- Heterogeneous game networks (Robert Nideffer)
 - *Unexceptional.net* (multi-platform, location-based (GPS), blog-based game)
 - *Blah-Blah-Blah* (text-speech-text, cell-phone based game)
- Science Learning games (Walt Scacchi)
 - *DSC Dinosaur Game* ((Virtual) exhibit-based, physical interaction life science discovery game with DSC)
 - *Earthquake 2020* (Earthquake Engineering modeling, design, and simulation game)
 - *Game Research Grid* (grid-based, massively multi-player science learning games and community-oriented game venues)

Current Lab Projects

- Autonomous character games (Bill Tomlinson)
 - *Virtual Raft* (interactive wireless tablet PC-based game examining anthropomorphic migration)
 - *EcoRaft* (interactive wireless tablet PC-based game examining restoration ecology)
- Earth systems games (Falko Kuester, Celia Pearce, Charlie Zender)
 - *Earth Systems Science Game Engine* (high resolution visualization and navigation of very large earth systems data sets)
 - *Spaceship Earth* (global earth systems modeling and simulation game)
- Software engineering games (Andre van der Hoek)
 - *SimSE* (team-based software development role-playing game)

Informal Science Education as a Game Grid Community?

- Science Games
- Game-based Science Learning LAN/Grid Parties as venue for Higher Education

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FOR
EDUCATORS



Related Research

- Free/Open Source Software Development for Games
 - *Fifth* most popular area for F/OSSD with >10,000 projects on SourceForge.org
 - Tools, techniques, and concepts for
 - Game development (e.g., game modding)
 - F/OSS-based game development
 - Online community development
 - Emerging game grid domains (physical sciences, nanotechnology, visual/performing arts, massively multi-participant worlds for living narratives, GameCons, etc.)
- can be brought together for mutual benefit.

What we are doing: The DSC Dinosaur Game Project

What we're doing?

Five phase program for developing and deploying *informal science learning games* at DSC designed to scale to massive, multi-player game worlds and online science learning communities

How we're doing it?

- **Phase 1:** Conduct design study for two dinosaur-based, CA science education standards compliant, science learning games
- **Phase 2:** Implement, test, deploy, document, and evaluate age/grade/skill-level targeted games at DSC
- **Phase 3:** Integrate Web-based information infrastructure to enable remote science learning games tied to incremental (skill/learning) evaluation, and continuous content improvement/update
- **Phase 4:** Develop and deploy new science learning games built on this infrastructure operating at DSC (and elsewhere)
- **Phase 5:** Transition game infrastructure to grid-based, enabling large-scale, multi-player science learning games

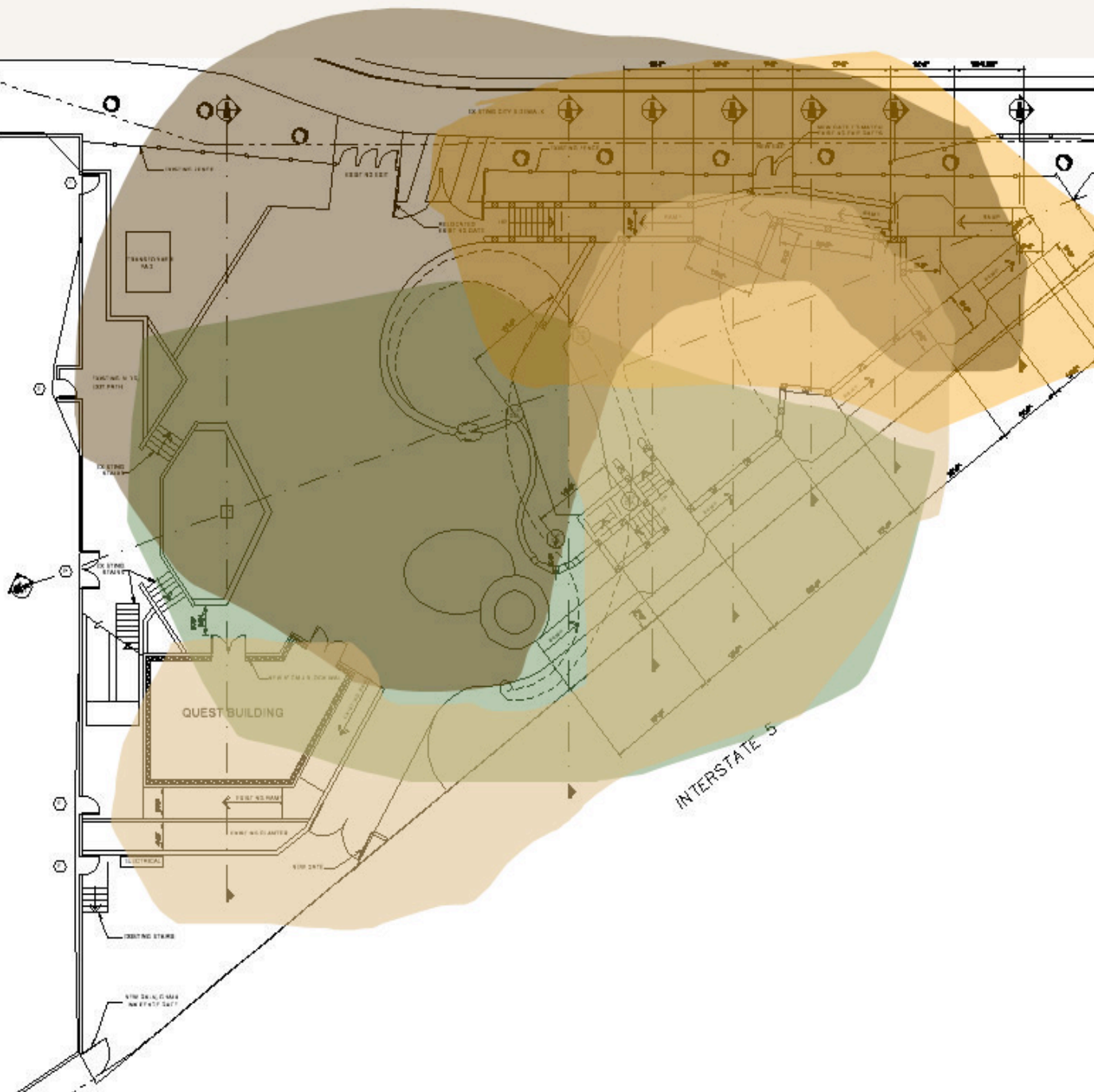
The Concept

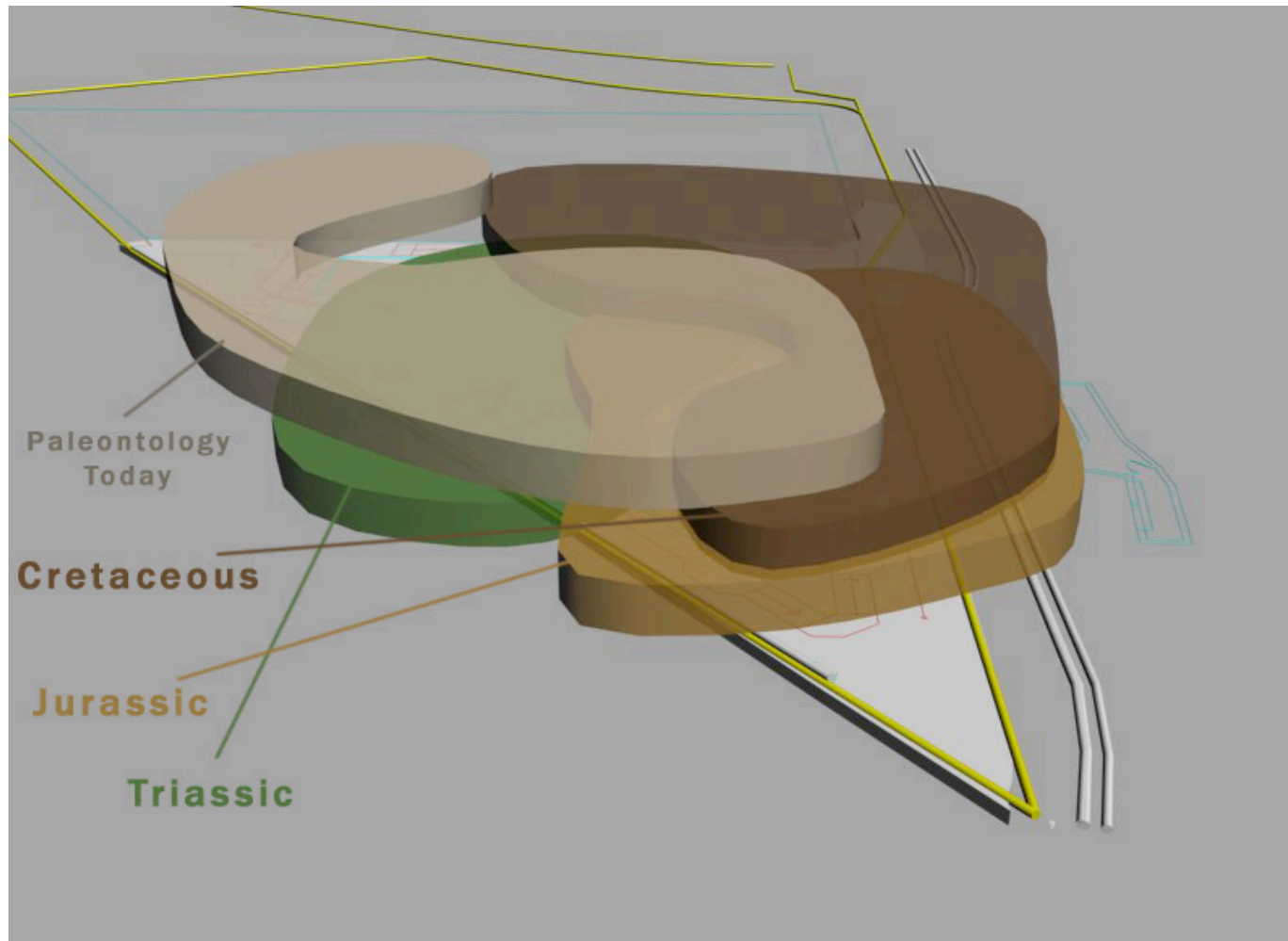
Overview

- *Backstory* -- Dinosaur treasure hunt and quest
- *Physical exhibit* -- Paths to dinosaur exhibit learning task activation interfaces
- *Game play* -- Performing the science learning tasks and receiving intrinsic and extrinsic rewards
- *Reward* -- Activation scoring and game-based reward (animation and audio of dinosaur coming to life; revealing new game play levels)
- *Evaluation* -- Tracking visitor game play progress, activations, skill accomplishments, and rewards
- *Redemption* -- Exchanging accumulated reward or activation points for collectible goods.

Concept

- Linking physical exhibits to online game environment
- Maps as guide to experience and future activities
- Maps locate “mesozoic island worlds” within game
- Uncovering and enacting discovery stories
- Rewards come in the form of activating regions on maps that highlight opportunities for more discoveries in online game





*Illustrating Island zones relationship
to DSC Dinosaur exhibit space*

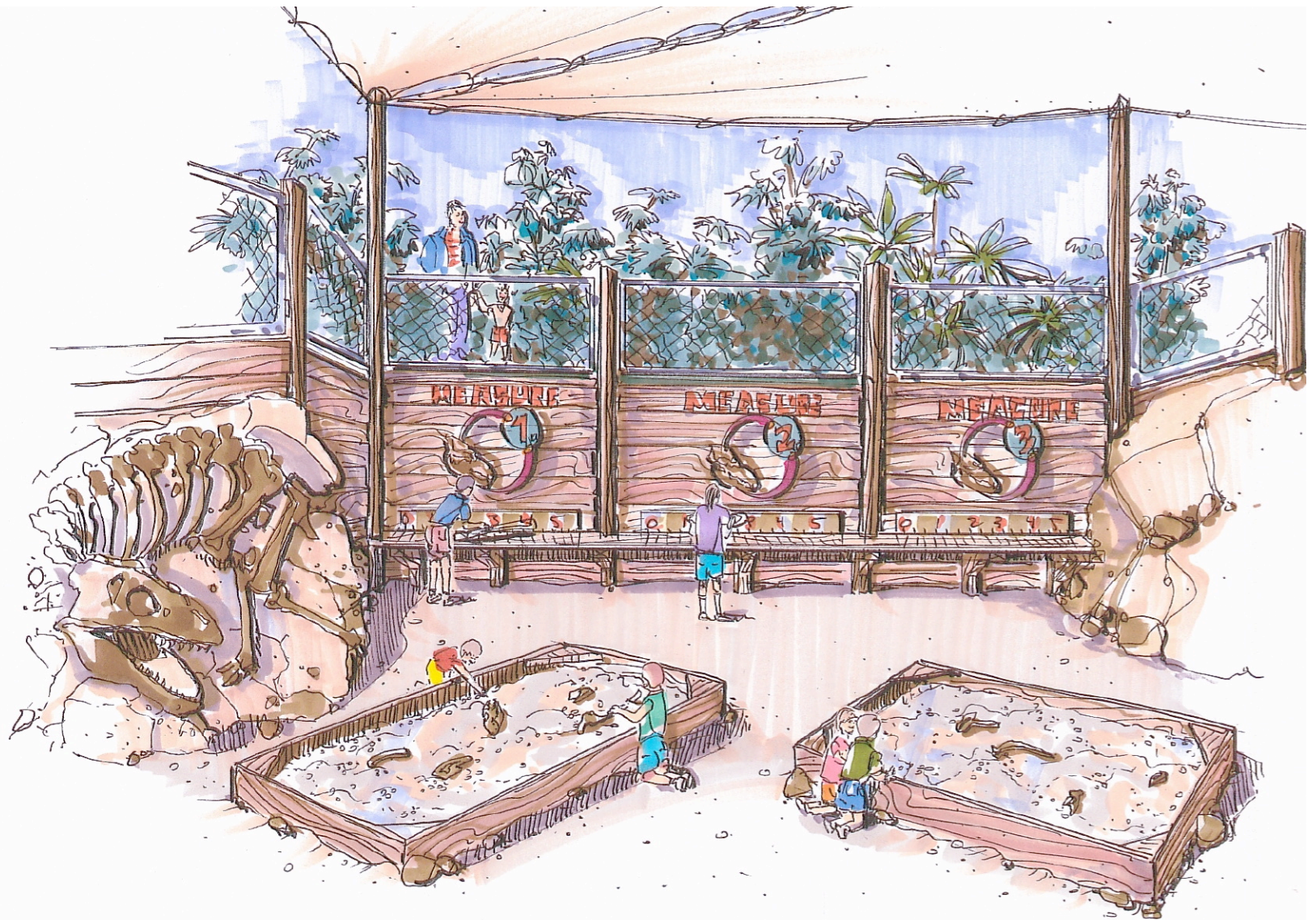
Game-map concept

- *Game map* –
 - Denotes correspondence from physical Dinosaur exhibit to online game environment
 - Illustrates activation of island worlds that signal completion of science learning tasks
- Other types of in-game or on-site “learning maps” may be provided
 - Family trees, piece assembly puzzles, etc.

User Experience and Game Play Scenarios

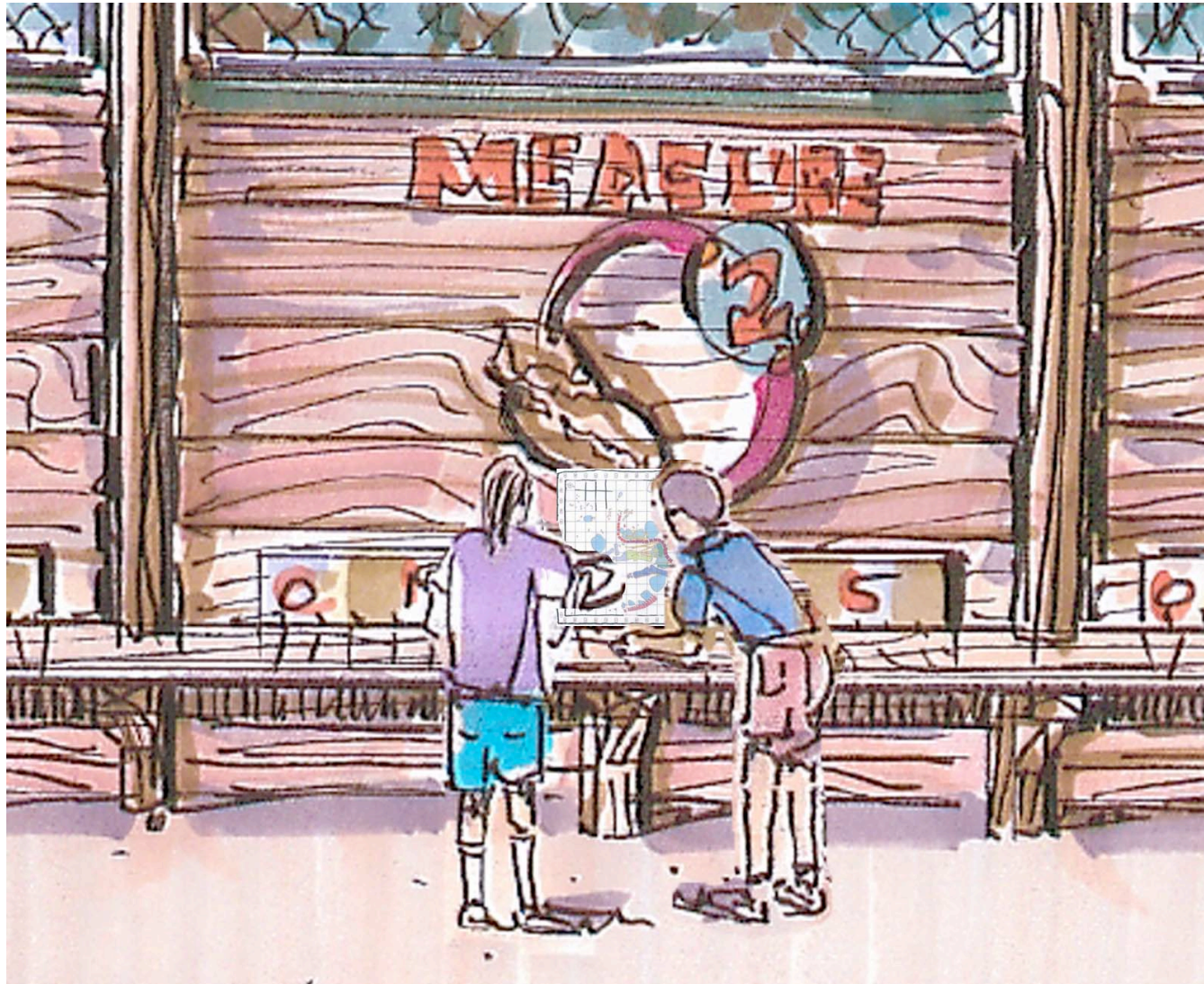
Fossil Dig:

Finding, measuring, identifying, and
assembling dinosaur bones



DINO DIG PIT AREA

© 04



Physical interaction

- Discovering fossil bones (digging)
- Measuring bones
- Identifying bones
- Placing bones into skeletal mold table
 - This triggers a signal that the task has been accomplished, activating the map region for that user

Online interaction

- Player sees virtual representation of fossil dig pit and skeletal silhouette
- Emerging skeleton shows bones that were placed while in physical and online environment
- Player can complete skeletal reconstruction fully activating map region
- Activity events stored in centralized database at DSC on an individual/group level
- Upon activation, creatures animate and progressively “come to life”

Addressing science education standards

- Communicate about investigations
- Understand that learning can come from careful observations and simple experiments
- Recognize how factors such as gravity can affect common objects
- Describe an observed change in terms of starting conditions, ending conditions, using words, simple diagrams, or graphs
- Identify what does and does not change when matter experiences an external influence such as push, pull, tip.

Transition and Discussion

- Robert will discuss integration opportunities, and Alex will present some game play scenarios
- We welcome your questions and comments.
- We want to explore with you the Opportunity Areas and how we might best pursue them with the Discovery Science Center, UCI Game Lab, and Creative Kingdoms