# Building a Flash game

**Project Overview**

In this project, student teams use their client-approved design documents for the technical build of a game. Teams will learn about technical features to enhance the look and feel, consistency, and usability of their games. They will also learn how to conduct technical and usability tests of their client games and make any necessary revisions.

The focus of this project is for students to develop reusable content, templates, and assets based on the game principles described in their design documents and production storyboards. The emphasis is on collaboratively building games for their clients. Each team will test and deploy its game, make any necessary revisions based on client review, and then redeploy the game and present it to their client. Finally, teams will present their game in a class-wide game fair.

*Student product:* Client game

**Note:** Portions of this project align to the Adobe Certified Associate objectives. Within the instruction steps and technical guides, the specific learning objectives for the exam(s) are referenced with the following format: [1.1]

## Project Objectives

At the completion of the project, students will have developed the following skills:

**Project management skills**

• Following and executing a project plan
• Following and executing a design comp and story-board
• Following up and following through on roles and responsibilities
• Defining and prioritizing tasks
• Producing deliverables and meeting deadlines
• Executing a review and redesign cycle
• Executing technical tests

**Design skills**

• Providing consistency and accessibility
• Creating templates and reusable designs
• Adapting content for readability and emphasis
• Designing for multiple screens and outputs
• Considering screen size and device requirements
• Designing a usability test

**Research and communication skills**

- Communicating ideas clearly
- Presenting a game to a group
- Connecting goals of the game with user interaction and experience
- Assessing team's technological developer skill level
- Critiquing designs
- Providing meaningful but not overly critical feedback
- Listening and interpreting information and feedback
- Demonstrating the realization of redesign goals
- Conducting usability analysis
- Creating technical tests

**Technical Skills**

*Photoshop*

- Resizing images
- Rotating images
- Cropping images

*Illustrator*

- Creating vector artwork
- Using Image Trace to convert photos to vector artwork
- Comparing vector and bitmapped images

*Flash*

- Using drawing tools
- Working with graphic files
- Creating and modifying text
- Working with text and text effects
- Understanding file types
- Working with graphic files
- Working with layers
- Organizing layers and libraries
- Creating folders and labels
- Creating and working with symbols

- Creating and working with instances
- Creating interactive buttons
- Creating transparent buttons
- Importing and compressing audio
- Importing images
- Optimizing images
- Using Trace Bitmap
- Producing Flash video
- Creating templates
- Using basic ActionScript
- Writing ActionScript
- Using Code Snippets
- Identifying function, event handlers, and listeners
- Using animation methods
- Creating Timeline effects
- Creating character animations
- Using sprite sheets
- Using motion presets
- Saving and using motion presets
- Testing movies
- Creating accessible Flash content
- Resizing and re-scaling Flash content
- Using the Device Simulator
- Publishing Flash documents
- Publishing mobile applications

**Project Activities**

- *Activity*: Editing images and graphics
- *Activity*: Importing and organizing content in Adobe Flash Professional
- *Activity*: Creating content by using Adobe Flash Professional
- *Activity*: Working with animation techniques
- *Activity*: Getting started with ActionScript
- *Activity*: Testing and publishing a Flash project
- *Activity*: Design project review and redesign
- *Activity:* Presenting design projects

## Background preparation resources

Technical and content information

Keywords

ISTE NETS*S Standards for Students

Adobe Certified Associate objectives

1. Explain that in this project, students will use their design documents and storyboards from Project 2 to build, test, and publish their client games using Adobe Flash Professional. Introduce the goals of the project:

   • Create and test a Flash-based game

   • Design for multiple screens

   • Conduct technical and usability tests

   • Publish and present a game in a game fair

2. Remind students to continually refer to and assess their project plans throughout the site build to make sure they are on task, team members are aware of responsibilities, and deliverables are completed by the expected due dates. If this is the first time they are working with Flash begin with the *Getting started with Adobe Flash Professional* activity.

| | |
|---|---|
| 3. *Activity*: Editing images and graphics (Suggested time: 100-150 minutes) | ACA Exam Objectives: 5.4, 2.1, 2.6, 3.1, 3.2, 3.3, 4.1, 4.3, 4.4, 4.5, 5.1, 2.5, 3.4, 4.4, 4.6 |

Follow these steps to utilize this activity for this project:

a. Use this activity to teach your students how to edit images and create graphic elements using Photoshop and Illustrator by discussing the difference between vector and bitmap images and demonstrating how to create vector artwork, how to adjust colors, and how to crop, rotate, resize, and transform images and graphics.

b. Ask students to use Photoshop and/or Illustrator to create any common graphic elements from their final comps, such as creating a character in Illustrator. Remind them that the look of their graphics should coordinate with their game designs.

**Note:** If your students have not worked with Photoshop or Illustrator it is recommended to first complete the *Getting started with Adobe Photoshop* and *Getting started with Adobe Illustrator* activities. Alternatively, you can skip this step and have students create game content by using the Flash Professional drawing and text tools (see Step 5).

| | |
|---|---|
| 4. *Activity:* Importing and organizing content in Adobe Flash Professional (Suggested time: 50–100 minutes) | ACA Exam Objectives: 2.5, 3.3, 3.7, 3.8, 4.3, 4.6, 4.7, 4.8, 4.12, 4.13 |

Follow these steps to utilize this activity for this project:

a. Use this activity to introduce how to import images, sound, and video, create buttons, and work with symbols.

b. Ask students to import asset and graphic elements created in Photoshop and/or Illustrator into Flash and store them in the library for later use throughout the game. Encourage them to create as many reusable assets and graphics as possible and use them across their games.

c. Ask students to turn assets into symbols with instance names and buttons necessary for their game.

5.  *Activity:* Creating content by using Adobe Flash Professional

    ACA Exam Objectives: 3.8, 4.2, 4.3, 4.4, 4.5, 4.9

    (Suggested time: 100-150 minutes)

Follow these steps to utilize this activity for this project:

a.  Use this activity to introduce drawing tools, how to work with bitmaps, how to optimize file sizes, and how to create and modify text.

b.  Ask students to create any additional game assets and graphics necessary for their games. Remind student to do the following:

    • Determine the correct file type for graphics
    • Create graphics that use a combination of drawing, shapes, color, and masking techniques.
    • Make sure graphics are turned into symbols with instance names.

6.  *Activity:* Working with animation techniques

    ACA Exam Objectives: 4.2, 4.6, 4.8, 4.10

    (Suggested time: 100-200 minutes)

Follow these steps to utilize this activity for this project:

a.  Use this activity to introduce how to create interesting visual effects and transitions using the Timeline, classic tweens, motion tweens, graphic filters, and motion presets.  Additionally teach your student how to create character animations using inverse kinematics and sprite sheets.

b.  Explain that students will now animate their graphics. Explain the following, depending on the type of games they create:

    • For a drag-and-drop game, students can decide to animate any of the movable items. For example, if they have a face, they can animate the eyes, nose, and mouth.
    • For a simple character-movement game, they can animate jumping, climbing, or other movements.
    • For all games, they can animate the background so it scrolls through the same or multiple scenes.

**Note**: If your students have not worked with animation before it is recommended that you begin with the *Getting started with animation* activity.

7.  *Activity*: Getting started with ActionScript

    ACA Exam Objectives: 4.11

    (Suggested time: 100-150 minutes)

Follow these steps to utilize this activity for this project:

a.  Use this activity to teach your students how to understand ActionScript, how to use Script Assist and code snippets, how to use Event handling, and how to use ActionScript to create movement and interaction in games.

b.  Building on the basic concepts of ActionScript, discuss and demonstrate some basic game features students can create by using ActionScript. As you go through the game features, have students identify how functions, event handlers, and listeners are used in the following examples:

    • How to give a button an action such as stop or play again

- How to drag and drop items
- How to add point scoring
- How to add character movement
- How to move objects across the screen
- How to create a timer

c. Allow each team time to add ActionScript to their games.

8. Using the skills they have learned ask students to continue to build their client games and prepare an initial prototype version for client review. One way of doing this, especially if you want students to learn specific technical techniques to prepare for the Adobe Certified Associate, Interactive Media exam, might be to have them build test game screens or sample features to show their clients how the technical features would be implemented or as a learning exercise for students to complete.

9. At this juncture it is recommended that students show their clients the prototype they have built so far. Remind students of what they learned in the *Working with clients* activity.

10. Allow students time to make any changes to the games as required by the client review begin to finalize their client game, in preparation for technical and usability testing.

11. *Activity*: Testing and publishing a Flash project        ACA Exam Objectives: 1.3, 2.3, 4.14, 4.15, 5.1, 5.2
    (Suggested time: 100-200 minutes)

Follow these steps to utilize this activity for this project:

a. Use this activity to teach your students how publish and test movies, implement accessibility standards, and publish mobile applications.

b. Explain that students should now test their game to make sure it is functioning properly. Explain that they need to test the desktop version of their game. (They will create and test the mobile version of their game later in this project.) Have each team test their game by playing the movie and seeing if it is getting stuck anywhere. If they are getting stuck, make sure they review keyframes, instance names, and ActionScript.

c. Once students have tested the FLA files, demonstrate how to set publishing settings and how to publish a preview of the game, for the desktop version of the game. Ask students to test their game previews to find any problems and revise the ActionScript as necessary.

d. Allow students time to revise their games as necessary, testing their games after each revision to make sure any problems have been solved.

12. Once the game functions properly, explain that they will now create the opening screens for their games, including instructions and a play button. Remind to refer to the outline of instructions they created in their *Game design planning* worksheet and there reason they are creating them now is so they don't have to move through it each time they test the game, which could be frustrating.

    **Note**: If necessary review how to work with text in the *Creating content by using Adobe Flash Professional* activity.

13. Ask students to create and conduct usability tests of their games for the desktop version. Ask teams to revise their games and game instructions based on the information from the usability tests.

| 14. *Activity:* Design project review and redesign (Suggested time: 50–100 minutes) | ACA Exam Objectives: 1.1, 2.6, 1.1, 1.4, 1.1, 2.6, 1.1, 1.6, 1.1, 1.4, 1.1, 1.4 |

Follow these steps to utilize this activity for this project:

a. This activity introduces students to conducting a review and redesign cycle. In this project, students will conduct the review and redesign with the client.

b. Remind students of what they learned earlier in the *Working with clients* activity and ask students to prepare a presentation for the client that includes some or all of the following:

   • How their games address the client's goals, audience, and requirements
   • Question-and-answer session in which the client gives feedback

c. Ask the clients to give feedback to each team.

d. Ask teams to revise the games based on client feedback and resubmit them until they receive final approval of the desktop version from their client.

15. Once the desktop version of the game has been finalized return to the *Testing and publishing a Flash project* activity and demonstrate how to resize content for multiple screens, test their mobile applications, use the Device Simulator, and publish a mobile application.

16. Using the finalized desktop version of the game, ask student to do the following to create a mobile version:

   • Resize the game content by either creating a new version, or using adaptive and manual scaling or ActionScript to resize the existing game version.
   • Create a mobile version of the desktop game for an Android or iOS device.
   • Test the mobile version of the game and, time permitting, conduct a usability test.
   • Review the instructions and make any necessary revisions for the mobile version.
   • Publish the final versions of the desktop and mobile versions of the game.

| 17. *Activity*: Presenting design projects (Suggested time: 50-100 minutes) | ACA Exam Objectives: 2.6, 1.4, 2.6, 1.6, 1.4, 1.4 |

Follow these steps to utilize this activity for this project:

a. This activity introduces your students to presenting their work to a variety of audiences, including clients. Use the tips in this activity to help your students learn how to communicate their ideas clearly.

b. Ask your students to present both versions of their final games to the clients, explaining how the game accomplishes the client goals.

18. Explain that each team will now submit their games to a class-wide game fair. In preparation for the game fair ask your students to do the following:

   • Create a booth where visitors learn about and play their game.
   • Create a basic poster advertising their game - encourage students to reuse graphics from their games for their game posters.

19. Select a class period and ask each team to set up their game fair booth with their poster. Explain that teams can play each other's games, taking notes on the games to provide feedback.

20. At the conclusion of the game fair, or during the next class period, ask students to share feedback on the games they played. Remind them to be respectful in their critiques. If necessary, review the *Peer review* activity.

## Extension Activities

You can extend the project in the following ways:

- *Technical help in the classroom*: To encourage students to develop self-sufficiency, you can assign a small group or pair of students to research challenging skills and present their findings to the class. Ask them to define key terms (such as optimization) and to explain the relevance of these terms to the task at hand. Then ask students to give a three- to five-minute oral report at the beginning of class, demonstrating the skill and reporting their findings.

- *Peer teaching*: If some teams use a guide to learn about a technical feature, have them hold a mini-seminar to teach the rest of the class. Their presentation could include the following:
  - A working example
  - Short explanations of when and why to use the feature (design challenges it helps to solve)
  - Step-by-step demonstration of how to use the feature

- *Using local experts*: Assign students as resource specialists. For example, have four students act as local experts to help others use a software application. With these extra hands and heads, you will be able to manage the classroom without being the sole software expert. As students become more familiar with the software, more students will be able to serve as local experts.

- *Distributed skill-building*: Another way to teach Flash skills is to distribute skill expertise among the students. Demonstrate and briefly introduce skills such as creating graphics, creating symbols and instances, using text and text properties, and using ActionScript. Following this brief introduction, divide the students into small groups and ask each group to become experts for one of the skills, applying it to an animation they create. After they have mastered their specific skill, ask each group to present the application of the skill to the class and explain their methodology. This explanation and presentation will help others understand how to use the technique while they continue to work on their content pages.

- *School game fair*: In addition to, or instead of, a classroom game fair, conduct a school-wide game fair where students and parents can come on a dedicated day or night to learn about and play student-created games.

- *Collaborative assessment*: Co-develop a rubric with your students during the design phase to be used for peer feedback and to promote discussion about game design and the importance of individual elements in the whole game. While developing the rubric, discuss and explore the essential features and elements of a successful game and the importance of each element of the game and how they work together. For example, when designing the rubric, a student may suggest that high-quality graphics are the most important thing in creating an excellent game. This could lead to discussions about whether a game can still be a great game with lower quality graphics but quality game play.

## Assessment

This is a high level view of what student should create during this project. Refer to the assessment rubrics in each activity for more detailed/specific assessment rubrics for each part of the project.

| | 0 – Does not meet expectations | 3 – Meets expectations | 5 – Exceeds expectations |
|---|---|---|---|
| Drag-and-drop Flash game | Absent or incomplete. | The drag-and-drop Flash game has clear audience, goals, rules, and outcomes. The game includes an introductory screen with a play button, a pause and stop button, a play again button, and five drag-and-drop objects. | The drag-and-drop Flash game has clearly defined audience, goals, rules, and outcomes. The game play and rules are intuitive and fun. The game includes a well-written introductory screen with a play button, a pause and stop button, a play again button, and six or more drag-and-drop objects. The game includes one or more optional features, such as scoring, timer, multiple players, or bonus features such as extra points or time. |
| Character-movement Flash game | Absent or incomplete. | The character-movement Flash game has clear audience, goals, rules and outcomes. The game includes an introductory screen with a play button, a pause and stop button, and a play again button. The game character navigates a course and needs to jump, climb, or avoid objects. | The character-movement Flash game has clearly defined audience, goals, rules and outcomes. The game play and rules are intuitive and fun. The game includes a well-written introductory screen with a play button, a pause and stop button, and a play again button. The game character navigates a course and needs to jump, climb, or avoid objects. The game includes one or more optional features, such as scoring, timer, multiple players, or bonus features such as extra points, time, or lives. |
| Time management | Absent or incomplete. | Student allots time for each phase of the design and development process. Completes most phases on schedule. | Student thoughtfully and effectively allots time for each phase of the design and development process. Completes all phases on schedule. |

## Background preparation resources:

- To view video tutorials aligned with the skills required to complete this project, visit Adobe TV: http://tv.adobe.com
- For more teaching and learning resources on the topics in this project, search for resources from the community on the Adobe Education Exchange: http://edex.adobe.com
- For an overview of the interface and for more information on the technical aspects of *Adobe Flash Professional*, see *Flash* Help.
- For an overview of the interface and for more information on the technical aspects of *Adobe Photoshop*, see *Photoshop* Help.
- For an overview of the interface and for more information on the technical aspects of *Adobe Illustrator*, see *Illustrator* Help.

## Keywords:

- ActionScript
- class
- code snippet
- event handling
- function
- input
- instance
- method
- object
- property
- variable

## ISTE NETS*S Standards for Students

This project is aligned to the ISTE NETS*S Technology Standards. Depending on the subject and content area the student selects you may research your own state content standards to see how this project aligns to your state requirements.

**ISTE NETS*S: Curriculum and Content Area Standards – NETS for Students**

1. Creativity and Innovation

   Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

   a. apply existing knowledge to generate new ideas, products, or processes.

   b. create original works as a means of personal or group expression.

   d. identify trends and forecast possibilities.

2. Communication and Collaboration

   Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

   b. communicate information and ideas effectively to multiple audiences using a variety of media and formats

3. Research and Information Retrieval

    Students apply digital tools to gather, evaluate, and use information. Students:

    a. plan strategies to guide inquiry.

    b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.

    c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks

4. Critical Thinking and Problem Solving

    Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:

    a. identify and define authentic problems and significant questions for investigation.

    b. plan and manage activities to develop a solution or complete a project.

    d. use multiple processes and diverse perspectives to explore alternative solutions

5. Digital Citizenship

    Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

    a. advocate and practice safe, legal, and responsible use of information and technology.

    b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.

    c. demonstrate personal responsibility for lifelong learning.

6. Technology Operations and Concepts

    Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

    a. understand and use technology systems.

    b. select and use applications effectively and productively.

    d. transfer current knowledge to learning of new technologies.

## Adobe Certified Associate Exam Objectives

### Adobe Certified Associate, Interactive Media Communication objectives

1.3 Understand options for producing accessible interactive media content.

1.6 Communicate with others (such as peers and clients) about design and content plans.

2.3 Identify general techniques to create interactive media elements that are accessible and readable.

2.5 Organize an interactive media design document.

3.3 Use the Timeline.

3.6 Use the Motion Editor.

3.7 Understand Flash file types.

3.8 Identify best practices for managing the file size of a published Flash or HTML document.

4.2 Use tools on the Tools panel to select, create, and manipulate graphics and text.

4.3 Import and modify graphics.

4.4 Create text.

4.5 Adjust text properties.

4.6 Create objects and convert them to symbols, including graphics, movie clips, and buttons.

4.7 Understand symbols and the library.

4.8 Edit symbols and instances.

4.9 Create masks.

4.10  Create animations (changes in shape, position, size, color, and transparency).

4.11  Add simple controls through ActionScript 3.0.

4.12  Import and use sound.

4.13  Add and export video.

4.14  Publish and export Flash documents.

4.15  Make a Flash document accessible.

5.1 Conduct basic technical tests.

5.2 Identify techniques for basic usability tests.

## Adobe Certified Associate, Web Authoring objectives

1.1 Identify the purpose, audience, and audience needs for a website.

2.6 Communicate with others (such as peers and clients) about design and content plans.

5.4 Modify images and image properties.

## Adobe Certified Associate, Visual Communication objectives

1.1 Identify the purpose, audience, and audience needs for preparing image(s).

1.4 Communicate with others (such as peers and clients) about design plans.

2.1 Demonstrate knowledge of image resolution, image size, and image file format for web, video, and print.

2.6 Understanding key terminology of digital images.

3.1 Identify elements of the Photoshop user interface and demonstrate knowledge of their functions.

3.2 Demonstrate knowledge of layers and masks.

3.3 Demonstrate knowledge of importing, exporting, organizing, and saving.

4.1 Demonstrate knowledge of working with selections.

4.3 Transform images.

4.4 Adjust or correct the tonal range, color, or distortions of an image.

4.5 Demonstrate knowledge of retouching and blending images.

5.1 Demonstrate knowledge of preparing images for web, print, and video.

## Adobe Certified Associate, Video Communication objectives

2.6 Communicate with others (such as peers and clients) about design and content plans.

## Adobe Certified Associate, Graphic Design & Illustration objectives

1.1 Identify the purpose, audience, and audience needs for preparing graphics.

1.4 Communicate with others (such as peers and clients) about design plans.

2.5 Understand key terminology of graphics

3.4 Demonstrate an understanding of vector drawing concepts.

4.4 Demonstrate knowledge of how to use scanned or photographic images.

4.6 Demonstrate knowledge of how to modify and transform objects.

## Adobe Certified Associate, Print & Digital Media Publication objectives

1.4 Communicate with others (such as peers and clients) about design plans.

## For more information

Find more teaching materials for using Adobe software in your classroom on the Adobe Education Exchange: http://edex.adobe.com/.