

# Digital Science Experiments

Students sometimes find it difficult to conduct science experiments, especially if they are visual learners and have a difficult time with written or oral instructions. By using recordings of the teacher's instructions and student observations combined with photos of an experiment's progress, all students can review and observe what occurred. It's a great way to reinforce student learning and to share experiments with students who weren't there.

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**Curriculum area:** Science

**Grade level:** Middle and High School

## Project Description

This lesson can be applied to any science experiment. The teacher uses an iPod and a voice recorder to provide experiment instructions to small groups of students. Students listen to the directions first, then they observe and record their experiment steps and results using a digital camera and an iPod. The images and audio are then combined in an iMovie project or on an iPod photo (if available) to share with others.

## Project Steps

- 1 Using an iPod and a voice recorder, record directions for a science experiment before the class conducts the lab.
- 2 Download the directions from the iPod to the iTunes library on your Macintosh computer and then transfer the audio file to each iPod that will be used by the students.
- 3 Divide students into small groups and give each group an iPod with the experiment directions. The students should take turns listening to the directions on the iPod. One student should be responsible for taking digital photos and another should record voice memos using an iPod with a voice recorder.
- 4 Have students conduct the experiment, recording each step and observation with the digital camera and with the iPod and a voice recorder.
- 5 Students should import their images into iPhoto on a Macintosh computer and create an album with the pictures from their experiment.
- 6 Have students connect their iPod to the computer. Their voice memos are automatically imported into the iTunes library. Students can make a playlist with their recorded observations.

- 7 Photos from the iPhoto album can be viewed on the computer or copied to an iPod photo (if one is available) for viewing. If an iPod photo is not available, students can create an iMovie project that includes the audio recordings and images.
- 8 Students can share their digital science experiments with other groups to compare experiment results. Students who missed the experiment can see and hear it without having to recreate it.
- 9 Students should draw conclusions and assess their science experiments.

### Outcomes

After completing this project, students will be able to:

- Use the steps of the scientific method
- Make and record observations that support a conclusion
- Understand the importance of following a planned methodology when conducting scientific experiments

### Technology Skills

After completing this project, students will be able to:

- Use a digital camera to capture images
- Use iPhoto to import and organize images
- Use an iPod with a voice recorder to record voice memos
- Use iTunes to import voice memos and create a playlist
- Use an iPod photo to observe a digital science experiment (optional)
- Use iMovie to create a video of the digital science experiment (optional)

### Assessment Suggestions

Students can assess their digital science experiments by applying a teacher-created rubric.

### Preparation and Duration

This project takes one additional class period or computer lab time of 30 minutes beyond the timeframe of the experiment itself.

### Tools and Resources

#### Internet

- [http://www.glencoe.com/sec/science/sc\\_interactions/si1/skill\\_handbook/psp.shtml](http://www.glencoe.com/sec/science/sc_interactions/si1/skill_handbook/psp.shtml)  
Practicing Scientific Processes
- <http://www.nceas.ucsb.edu/nceas-web/kids/experiments/scimethod/scimethod.html>  
The Scientific Method
- <http://education.apple.com/education/ilife/howto/>  
iLife How-To guides

**Tools**

Macintosh computers, iPods, iPod photo (optional), iPod voice recorders, digital cameras, lab equipment for the experiment, iPhoto, iTunes, iMovie (optional)

**Note:** A voice recorder can be used with all iPod models that have a Dock Connector, except for the iPod mini. (The iPod shuffle does not have a Dock Connector.) For more information, see your iPod User's Guide.

**Prerequisite Skills**

Teachers and students should be familiar with the iPod, voice recorder, digital cameras, iPhoto, iMovie (if it is used), and iTunes.

**Facilitation Tips**

- Student groups of three or four are ideal for this experiment.
- Having materials ready and designating responsibilities are critical for success.
- You should make a digital science experiment in advance to become familiar with the process.

**Technology Tips**

Have students practice with the voice recorder to determine the proper distance and volume needed for best results.