

Overview of ClassAction

Introduction

Research indicates that students today best learn through challenges brought forth in the classroom while basic fact gathering can take place outside the classroom. The traditional lecture style of re-iterating the general information in a textbook and performing an occasional example problem for the class just doesn't work. Students need to interact with the instructor and their peers for a true synthesis and extension of the knowledge intended to be passed on for the course – this is interactive engagement.

But interactive engagement isn't simply just putting one multiple choice question after another onto the overhead and employing the think-share-pair technique. Technology today allows the instructor to do much more, and as a result the instructor has more ways in which to prompt the students as well as receive better feedback. This technology not only includes colorful and accurate images, but it also user controlled images, animations, and simulations. Additionally, this technology includes multiple choice questions which are dynamic in sense that with a simple "click" the instructor can adapt the same question slightly to see whether or not the students are understanding the information presented or are still confused – an instant follow-up question to provide solid feedback.

ClassAction is all about interactive engagement. ClassAction pre-packages by theme a collection of the materials mentioned above (images, interactive animations and simulations, adaptable questions) as well as general information materials like outlines and tables.

ClassAction is also designed to help the instructor who is either new to interactive curriculum development, has struggled with development, or simply doesn't have the necessary time for development. With all the materials necessary for a productive interactive engagement all in modular packages, development is simply choosing which specific path to take within ClassAction.

The overall intent of ClassAction is to effectively enhance the learning environment for the students while maximizing convenience for the instructor.

One important note: To fully and properly utilize ClassAction, some type of computer video projection system is needed.

Example of Usage

Although ClassAction materials are designed to be flexible, it is anticipated that the instructor will enter the classroom with a pre-selected sequence of questions, images, animations, etc. in mind. This could be as simple as writing down question numbers and the resources necessary to provide feedback on those questions. However, the more familiar that an instructor is with ClassAction materials, the better they will be able to adapt to unanticipated misconceptions from students. This can be achieved using the appropriate user friendly instructor's manual.

Also, ClassAction is designed to provide more content than any one instructor can use. Since everyone teaches differently, we anticipate instructors selecting some subset of materials appropriate for their approach.

Presented here is a detailed example of a possible pre-selected sequence for an astronomical topic utilizing ClassAction materials.

Astronomical Topic: Eclipses

ClassAction Module: Lunar Cycles

1. ClassAction Outline: Lunar and Solar Eclipses
Hand out to the students at the end of the meeting prior so students can familiarize and prepare. Additionally, have the students read beforehand the textbook section(s) on eclipses and perhaps give a short reading quiz.
2. ClassAction General Question: Types of Lunar Eclipses
Directly related to the outlines, this question tests to see if they have properly prepared.
3. ClassAction Follow up Images: Types of Shadow; Lunar Eclipse I; Lunar Eclipse II; Total Solar Eclipse; Annular Solar Eclipse; Solar Eclipses; Total Solar Eclipse Image; Annular Solar Eclipse Image. These images reinforce the understanding of the types of eclipses seen and which parts of a shadow produce a given eclipse. Have the students help describe the images they are viewing.
4. Misconception Destroying Verbal Question: “How are the shadows represented in these images different from the shadows seen throughout the phases of the Moon.”
5. ClassAction General Question: Phases, Eclipses, and Tides
Using only the two adaptations that involve eclipses, this question is a lead-in to understanding why eclipses occur.
6. ClassAction Follow up or Hint Animation: 3 Views Simulator
Using the view from the Earth, ask the students to indicate when the animation should be stopped to indicate the proper configuration for a lunar eclipse / solar eclipse. Have the students note the phase that is displayed in the upper right hand corner.
7. Lead-in Verbal Question: “If full and new moons occur every month, why are there not lunar and solar eclipses every month?”
8. ClassAction Follow up Images: Lunar Eclipse I; Solar Eclipses
Follow up Verbal Question: “Why would the Moon or Earth be in different parts of the shadow?”
These images and question suggest that the Earth, Sun, and Moon are not always on the same plane.
9. ClassAction Follow up Animation: Moon Inclination Simulation
Without the animation running, the image for the simulation clearly shows the inclination of the Moon’s orbit, indicating that the Moon, Earth, and Sun are not always lined up on the ecliptic plane.
10. ClassAction Lead-in Animation: Moon Inclination Simulation

With the animation running, the precession of the Moon's orbit with time is shown along with the indication of approximately 6 month intervals between eclipse seasons.

11. *ClassAction General Question: Frequency of Eclipses*

This question tests the students' ability to recognize the approximate 6 month interval between eclipse seasons.

12. *ClassAction Follow up Images: Line of Nodes; Eclipse Seasons*

These image reinforce the understanding of the frequency of eclipses and introduces the term "line of nodes."

13. *ClassAction Follow up Animation: Eclipse Table*

This interactive table displays the actual occurrences of lunar and solar eclipses and also reinforces the understanding of the frequency of eclipses.

14. *ClassAction Follow up Image: Solar Eclipse Paths*

A final image showing past, present, and future paths of solar eclipses. This image ties together the frequency of eclipses and the parts of the shadow during an eclipse.

15. *ClassAction Discussion Question: Moon's Plane is Perpendicular*

This question extends the students' understanding of the plane of the Moon's orbit not being in the ecliptic plane and the orientations and frequency of certain phases and eclipses.

Notice the vision is that an interactive engagement would smoothly transition from lead-ins to follow-ups with common misconceptions addressed when appropriate. Again, though, it is ultimately up to the instructor to design their own curriculum construction, and ClassAction is there to be a helpful toolbox containing numerous tools.