



Harvard-HHMI Summer Outreach Program

Biology lesson plan: Evolution of Human Walking & Running By Danny Fain

Student Mastery Objectives:

1. Identify the main leg parts involved in walking and running.
2. Identify some human characteristics that make us well-suited for endurance walking & running, in contrast to other mammals.
3. Compare/contrast the lower-body morphology of humans and
4. ~~Describe~~ **Display** ~~evidence~~ of the evidence supporting the hypothesis that endurance walking and running in humans was an evolutionary adaptation.
5. Explain how modern sedentary lifestyle is not well-suited to physiology of human body.
6. Identify some specific activities they can/do engage in that are better suited to physiology.

Intended Audience:

High school students in an Introductory Biology class. Suitable for students with moderate language-based learning disabilities (dyslexia, input/output processing, etc).

Curriculum Prerequisites:

Introduction to taxonomy and Natural Selection theory of evolution. Introduction to theories and evidence of hominid evolution. Some understanding of vertebrate musculoskeletal tissues (muscles, bones, tendons) useful but not essential.

Required Resources:

- ❑ Printed or digital text & pictures showing major elements of human leg anatomy (bones, muscles, tendons).
- ❑ PowerPoint presentation slideshow.
- ❑ Web browser (for links to online animations, videos ...).
- ❑ Student journal; could be augmented by a class wiki.
- ❑ Optional: hand-held video camera.

Teacher Preparation:

- ❑ Arrange to use a large space for kinesthetic activator exercise, and optionally obtain hand-held video camera.
- ❑ Obtain and setup digital projector for PowerPoint presentation.
- ❑ Photocopy the follow-up handout sheet.
- ❑ If necessary, pre-teach selected vocabulary terms (e.g. locomotion).

Main activities:

1. Kineshetic activator exercise: students “practice” walking and running in a large space (e.g. gym, hallway) while noticing how their legs move, then jot down brief observations in journal.
Optional extension: students videotape each other’s legs during walking and running; view later, perhaps in slow-motion, to observe details of how different leg parts move, and notice stride variations between individual
2. ~~Students~~ answer activator questions in journal:
 - What body parts below the waist are important for walking?
 - What body parts below the waist are important for running?
 - How might running have been important to the survival of earlyGroup ~~discussion~~ discussion of the answers; generate additional questions. Students write additional questions in journal.
3. Students (possibly in pairs/groups) read human leg anatomy text, answer brief comprehension questions to get familiar with basic vocabulary and spatial relationships.
4. Show and narrate PowerPoint presentation. Pause at particular slides for guided discussion, and to let students jot down notes in journal.
5. Follow-up comprehension/reflection questions handout (suitable for homework assignment); students write answers in journal.
6. After completion of handout, group discussion of answers.