# BISC 414 Blueprint Template

| **Outcome** | **Unit topics** | **Assessment** | **Learning resources** | **Learning activities** | **Media** | **Tutor support** |
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| **K1. Discuss and compare the elements of the theory of evolution.**  **K1. Discuss and compare the elements of the theory of evolution.**  **K1. Discuss and compare the elements of the theory of evolution.** | 1. Elements of Evolutionary Theory (Week 1)  2. *On the* *Origin of Species*(Week 3)  3. Discovering Causes and Patterns of Variation in Nature and Mechanism for Inheritance (Week 4)  4. The Modern Synthesis (Week 5)  5. Contemporary Evolutionary Theory: Reviewing Elements of Evolutionary Theory in the Light of Current Knowledge (Weeks 6-7)  6. Controversial Topics (Weeks 8-12)  7. Completion of Assignment 1 (Week 13) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why?; Mini-quiz (5%): Testing basic knowledge of elements of evolutionary theory introduced in the first unit.  2. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  3. Report blog on group exercise: In pairs, students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  4. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community.  5. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog; Forum discussion: What is the evidence for evolution?; Assignment 3 (5%): Students post opinion blogs on the following challenge problem: Humans cannot photosynthesize. Why? Students must comment on at least two blogs posted by their peers.  6. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  7. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1.<http://evolution.berkeley.edu/>; <http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.talkorigins.org/faqs/faq-intro-to-biology.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://ethomas.web.wesleyan.edu/wescourses/2004s/ees227/01/spandrels.html>  2. <http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  3.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology16.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>;<http://www.blackwellpublishing.com/ridley/tutorials/Molecular_and_Mendelian_Genetics1.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_idea_of_a_species1.asp>  4.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>  5. Use available sources for Weeks 1-5.  6. No instructor learning resources necessary. Support student search for resources.  7. No instructor learning resources necessary. Support student search for resources.  For 1. through 7. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article; students introduce themselves to their peers and tutor. They also must answer the following: What topic in evolutionary biology is of most interest to you? What do you hope to achieve through this course; students participate in challenge question group discussion forum and take the mini-quiz; students are introduced to all formative and summative assessments and basics of literature search, with detailed explanation of the major project and Assessment 1 and are encouraged to start working on these early (they will be divided into groups for the major project in Week 2).  2. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; student read recent article reviewing Darwin’s view of evolutionary theory. Students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, and complete Stage 1 of Assignment 1.  3. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution; Students complete group exercise and associated blogs in the same groups as assigned for the challenge question forum discussion in Week 1.  4. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; Students complete Stage 2 of Assignment 1.  5. Students review learning modules provided in Weeks 1-5 and all their formative exercises; Students follow along provided schematics of the development of each of the topics in the unit (i.e., variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2, participate in forum discussion on the evidence for evolution, and complete Assignment 3.  6. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  7. Students complete Stage 3 of Assignment 1. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  5. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  6. Support student needs for media.  7. Support student needs for media. | 1. Initiate student introductions; pair up students for the first forum discussion on a challenge question and participate in this forum discussion; introduce all formative and summative assessment and encourage early commencement of all student tasks; mark the mini-quiz as per the provided key (return in Week 2); form groups for major projects using answers from student introductions.  2. Read and comment on student critiques of Darwin’s *On the Origin of Species*; announce student groups for the major project; mark Assignment 1, Stage 1.  3. Read and comment on student blogs of group exercise; return marked Stage 1 of Assignment 1.  4. Mark Stage 2 of Assignment 1.  5. Return marked Stage 2 of Assignment 1; mark Assignment 2; read and comment on blogs for Assignment 2; return marked Assignment 2; mark Assignment (return in Week 8); read and comment on blogs for Assignment 3; participate in forum discussion on the evidence for evolution.  6. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  7. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **K2. Recognize evolutionary processes on different temporal scales.**  **K2. Recognize evolutionary processes on different temporal scales.**  **K2. Recognize evolutionary processes on different temporal scales.** | 1. Elements of Evolutionary Theory (Week 1)  2. *On the* *Origin of Species*(Week 3)  3. Discovering Causes and Patterns of Variation in Nature and Mechanism for Inheritance (Week 4)  4. The Modern Synthesis (Week 5)  5. Contemporary Evolutionary Theory: Reviewing Elements of Evolutionary Theory in the Light of Current Knowledge (Weeks 6-7)  6. Controversial Topics (Weeks 8-12)  7. Completion of Assignment 1 (Week 13) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why?; Mini-quiz (5%): Testing basic knowledge of elements of evolutionary theory introduced in the first unit.  2. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  3. No assessment for this outcome for the unit of Week 4.  4. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community.  5. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog; Forum discussion: What is the evidence for evolution?; Assignment 3 (5%): Students post opinion blogs on the following challenge problem: Humans cannot photosynthesize. Why? Students must comment on at least two blogs posted by their peers.  6. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  7. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1.<http://evolution.berkeley.edu/>; <http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.talkorigins.org/faqs/faq-intro-to-biology.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://ethomas.web.wesleyan.edu/wescourses/2004s/ees227/01/spandrels.html>  2. <http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  3.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology16.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>;<http://www.blackwellpublishing.com/ridley/tutorials/Molecular_and_Mendelian_Genetics1.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_idea_of_a_species1.asp>  4.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>  5. Use available sources for Weeks 1-5.  6. No instructor learning resources necessary. Support student search for resources.  7. No instructor learning resources necessary. Support student search for resources.  For 1. through 7. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article; students introduce themselves to their peers and tutor. They also must answer the following: What topic in evolutionary biology is of most interest to you? What do you hope to achieve through this course; students participate in challenge question group discussion forum and take the mini-quiz; students are introduced to all formative and summative assessments and basics of literature search, with detailed explanation of the major project and Assessment 1 and are encouraged to start working on these early (they will be divided into groups for the major project in Week 2).  2. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; student read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, and complete Stage 1 of Assignment 1.  3. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution.  4. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; students complete Stage 2 of Assignment 1.  5. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2, participate in forum discussion on the evidence for evolution, and complete Assignment 3.  6. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  7. Students complete Stage 3 of Assignment 1. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  5. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  6. Support student needs for media.  7. Support student needs for media. | 1. Initiate student introductions; pair up students for the first forum discussion on a challenge question and participate in this forum discussion; introduce all formative and summative assessment and encourage early commencement of all student tasks; mark the mini-quiz as per the provided key (return in Week 2); form groups for major projects using answers from student introductions.  2. Read and comment on student critiques of Darwin’s *On the Origin of Species*; mark Stage 1 of Assignment 1.  3. Return marked Stage 1 of Assignment 1.  4. Mark Stage 2 of Assignment 1.  5. Return marked Stage 2 of Assignment 1; mark Assignment 2; read and comment on blogs for Assignment 2; return marked Assignment 2; mark Assignment 3 (return in Week 8); read and comment on blogs for Assignment 3; participate in forum discussion on the evidence for evolution.  6. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  7. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **K3. Relate the changes in evolutionary thinking by outlining how historical approaches are continuously modified to accommodate new findings.**  **K3. Relate the changes in evolutionary thinking by outlining how historical approaches are continuously modified to accommodate new findings.**  **K3. Relate the changes in evolutionary thinking by outlining how historical approaches are continuously modified to accommodate new findings.** | 1. Early History of Natural Sciences: Setting the Stage for Evolutionary Thinking (Week 2)  2. *On the Origin of Species* (Week 3)  3. Discovering Causes and Patterns of Variation in Nature and Mechanisms for Inheritance (Week 4)  4. The Modern Synthesis (Week 5)  5. Contemporary Evolutionary Theory: Reviewing Elements of Evolutionary Theory in the Light of Current Knowledge (Weeks 6-7)  6. Controversial Topics (Weeks 8-12)  7. Completion of Assignment 1 (Week 13) | 1. Forum discussion: Discuss the age and dimensions of Earth; Self-assessment: evolutionary timeline.  2. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search; Self assessment: evolutionary timeline.  3. Self assessment: evolutionary timeline.  4. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community; Self assessment: evolutionary timeline.  5. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog; Forum discussion: What is the evidence for evolution.  6. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  7. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.ucmp.berkeley.edu/history/evothought.html>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology6.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>  2.<http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  3.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology16.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>;<http://www.blackwellpublishing.com/ridley/tutorials/Molecular_and_Mendelian_Genetics1.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_idea_of_a_species1.asp>  4.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>  5. Use available sources for Weeks 1-5.  6. No instructor learning resources necessary. Support student search for resources.  7. No instructor learning resources necessary. Support student search for resources.  For 1. through 7. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read and follow an interactive timeline which consists of a series of mini essays on each of the topic periods, external links or more detailed fun-facts behind the scientific discoveries, and podcasts of Tom talking about personal aspects of lives of some of these great scientific minds; students read or watch interview with an evo-devo expert and choose and evo-devo topic of interest; students participate in forum discussion on Earth dimension and age and begin self-assessment of evolutionary timeline.  2. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; Student read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, complete Stage 1 of Assignment 1, and continue self-assessment of evolutionary timeline.  3. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution; Students continue with self-assessment of evolutionary timeline.  4. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; students complete Stage 2 of Assignment 1, and finalize the self-assessment of evolutionary timeline.  5. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2, and participate in forum discussion on the evidence for evolution.  6. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  7. Students complete Stage 3 of Assignment 1. | 1. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  5. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  6. Support student needs for media.  7. Support student needs for media. | 1. Announce student groups for the major project; participate in forum discussion on size and age of Earth.  2. Read and comment on student critiques of Darwin’s *On the Origin of Species*; mark Assignment 1, Stage 1.  3. Read and comment on student blogs of group exercise; return marked Stage 1 of Assignment 1.  4. Mark Stage 2 of Assignment 1.  5. Return marked Stage 2 of Assignment 1; mark Assignment 2; return marked Assignment 2; read and comment on blogs for Assignment 2; participate in forum discussion on the evidence for evolution.  6. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  7. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **K4. Use recently developed tools and applications in the field of evolutionary biology.**  **K4. Use recently developed tools and applications in the field of evolutionary biology.** | 1. Discovering Causes and Patterns of Variation in Nature and Mechanism for Inheritance (Week 4)  2. The Modern Synthesis (Week 5)  3. Controversial Topics (Weeks 8-12) | 1. Report blog on group exercise: In pairs (as assigned for forum discussion in Week 1), students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  2. Group exercise: In the same groups as Week 4, students complete a phylogenetic analysis of the same candy bars. They post their trees as an addition to last week’s blog and comment on species and clade relationships they have found.  3. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups. | 1.<http://darwin.eeb.uconn.edu/simulations/simulations.html>  <http://www.blackwellpublishing.com/ridley/experiments/>  <http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>  <http://nsm1.nsm.iup.edu/rgendron/labs.shtml>  <http://mesquiteproject.org/mesquite/mesquite.html>  <http://www.phylip.com/>  2.<http://darwin.eeb.uconn.edu/simulations/simulations.html>  <http://www.blackwellpublishing.com/ridley/experiments/>  <http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>  <http://nsm1.nsm.iup.edu/rgendron/labs.shtml>  <http://mesquiteproject.org/mesquite/mesquite.html>  <http://www.phylip.com/>  3. Provide support for student resource needs.  For 1. through 3. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students complete group exercise, blog about their group findings, and comment on peer blogs.  2. Students complete a phylogenetic analysis of ten candy bars using provided phylogenetic software and post their results and comments on their blog from last week.  3. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group. | 1. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species and speciation concepts.  2. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species and speciation concepts.  3. Support student needs for media. | 1. Read and participate in blog discussion on species exercise.  2. Read and participate in blog updates on the phylogeny of candy bars.  3. Follow group progress and work each week; provide marks by Week 12 as per given rubrics. |
| **K5. Apply the principles of evolutionary theory to a myriad of contemporary problems and questions.**  **K5. Apply the principles of evolutionary theory to a myriad of contemporary problems and questions.**  **K5. Apply the principles of evolutionary theory to a myriad of contemporary problems and questions.** | 1. Elements of Evolutionary Theory (Week 1)  2. Early History of Natural Sciences: Setting the Stage for Evolutionary Thinking (Week 2)  3. *On the* *Origin of Species*(Week 3)  4. Discovering Causes and Patterns of Variation in Nature and Mechanism for Inheritance (Week 4)  5. The Modern Synthesis (Week 5)  6. Contemporary Evolutionary Theory: Reviewing Elements of Evolutionary Theory in the Light of Current Knowledge (Weeks 6-7)  7. Controversial Topics (Weeks 8-12)  8. Completion of Assignment 1 (Week 13) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why?  2. Forum discussion: Discuss the age and dimensions of Earth.  3. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  4. Report blog on group exercise: In pairs, students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  5. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community.  6. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog; Forum discussion: What is the evidence for evolution?; Assignment 3 (5%): Students post opinion blogs on the following challenge problem: Humans cannot photosynthesize. Why? Students must comment on at least two blogs posted by their peers.  7. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  8. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1.<http://evolution.berkeley.edu/>; <http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.talkorigins.org/faqs/faq-intro-to-biology.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://ethomas.web.wesleyan.edu/wescourses/2004s/ees227/01/spandrels.html>  2.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.ucmp.berkeley.edu/history/evothought.html>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology6.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>  3. <http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  4.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology16.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>;<http://www.blackwellpublishing.com/ridley/tutorials/Molecular_and_Mendelian_Genetics1.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_idea_of_a_species1.asp>  5.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>  6. Use available sources for Weeks 1-5.  7. No instructor learning resources necessary. Support student search for resources.  8. No instructor learning resources necessary. Support student search for resources.  For 1. through 8. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article; students introduce themselves to their peers and tutor. They also must answer the following: What topic in evolutionary biology is of most interest to you? What do you hope to achieve through this course; students participate in challenge question group discussion forum and take the mini-quiz; students are introduced to all formative and summative assessments and basics of literature search, with detailed explanation of the major project and Assessment 1 and are encouraged to start working on these early (they will be divided into groups for the major project in Week 2).  2. Students read and follow an interactive timeline which consists of a series of mini essays on each of the topic periods, external links or more detailed fun-facts behind the scientific discoveries, and podcasts of Tom talking about personal aspects of lives of some of these great scientific minds; students read or watch interview with an evo-devo expert and choose and evo-devo topic of interest; students participate in forum discussion on Earth dimension and age.  3. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; students read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, and complete Stage 1 of Assignment 1.  4. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution; students complete group exercise and associated blogs in the same groups as assigned for the challenge question forum discussion in Week 1.  5. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; students complete Stage 2 of Assignment 1.  6. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2, participate in forum discussion on the evidence for evolution, and complete Assignment 3.  7. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  8. Students complete Stage 3 of Assignment 1. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  5. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  6. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  7. Support student needs for media.  8. Support student needs for media. | 1. Initiate student introductions; pair up students for the first forum discussion on a challenge question and participate in this forum discussion; introduce all formative and summative assessment and encourage early commencement of all student tasks; form groups for major projects using answers from student introductions.  2. Announce student groups for the major project; participate in forum discussion on size and age of Earth.  3. Read and comment on student critiques of Darwin’s *On the Origin of Species*; announce student groups for the major project; mark Assignment 1, Stage 1.  4. Read and comment on student blogs of group exercise; return marked Stage 1 of Assignment 1.  5. Mark Stage 2 of Assignment 1.  6. Return marked Stage 2 of Assignment 1; mark Assignment 2; read and comment on blogs for Assignment 2; return marked Assignment 2; mark Assignment 3 (return in Week 8); read and comment on blogs for Assignment 2; participate in forum discussion on the evidence for evolution.  7. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  8. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **S1. Critically evaluate scientific…**  **S1. Critically evaluate scientific findings.**  **S1. Critically evaluate scientific findings.** | 1.Cumulative topics (specific exercises in Week 3)  2. Cumulative topics (specific exercises in Week 5)  3. Cumulative topics (specific exercises in Week 6)  4. Controversial Topics (Weeks 8-12)  5. Completion of Assignment 1 (Week 13) | 1. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  2. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community; Group exercise: In the same groups as Week 4, students complete a phylogenetic analysis of the same candy bars. They post their trees as an addition to last week’s blog and comment on species and clade relationships they have found.  3. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog; Forum discussion: What is the evidence for evolution?  4. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  5. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1. <http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  2.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>;<http://darwin.eeb.uconn.edu/simulations/simulations.html>;<http://www.blackwellpublishing.com/ridley/experiments/>;<http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>;<http://nsm1.nsm.iup.edu/rgendron/labs.shtml>;<http://mesquiteproject.org/mesquite/mesquite.html>;<http://www.phylip.com/>  3. Use available sources for Weeks 1-5.  4. No instructor learning resources necessary. Support student search for resources.  5. No instructor learning resources necessary. Support student search for resources.  For 1. through 5. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; students read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, and complete Stage 1 of Assignment 1.  2. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; students complete Stage 2 of Assignment 1, and a phylogenetic analysis of ten candy bars using provided phylogenetic software and post their results and comments on their blog from last week.  3. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; Students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2.  4. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  5. Students complete Stage 3 of Assignment 1. | 1. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  3. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  4. Support student needs for media.  5. Support student needs for media. | 3. Read and comment on student critiques of Darwin’s *On the Origin of Species*; announce student groups for the major project; mark Assignment 1, Stage 1 (return in Week 4).  2. Mark Stage 2 of Assignment 1; read and participate in blog updates on the phylogeny of candy bars.  3. Return marked Stage 2 of Assignment 1; mark Assignment 2 (return in Week 7); read and comment on blogs for Assignment 2.  4. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  5. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **S2. Interpret and communicate scientific knowledge and results effectively to a wide audience (general public and scientific community).**  **S2. Interpret and communicate scientific knowledge and results effectively to a wide audience (general public and scientific community).**  **S2. Interpret and communicate scientific knowledge and results effectively to a wide audience (general public and scientific community).**  **S2. Interpret and communicate scientific knowledge and results effectively to a wide audience (general public and scientific community).** | 1. Cumulative topics (specific exercises in Week 1)  2. Cumulative topics (specific exercises in Week 2)  3.Cumulative topics (specific exercises in Week 3)  4. Cumulative topics (specific exercises in Week 4)  5. Cumulative topics (specific exercises in Week 5)  6. Cumulative topics (specific exercises in Week 6)  7. Cumulative topics (specific exercises in Week 7)  8. Controversial Topics (Weeks 8-12)  9. Completion of Assignment 1 (Week 13) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why  2. Forum discussion: Discuss the age and dimensions of Earth.  3. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  4. Report blog on group exercise: In pairs, students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  5. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community; Group exercise: In the same groups as Week 4, students complete a phylogenetic analysis of the same candy bars. They post their trees as an addition to last week’s blog and comment on species and clade relationships they have found.  6. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog;  7. Forum discussion: What is the evidence for evolution?; Assignment 3 (5%): Students post opinion blogs on the following challenge problem: Humans cannot photosynthesize. Why? Students must comment on at least two blogs posted by their peers.  8. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  9. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1.<http://evolution.berkeley.edu/>; <http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.talkorigins.org/faqs/faq-intro-to-biology.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://ethomas.web.wesleyan.edu/wescourses/2004s/ees227/01/spandrels.html>  2.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.ucmp.berkeley.edu/history/evothought.html>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology6.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>  3. <http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  4.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology16.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>;<http://www.blackwellpublishing.com/ridley/tutorials/Molecular_and_Mendelian_Genetics1.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_idea_of_a_species1.asp>  5.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>;<http://darwin.eeb.uconn.edu/simulations/simulations.html>;<http://www.blackwellpublishing.com/ridley/experiments/>;<http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>;<http://nsm1.nsm.iup.edu/rgendron/labs.shtml>;<http://mesquiteproject.org/mesquite/mesquite.html>;<http://www.phylip.com/>  6. Use available sources for Weeks 1-5.  7. Use available sources for Weeks 1-5.  8. No instructor learning resources necessary. Support student search for resources.  9. No instructor learning resources necessary. Support student search for resources.  For 1. through 9. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article; students introduce themselves to their peers and tutor. They also must answer the following: What topic in evolutionary biology is of most interest to you? What do you hope to achieve through this course; students participate in challenge question group discussion forum and take the mini-quiz; students are introduced to all formative and summative assessments and basics of literature search, with detailed explanation of the major project and Assessment 1 and are encouraged to start working on these early (they will be divided into groups for the major project in Week 2).  2. Students read and follow an interactive timeline which consists of a series of mini essays on each of the topic periods, external links or more detailed fun-facts behind the scientific discoveries, and podcasts of Tom talking about personal aspects of lives of some of these great scientific minds; students read or watch interview with an evo-devo expert and choose and evo-devo topic of interest; students participate in forum discussion on Earth dimension and age.  3. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; students read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, and complete Stage 1 of Assignment 1.  4. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution; students complete group exercise and associated blogs in the same groups as assigned for the challenge question forum discussion in Week 1.  5. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; students complete Stage 2 of Assignment 1, and a phylogenetic analysis of ten candy bars using provided phylogenetic software and post their results and comments on their blog from last week.  6. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2.  7. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students participate in forum discussion on the evidence for evolution, and complete Assignment 3.  8. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  9. Students complete Stage 3 of Assignment 1. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  5. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  6. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  7. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts.  8. Support student needs for media.  9. Support student needs for media. | 1. Initiate student introductions; pair up students for the first forum discussion on a challenge question and participate in this forum discussion; introduce all formative and summative assessment and encourage early commencement of all student tasks; form groups for major projects using answers from student introductions.  2. Announce student groups for the major project; participate in forum discussion on size and age of Earth.  3. Read and comment on student critiques of Darwin’s *On the Origin of Species*; announce student groups for the major project; mark Assignment 1, Stage 1.  4. Read and comment on student blogs of group exercise; return marked Stage 1 of Assignment 1.  5. Mark Stage 2 of Assignment 1; read and participate in blog updates on the phylogeny of candy bars.  6. Return marked Stage 2 of Assignment 1; mark Assignment 2; read and comment on blogs for Assignment 2.  7. Return marked Assignment 2; mark Assignment 3 (return in Week 8); read and comment on blogs for Assignment 3; participate in forum discussion on the evidence for evolution.  8. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  9. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **S3. Justify arguments effectively using logical and scientific support.**  **S3. Justify arguments effectively using logical and scientific support.**  **S3. Justify arguments effectively using logical and scientific support.**  **S3. Justify arguments effectively using logical and scientific support.** | 1. Cumulative topics (specific exercises in Week 1)  2. Cumulative topics (specific exercises in Week 2)  3.Cumulative topics (specific exercises in Week 3)  4. Cumulative topics (specific exercises in Week 4)  5. Cumulative topics (specific exercises in Week 5)  6. Cumulative topics (specific exercises in Week 7)  7. Controversial Topics (Weeks 8-12)  8. Completion of Assignment 1 (Week 13) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why?  2. Forum discussion: Discuss the age and dimensions of Earth.  3. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers; Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  4. Report blog on group exercise: In pairs, students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  5. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community; Group exercise: In the same groups as Week 4, students complete a phylogenetic analysis of the same candy bars. They post their trees as an addition to last week’s blog and comment on species and clade relationships they have found.  6. Forum discussion: What is the evidence for evolution?; Assignment 3 (5%): Students post opinion blogs on the following challenge problem: Humans cannot photosynthesize. Why? Students must comment on at least two blogs posted by their peers.  7. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  8. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1.<http://evolution.berkeley.edu/>; <http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.talkorigins.org/faqs/faq-intro-to-biology.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://ethomas.web.wesleyan.edu/wescourses/2004s/ees227/01/spandrels.html>  2.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.ucmp.berkeley.edu/history/evothought.html>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology6.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>  3. <http://darwin-online.org.uk/>; <http://www.amnh.org/exhibitions/darwin/>; <http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_14>; <http://darwin-online.org.uk/>;<http://www.open.ac.uk/darwin/index.php>;<http://evolution.berkeley.edu/evolibrary/news/090201_darwinday>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology10.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology14.asp>;<http://www.actionbioscience.org/evolution/berra.html>;<http://www.wku.edu/~smithch/index1.htm>; Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll.  4.<http://evolution.berkeley.edu/evolibrary/article/0_0_0/history_01>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology16.asp>;<http://www.accessexcellence.org/AE/AEPC/WWC/1995/cron_evol.php>;<http://www.blackwellpublishing.com/ridley/tutorials/Molecular_and_Mendelian_Genetics1.asp>;<http://www.blackwellpublishing.com/ridley/tutorials/The_idea_of_a_species1.asp>  5.<http://evolution.berkeley.edu/>;<http://evolution.berkeley.edu/evosite/evo101/index.shtml>;<http://www.amnh.org/learn/courses/evolution.php>;<http://biology.kenyon.edu/courses/biol241/evolutionlectures.htm>;<http://www.blackwellpublishing.com/ridley/tutorials/The_rise_of_evolutionary_biology2.asp>;<http://paleobiology.si.edu/geotime/main/index.html>;<http://www.hhmi.org/biointeractive/evolution/lectures.html>;<http://www.actionbioscience.org/evolution/futuyma.html>;<http://tolweb.org/tree/>;<http://darwin.eeb.uconn.edu/simulations/simulations.html>;<http://www.blackwellpublishing.com/ridley/experiments/>;<http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>;<http://nsm1.nsm.iup.edu/rgendron/labs.shtml>;<http://mesquiteproject.org/mesquite/mesquite.html>;<http://www.phylip.com/>  6. Use available sources for Weeks 1-5.  7. No instructor learning resources necessary. Support student search for resources.  8. No instructor learning resources necessary. Support student search for resources.  For 1. through 8. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article; students introduce themselves to their peers and tutor. They also must answer the following: What topic in evolutionary biology is of most interest to you? What do you hope to achieve through this course; students participate in challenge question group discussion forum and take the mini-quiz; students are introduced to all formative and summative assessments and basics of literature search, with detailed explanation of the major project and Assessment 1 and are encouraged to start working on these early (they will be divided into groups for the major project in Week 2).  2. Students read and follow an interactive timeline which consists of a series of mini essays on each of the topic periods, external links or more detailed fun-facts behind the scientific discoveries, and podcasts of Tom talking about personal aspects of lives of some of these great scientific minds; students read or watch interview with an evo-devo expert and choose and evo-devo topic of interest; students participate in forum discussion on Earth dimension and age.  3. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; students read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, blog their opinions on peers’ critiques, and complete Stage 1 of Assignment 1.  4. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution; students complete group exercise and associated blogs in the same groups as assigned for the challenge question forum discussion in Week 1.  5. Students continue to read and follow an interactive timeline which is now completely up to date. Information is added on stratigraphy and plate tectonics through links to external simulations. More links are added on fossil record and evolution of life on Earth; students read a recent summary article on the importance of fossil record for evolutionary studies; students complete Stage 2 of Assignment 1, and a phylogenetic analysis of ten candy bars using provided phylogenetic software and post their results and comments on their blog from last week.  6. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students participate in forum discussion on the evidence for evolution and complete Assignment 3.  7. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  8. Students complete Stage 3 of Assignment 1. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  5. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  6. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  7. Support student needs for media.  8. Support student needs for media. | 1. Initiate student introductions; pair up students for the first forum discussion on a challenge question and participate in this forum discussion; introduce all formative and summative assessment and encourage early commencement of all student tasks; form groups for major projects using answers from student introductions.  2. Announce student groups for the major project; participate in forum discussion on size and age of Earth.  3. Read and comment on student critiques of Darwin’s *On the Origin of Species*; announce student groups for the major project; mark Assignment 1, Stage 1.  4. Read and comment on student blogs of group exercise; return marked Stage 1 of Assignment 1.  5. Mark Stage 2 of Assignment 1 (return in Week 6); read and participate in blog updates on the phylogeny of candy bars.  6. Return marked Stage 2 of Assignment 1; mark Assignment 3 (return in Week 8); participate in forum discussion on the evidence for evolution.  7. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  8. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **S4. Identify questions and problems in the current scientific knowledge and propose novel approaches for their resolution.** | 1.Cumulative topics (specific exercise in Week 3)  2. Cumulative topics (specific exercise in Week 5)  3. Completion of Assignment 1 (Week 13) | 1. Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  2. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community.  3. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1. Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll. Support student search for resources.  2. Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll. Support student search for resources.  3. No instructor learning resources necessary. Support student search for resources.  For 1. through 3. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students complete Stage 1 of Assignment 1.  2. Students complete Stage 2 of Assignment 1.  3. Students complete Stage 3 of Assignment 1. | 1. No media other than Carroll’s book for tutors necessary.  2. No media other than Carroll’s book for tutors necessary.  3. No media other than Carroll’s book for tutors necessary. | 1. Mark Stage 1 of Assignment 1 (return in Week 4).  2. Mark Stage 2 of Assignment 1 (return in Week 6).  3. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **A1. Appreciate the way in which scientific inquiry is…**  **A1. Appreciate the way in which scientific inquiry is embedded in the fabric of the society in which it exists.**  **A1. Appreciate the way in which scientific inquiry is embedded in the fabric of the society in which it exists.** | 1.Cumulative topics (specific exercises in Week 3)  2. Cumulative topics (specific exercises in Week 5)  3. Cumulative topics (specific exercises in Week 6)  4. Cumulative topics (specific exercises in Week 7)  5. Controversial Topics (Weeks 8-12)  6. Completion of Assignment 1 (Week 13) | 1. Assignment 1, Stage 1 (5%): Students identify a problem of interest within an assigned evo-devo topic and write a statement of the problem in evolutionary terms and based on preliminary literature search.  2. Assignment 1, Stage 2 (5%): Students write a mini proposal with a more detailed literature review on the evo-devo topic they have chosen, identify the problem and unknowns in the current research, propose novel approaches to solve for such problems, and briefly discuss how their proposed study would contribute to the scientific community; Group exercise: In the same groups as Week 4, students complete a phylogenetic analysis of the same candy bars. They post their trees as an addition to last week’s blog and comment on species and clade relationships they have found.  3. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog;  4. Forum discussion: What is the evidence for evolution?  5. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups.  6. Assignment 1, Stage 3 (5%): Students develop a report based on the mini-proposal of Stage 2. The report includes a synthesis and brief critical review of the current scientific knowledge in the evo-devo topic they have chosen from an evolutionary perspective and address how evo-devo unravelled a mystery that some may have found explanatory only by intelligent design. | 1. Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll. Support student search for resources.  2. Assign evo-devo topic s (and recommend to students) based on “Endless Forms Most Beautiful" by Sean B. Carroll. Support student search for resources.  3. Use available sources for Weeks 1-5.  4. Use available sources for Weeks 1-5.  5. No instructor learning resources necessary. Support student search for resources.  6. No instructor learning resources necessary. Support student search for resources.  For 1. through 6. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students complete Stage 1 of Assignment 1.  2. Students complete Stage 2 of Assignment 1.  3. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2.  4. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction).  5. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group.  6. Students complete Stage 3 of Assignment 1. | 1. No media other than Carroll’s book for tutors necessary.  2. No media other than Carroll’s book for tutors necessary.  3. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  4. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts.  5. Support student needs for media.  6. Support student needs for media. | 1. Mark Stage 1 of Assignment 1 (return in Week 4).  2. Mark Stage 2 of Assignment 1.  3. Return marked Stage 2 of Assignment 1; mark Assignment 2.  4. Return marked Assignment 2; participate in forum discussion on the evidence for evolution.  5. Follow group progress and work each week; provide marks by Week 12 as per given rubrics.  6. Collects proof of participation in forum discussions from students; comment on peer work from students; mark and return Stage 3 of Assignment 1 by Week 14 as per given rubric; provide participation and final marks using the assigned weighting by Week 14. |
| **A2. Demonstrate an ability to work collaboratively.**  **A2. Demonstrate an ability to work collaboratively.** | 1. Elements of Evolutionary Theory (Week 1)  2. Discovering Causes and Patterns of Variation in Nature and Mechanism for Inheritance (Week 4)  3. The Modern Synthesis (Week 5)  4. Controversial Topics (Weeks 8-12) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why?  2. Report blog on group exercise: In pairs (as assigned for forum discussion in Week 1), students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  3. Group exercise: In the same groups as Week 4, students complete a phylogenetic analysis of the same candy bars. They post their trees as an addition to last week’s blog and comment on species and clade relationships they have found.  4. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups. | 1. Use available sources for Weeks 1-5.  2.<http://darwin.eeb.uconn.edu/simulations/simulations.html>  <http://www.blackwellpublishing.com/ridley/experiments/>  <http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>  <http://nsm1.nsm.iup.edu/rgendron/labs.shtml>  <http://mesquiteproject.org/mesquite/mesquite.html>  <http://www.phylip.com/>  3.<http://darwin.eeb.uconn.edu/simulations/simulations.html>  <http://www.blackwellpublishing.com/ridley/experiments/>  <http://www.faculty.virginia.edu/evolutionlabs/Online_Resources.html#tutorials>  <http://nsm1.nsm.iup.edu/rgendron/labs.shtml>  <http://mesquiteproject.org/mesquite/mesquite.html>  <http://www.phylip.com/>  4. Provide support for student resource needs.  For 1. through 4. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article.  2. Students complete group exercise, blog about their group findings, and comment on peer blogs.  3. Students complete a phylogenetic analysis of ten candy bars using provided phylogenetic software and post their results and comments on their blog from last week.  4. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species and speciation concepts.  3. Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species and speciation concepts.  4. Support student needs for media. | 1. Participate in forum discussion on the challenge problem.  2. Read and participate in blog discussion on species exercise.  3. Read and participate in blog updates on the phylogeny of candy bars.  4. Follow group progress and work each week; provide marks by Week 12 as per given rubrics. |
| **A3. Objectively assess peer work.**  **A3. Objectively assess peer work.**  **A3. Objectively assess peer work.** | 1. Cumulative topics (specific exercises in Week 1)  2. Cumulative topics (specific exercises in Week 2)  3.Cumulative topics (specific exercises in Week 3)  4. Cumulative topics (specific exercises in Week 4)  5. Cumulative topics (specific exercises in Week 6)  6. Cumulative topics (specific exercises in Week 7)  7. Controversial Topics (Weeks 8-12) | 1. Forum discussion: Discuss the following challenge problem in groups of 2-3: Humans cannot photosynthesize. Why?  2. Forum discussion: Discuss the age and dimensions of Earth.  3. Opinion: In a role of Darwin’s contemporary colleague or critic, students write either positive or negative review of Darwin’s book *On the Origin of Species* as their first blog entry. They must also comment on at least two book reviews posted by their peers.  4. Report blog on group exercise: In pairs, students choose ten candy bars which they both purchase. They then discuss how many species of the bars they recognize and present their reasoning and conclusions through a blog. Each student must post a comment on at least two blogs posted by their peers.  5. Assignment 2 (15%): Students write an obituary for any scientist who has left a legacy important for development of evolutionary theory prior to Darwin as it were written from an angle of contemporary evolutionary theorist and post it as a blog;  6. Forum discussion: What is the evidence for evolution?; Assignment 3 (5%): Students post opinion blogs on the following challenge problem: Humans cannot photosynthesize. Why? Students must comment on at least two blogs posted by their peers.  7. Participation in activity assigned by the presenting student group; Major project (40%): Students develop blog or mini newspaper with any chosen media. They need to frame the controversy, present competing hypotheses and opinions, discuss impacts on policy, public, and scientific community, design participation activity for their peers and complete peer evaluation within their own and other groups. | 1. Use available sources for Weeks 1-5.  2. Use available sources for Weeks 1-5.  3. Use available sources for Weeks 1-5.  4. Use available sources for Weeks 1-5.  5. Use available sources for Weeks 1-5.  6. Use available sources for Weeks 1-5.  7. No instructor learning resources necessary. Support student search for resources.  For 1. through 9. also use the following books as sources:  Evolution: The history of an idea by Peter Bowler  One Long Argument by Ernst Mayr  Evolution by Mark Ridley  Evolution by Douglas Futuyma | 1. Students read available online learning modules: presentations, animations, videos, schematics for each learning topic, recent summary article.  2. Students read and follow an interactive timeline which consists of a series of mini essays on each of the topic periods, external links or more detailed fun-facts behind the scientific discoveries, and podcasts of Tom talking about personal aspects of lives of some of these great scientific minds; students participate in forum discussion on Earth dimension and age.  3. Students continue to read and follow an interactive timeline which focuses on Darwin and his contemporaries. Timeline will have links to movie clips and excerpts from Darwin’s books and autobiography as well as interesting facts about his life narrated by Tom and David Attenborough (BBC lectures and new Darwin series) presented as podcasts; students read recent article reviewing Darwin’s view of evolutionary theory; students write a brief critique of Darwin’s book *On the Origin of Species*, and blog their opinions on peers’ critiques.  4. Students continue to read and follow an interactive timeline as of last week. However, in this week’s timeline details on Mendel and Haeckel are added for Darwin’s time and timeline is updated to the 1970s and important discoveries in population genetics. An external link for population genetics simulation is included; students read a recent summary article for current views on role of genetics in evolution; students complete group exercise and associated blogs in the same groups as assigned for the challenge question forum discussion in Week 1.  5. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (ie, variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students read the provided obituary for Ernst Mayr as a guide for their Assignment 2; students complete Assignment 2.  6. Students review learning modules provided in Weeks 1-5 and all their formative exercises; students follow along provided schematics of the development of each of the topics in the unit (i.e., variation, heritability, population growth, natural selection, adaptation, reproductive isolation, speciation, extinction); students read provided opinion pieces on current controversies in contemporary theory of evolution; students participate in forum discussion on the evidence for evolution, and complete Assignment 3.  7. Student groups develop blogs or mini newspaper on the assigned controversy and participate in the activities assigned by the presenting group. | 1. PDFs, flash animations and videos of images and simple schematics, external web links and link to a review article.  2. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations.  3. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  4. Interactive time line with mini articles, external links, podcasts, videos, and some flash animations; link to a review article.  Use external links and exercises provided in Week 1 and in interactive timeline up to Week 4 to illustrate species, speciation, and phylogenetic concepts.  5. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts. Add podcasts, invited expert opinions on current controversies, link to Mayr obituary.  6. Use media from Weeks 1-5 for review. Add extra flash animations and videos of images and simple schematics, external web links to illustrate more complex concepts.  7. Support student needs for media. | 1. Participate in forum discussion on the challenge problem.  2. Participate in forum discussion on size and age of Earth.  3. Read and comment on student critiques of Darwin’s *On the Origin of Species*; announce student groups for the major project.  4. Read and comment on student blogs of group exercise.  5. Mark Assignment 2; read and comment on blogs for Assignment 2.  6. Return marked Assignment 2; mark Assignment 3 (return in Week 8); read and comment on blogs for Assignment 3; participate in forum discussion on the evidence for evolution.  7. Follow group progress and work each week; provide marks by Week 12 as per given rubrics. |

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