Gel Scramble
Posttest and Student Materials Evaluation

The following demographic questions are for evaluative purposes and will be kept confidential.

(1) Email address (for data tracking purposes only).

(2) Academic year:

a. Freshman
b. Sophmore
c. Junior
d. Senior
e. Other

(3) Department/major in which this course was offered:

a. Psychology
b. Biology
c. Neuroscience
d. Other

(4) College/university attending:

(5) Grade expected to receive in this course:

a. A
b. B
c. C
d. D
e. F

(6) Gender

a. Male
b. Female

(7) I would characterize myself as:

a. Asian
b. Black
c. Latino(a)
d. Native American
e. White
f. Other

(8) How many weeks has it been since you completed the Gel Scramble Module?

9) Suppose that on an a gel of an endonuclease digest, one observes the molecular weight standards ladder but no bands in other lanes, including the loading wells. Which explanation best explains these results?
   a. The current wasn't turned on so no DNA migrated through the gel.
   b. The DNA was not added to the digests.
   c. The ultraviolet illuminator must have burned out.
   d. The enzymes were omitted from the digests.
   e. Any of the above are equally good explanations for this outcome.

10) Why do we include the cut and uncut plasmid vector in separate lanes in our endonuclease digest protocols?
   a. As comparison if we get bands that match their molecular weight in other digests.
   b. In order to form concatamers.
   c. As a positive control for the digests.
   d. To compare their molecular size to the insert.
   e. To see if uncut and cut plasmids run at different rates in the gel.

11) Suppose that we are performing an endonuclease digest and don't get a cut from an enzyme at one predicted site but yet the same enzyme cuts at another predicted site. Which of the following is the best explanation?
   a. The enzyme wasn't added to the reaction.
   b. A greater concentration of the enzyme is necessary to bring the reaction to completion.
   c. The DNA was contaminated.
   d. The enzyme was contaminated.
   e. The site may have been methylated.

12) What of the following is true of PCR reactions?
   a. They routinely amplify the whole genome so that SNPS can be identified.
   b. They are routinely used to amplify entire genes and can establish if the alleles are different in biologically meaningful ways.
   c. They never make copy errors when amplifying DNA.
   d. They are used to clone DNA.
   e. They routinely can only amplify a small section of DNA, usually not even an entire gene.

13) Suppose we find bands in the lane in which we had the uncut plasmid that are much larger than the plasmid alone. These size of these larger bands all seem to be integer multiples of the plasmid. Which of the following is the best explanation for this phenomenon?
   a. The larger bands are probably higher weight molecular forms such as concatemers.
   b. The DNA has been contaminated by another, larger species of DNA.
   c. A ligating enzyme must be in operation to create these higher weight molecular forms.
   d. The current applied to the gel must have been hooked up backwards.
   e. b OR c.

14) Suppose that we use two different concentrations of template in a PCR reaction one was 100 X the concentration of the other. Which of the following outcomes would we expect?
   a. If a small number of cycles has been used, the higher concentration should provide many more copies.
   b. If a large number of cycles is used, there should be a small difference in the number of copies.
   c. The number of copies depends on the concentration of polymerase used but not the concentration of the template, so no difference between conditions in number of copies.
   d. All of the above are true.
   e. a & b only.

15) The definition of an endonuclease enzyme that has a unique site within a gene is:
   a. A piece of DNA that cleaves single stranded DNA in one place in the gene.
   b. A piece of RNA that cleaves double stranded DNA in one place in the gene.
   c. A protein that cleaves single stranded DNA in one place in the gene.
   d. A protein that cleaves double stranded DNA in one place in the gene.
   e. An RNAase that cleaves either DNA or RNA in a single, defined position.

16) Which of the following are needed for a PCR reaction?
   a. Primers adhering to the sense strand and anti-sense strands of DNA.
   b. A double-stranded DNA template.
   c. An endonuclease enzyme.
   d. All of the above.
   e. All of the above except not C.

17) Suppose that a given enzyme cuts in the multiple cloning (polylinker) site and also cuts twice in the insert. Which of the following band patterns would we expect to see on a gel?

   a. Three bands corresponding with one corresponding to the insert.
   b. Two bands since cuts in the multiple cloning site don't matter.
   c. Three bands if the reaction ran to completion.
   d. A single linear band corresponding to the plasmid and a single band corresponding to the molecular weight of the insert.
   e. Four bands—one corresponding to the plasmid molecular weight and three others slightly smaller than the weight of the insert.

18) Which of the following could be done with a PCR reaction?
   a. Forensic identification.
   b. Parental identification.
   c. Presence of viral DNA in a sample.
   d. Presence of a deleterious allele
   e. All of the above.

19) Suppose that you run an endonuclease digest and the uncut and linearized vector and vector run as expected. The vector plus insert lanes don't match the predicted sizes. None of the other bands match the predicted either. Which of the following is the most likely explanation for these results?

a. The inserted DNA is not what it is supposed to be.
b. The enzymes were mixed up.
c. The Inserted DNA was contaminated with other DNA that was probably inserted into a sunset of the plasmids.
d. A and b above.
e. A or above.

20) A plasmid is:

a. Genomic DNA.
b. The DNA found on ribosomes.
c. Small circular DNA forms found in the cytoplasm of bacteria.
d. Small circular DNA forms found in mammalian cells.
e. Small circular DNA forms found in the nucleus of bacteria.

21) A polylinker:

a. Is the same as a multiple cloning site.
b. Has sites that can be cleaved by different enzymes in close proximity to each other.
c. Can combine several plasmids with each other.
d. Links DNA to RNA.
e. A and b.

22) Enzymes such as EcoR1:

a. are called endonucleases.
b. cleave only defined sequences of DNA.
c. are used in PCR reactions.
d. all of the above.
e. A & b only.

23)Enzymes such as Taq polymerase:

a. are called endonucleases.
b. cleave only defined sequences of DNA.
c. are used in PCR reactions.
d. all of the above.
e. A & b only.

The following questions are based on your opinion of the learning materials used in the Gel Scramble module.

(24) The student lab manual was clear and easy to follow.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(25) Overall, the purpose of the computer tasks was clear and easy to follow.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(26) Understanding endonuclease digests and PCR is important.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(27) My understanding of endonuclease digests was enhanced by doing the computer tasks and examining their data.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(28) My understanding of PCR reactions was enhanced by the Gel Scramble module.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(29) My understanding of control procedures was enhanced by the module.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(30) I learned something about molecular biology from the module.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(31) I felt relaxed about performing the computer tasks because I knew that it was okay to make mistakes.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(32) I feel that this module helped me to think critically, especially when experiments don't go as planned.

(a)	(b)	(c)	(d)	(e)
strongly agree	**agree**	**neither**	**disagree**	**strongly disagree**

(33) Please describe the purpose of the module from a learning standpoint in the space provided below.