New York State Regents Examination in Physical Setting/Earth Science

2015 Technical Report

3UHSDUHG IRU WKH 1HZ <RUN 6WDWH 'HSDUWPHQW

E\

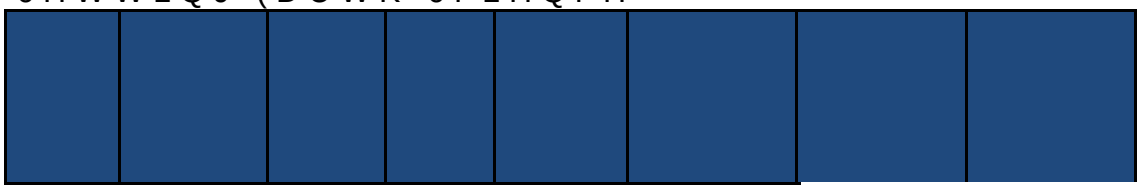
'DWD 5HFRJQLWLRQ &RUSRUDWLRQ

$SULO

WR LQGLFDWH 3HDUVRQLQDWLRQH FRUUHODWLRQ FRHIILFLHQ
KLJK VFRULQJ VWXGHQWV WHQG WR JHW WKH LWHP ULJKW ZI
EHWZHHQ WKH LWHP VFRUH DQG WKH WRWDO WHVW VFRUH Z
PDJQLWXGH L H DERYH]HUR PHDQLQJ WKH LWHP LV OLNH
SHUIRUPLQJ VWXGHQWV 3RLQW ELVHULDO FRUUHODWLRQV DUH
LQFRUUHFW RSWLRQV FRPPRQO\ UHIHUUHG WR DV ³GLVWUDF
GLVWUDFWRU DUH DQ LPSRUWDQW SDUW RI WKH DQDO\VLV 7
QHJDWLYH 3RVLWLYH YDOXHV FDQ LQGLFDWH WKDW KLJKHU
RU WKDW WKH LWHP NH\ IRU WKH FRUUHFW DQVZHU VKRXOG

5HIHU WR 7DEOHV DQG IRU SRLQW ELVHULDO YDOXHV RQ
RQO\ 7KH YDOXHV IRU DFURVV FKDQJHV VZHRU VDOO LWHPV LQGLFDW
GLVFULPLQDWLQJ UHDVRQDEO\ ZHOO EHWZHHQ KLJK DQG OR
G LVWUDFWHU RQH VWDQGDUG GHYLDWLRQ YHU\ FORVH WR]HUR LQGLFDWLQJ WK
LWHPV DV H[SHFWHG GXULQJ LWHP GHYHORSPHQW

7DEOH &KRLFH ,WHP $QDO\VLV 6XPPDU\ 5HJHQWV ([
6HWWLQJ (DUWK 6FLHQFH



Chapter 3: IRT Calibrations, Equating, and Scaling (Standards 2, and 4.10)

7KH LWHP UHVSRQVH WKHRU\ ,57 PRGHO XVHG IRU WKH 5HJ
6FLHQFH EDVHG RQ WKH ZRUN RI *HRUJ 5DVFK DQG 6DPXHO
SUHVHQFH LQ DSSOLHG WHVWLQJ SURJUDPV ,57 KDV VHYHUD
EHFRPH WKH VWDQGDUG SURFHGXUH IRU DQDO\]LQJ LWHP UH
WR 9DQ GHU /LQGHQ DQG +DPEOHWRQ ³7KH FHQWUDO I
PDWKHPDWLFDO IXQFWLRQ UHODWLQJ WKH SUREDELOLW\ RI
XQGHUO\LQJ DELOLW\ ´ $ELOLW\ LQ WKLV VHQVH FDQ EH WKI
³WKH H[SHFWHG YDOXH RI REVHUYHG SHUIRUPDQFH RQ WKH
5RJHU 7KLV SHUIRUPDQFH 7\SHUXRLPDRZHQQEHIXHUG
LQWHUFKDQJHDEOH\WKH UHPDLQGHU RI WKLV UHSRUW

$ IXQGDPHQWDO DVVXPSWLRQ ,57 LV WKDW LW OLQNV H[DPLQHH SHUI
DQG SODFHV WKHP RQ WKH VDPH VFDOH DOORZLQJ IRU DQ H
WKH GLIILFXOW\ RI WKH WHVW 7KLV LV SDUWLFXODUO\ YDO

&KHFNLQJ 5DVFK $VVXPSWLRQV

Local Independence

/RFDO LQGHSHQGHQFH /, LV D IXQGDPHQWDO DVVXPSWLRQ SXUSRVHV DQ\ RQH LWHP VKRXOG QRW DQ\ RWKHU LWHP RQ WKH WHVW DQ\ RWKHU LWHP RQ WKH WHVW ORFDOO\ LQGHSHQGHQW ZLWKLQ HDFK ODWHQW YD

—

7KLV IRUPXOD HVVHQWLDOO\ VWDWHV WKDW WKH SUREDELOO FRQGLWLRQLQJ RQ WKH WUXH DELOLWLHV RI WKH RXO RI WKH FRQGLWLRQDO SUREDELOLWLHV DFURVV HDFK LWHP ZKHUH WKH MRLQW SUREDELOLWLHV DUH HTXDO WR WKH SUR 7KH HTXDWLRQ DERYH VKRZV WKH FRQGLWLRQ DIWHU VDWLVI IRUP RI ORFDO LQGHSHQGHQFH \LHOGV 7KH GLVWLQ EHFDXVH PDQ\ LQGLFDWRUV RI ORFDO GHSHQGHQF\ DUH DFW FRYDULDQFHV RI DOO SDLUV RI LWHP UHVSRQVHV FRQGLWLR :KHQ WKLV DVVXPSWLRQ LV PHW WKH MRLQW SUREDELOLW\ LW WKH SURGXFW RI WKH SUREDELOLWLHV RI UHVSRQVHV WR W WKH IROORZLQJ H[SUHVVLRQ FDQ EH GHULYHG

$$3(X_1 = x_1, X_2 = x_2, \ldots, X_n = x_n \mid \theta) = \prod_{i=1}^{n} P(X_i = x_i \mid \theta)$$

0DUDLV DQG $QGULFK SRLQW RXW WKDW ORFDO LWHP G ZD\V WKDW PD\ EH VDWLVILHG ZKHQ WKH ILUVW ZD\ FFXUV ZKHQ W XQLGLPHQVLRQDOLW\ LV YLRODWHG +RZHYHU GLPHQVLRQDOLW\ GHWHUPLQH VWXGHQW SHUIRUPDQFH WKLV FDQ EH FDOOHG ZKHQ UHVSRQVHV WR DQ LWHP DUH VWDWLVWLFDOO\ LQGHS

LQGHSHQGHQFH DQG FDQ EH FDOOHG UHVSRQVH GHSHQGHQF
GHSHQGHQFH RQH FDQ VHH WKDW ZKLOH ORFDO LQGHSHQGH
GLIIHUHQW DVVXPSWLRQV DQG WKHUHIRUH UHTXLUH GLIIHU

5HVLGXDO LWHP FRUUHODWLRQV SURYLGHG LQ :,167(36 IRU
GHSHQGHQFH DPRQJ WKH 5HJHQWV ([DPLQDWLRQ LQ 3K\VLFD

IDFWRU RI WKH 6(0 $V DQ H[DPSOH VWXGHQWV ZLWK D JLYH
EHWZHHQ í 6(0 DERXW WZRUWKLQ6G0V FRQWKHQEHLQWHUYD
DERXW SHUFHQW

7KH FRHIILFLHQW DOSKD RUGHUV VWUXFWXUH LQ 3K
6FLHQFH SURYLGHG LQQ 7DEOH

7DEOH 5HOLDELOLWLHV DQG 6WDQGDUG (UURUV RI 0HDVXUHPH
6HWWLQJ (DUWK 6FLHQFH

6XEMHFW	&RHIILFLHQW $OSKD	SEM
(DUWK6FLHQFH		

$VVXPLQJ QRUPDOO\ GLVWULEXWHG VFRUHV RQH ZRXOG H[S
ZLWKLQ RQH VWDQGDUG GHYLDWLRQ RI WKH PHDQ $Q HVWLP
EH FRPSXWHG DV

$$ 7 \sqrt{ [\quad] } $$

Conditional Standard Error of Measurement

(YHU\ WLPH DQ DVVHVVPHQW LWHP LV DGPLQLVWHUHG FHUWDLQ LQIHUHQFHV
VDPH H[DP ZHUH DGPLQLVWHUHG DQRWKHU QXPEHU RI WLPHV WR WKH VDP
GLVWULEXWLRQ RI WKH VWXGHQW¶V UDZ VFRUHV ZRXOG EH REWDLQHG
QR HUURU DQG WKH VWDQGDUG GHYLDWLRQ RI WKH GLVWU
VWDQGDUG HUURU WKDW FDQ EH H[SHFWHG RYHU GLIIHUHQW EHWZHHQ WDNH
PRGHO ZH FDQ DSSO\ WKLV FRQFHSW PRUH JHQHUDOO\ WR D
DQG FDOFXODWH WKH SUREDELOLW\ RI REWDLQLQJ H7KHK SR
VWDQGDUG GHYLDWLRQ RI WKLV FRQGLWLRQDO GLVWULEXWL
PHDVXUHPHQW &6(0 7KH FRPSXWHU SURJUDP 32/<&6(0 .RO
PHFKDQLFV RI WKLV FRPSXWDWLRQ

7KH UHKDSWLEHRQDZHHQ WKH VFDOH VFRUH LV QRW H[SUHVVLEOH
EHFDXVH LW LV D EOHQG RI WKLUG GHJUHH SRO\QRPLD
DORQJ ZLWK WKH QRQOLQHDU UHODWLRQVKLS, EHWZHHQ WKH
LV HTXDWHG IURP \HDU WR \HDU WKH UHODWLRQVKLS EHWZ
RULJLQDOHWKSLRUG\QRPLDO UHODWLRQVKLS WR PDQLSXODWH LV
PDWKHPDWLFDO IRUP ,Q WKH DEVHQFH RI D VLQJOH WKHPDWFKHH
VFRUHV WKH &6(0V WKDWWRUHH YDLYDOLG EHWZHHQ ,57RHDHQQFW EH FR
VFDOH VFRUH PHWULF

7KH XVH RI 557DWR VFDOH DQG HTXDWHG RZKHPEHGGHG WHVW VR
FDOFXODWH &6(0V XVLQJ WKH SURFHGXUHV GHVFULEHG E\ .R
GLFKRWRPRXVO\ VFRUHG LWHPV DQG H[WHQGHG E\ :DQJ .RO

6RPH SUHIHU WKH IROORZLQJ LQWHUSUHWDWLRQ ,I D VWXGHQW ZHUH
LQWHUYDOV FRQVWUXFWHG @ SUHU

GLIILFXOW IRUPV RI WKH WHVW" ,I WZR SDUDOOHO IRUPV RI FRQVLVWHQF\ RI WKH PHDVXUH ZRXOG KHOG VLJQLILFDQWO\ IURP WKH ILUVW VHW RI WHVW VFRUHV PDWFKHG WKH GHFLV WKH WDEOHV EHORZ

7(67 7:2		7(67 21(/(9(/ ,	7(67 21(/(9(/ ,,	7(67 21(0$5*,1$/
	/(9(/ ,	M	M	M”
	/(9(/ ,,	M	M	M”
	0$5*,1$/	M’	M’	

)LJXUH 'HFLVLRQ 7DEOH IRU 7ZR +\SRWKHWLF

7(67 7:2		7(67 21(/(9(/ ,	/(9(/ ,,	/(9(/ ,,,	/(9(/ ,9	0$5*,1$/
	/(9(/ ,	M	M	M	M	M”
	/(9(/ ,,	M	M	M	M	M”
	/(9(/ ,,,	M	M	M	M	M”
	/(9(/ ,9	M	M	M	M	M”
	0$5*,1$/					

Chapter 5: Validity (Standard 1)

5HVWDWLQJ WKH SXUSRVH DQG XVHV RI WKH 5HJHQWV ([DPL
H[DPLQDWLRQ LQHH DFKLHYHPHQW DJDLQVW 1HZ <RUN 6WDWH
SUHSDUHG E\ WHDFKHU H[DPLQDWLRQ FRPPLWWHHV DQG 1HZ
DQG WHVWLQJ DJDLQVW VWDQGDUGV WKH DFKHUV DQG VWXGHQWV ZLWK L
OHDUQLQJ DQG SHUIRUPDQFH DJDLQVW WKH HVWDEOLVKHG F
XVHG WR LGHQWLI\ VWXGHQW VWUHQJWKV DQG QHHGV WR JX
SURYLGH VWXGHQWV SDUHQWV FRXQVHORUV DGPLQLVWUD
DQG GDVLO\ XQGHUVWRRG DFKLHYHPHQW LQIRUPDWLRQ WKDW
HGXFDWLRQDO DQG YRFDWLRQDO GHFLVLRQV DERXW VWXGH
5HJHQWV ([DPLQDWLRQ LQ 3K\VLFDO 0`H

WKHRP@GL

UHVSRQGLQJ WR HDFK LWHP (DFK RI LWLQHSVHDHFHHPXHQWLVDRWHW
IDLUQHVV IRU DOO VWXGHQWV\DPELQWHUVJHRWLQJ DFRQVLVWHQF\Q
YDOLGLW\ RI WKHLU LQWHUSUHWDWLRQV

6SHFLILFDWHP UWKHLHZ SUWKHVRXUFXRDLWWHVP FKDUDFWHU
6WDWH (GXFDWLRQ 'HSDUWPHQW ORRNV IRU LQ GHYHORSLQJ

ODQJXDJH DQG JUDSKLFDO DSSURSULDWHQHVV
VHQVLWLYLW\ ELDV
ILGHOLW\ RI PHDVXUHPHQW WR VWDQGDUGV
4. FRQIRUPLW\ WR WKH H[SHFWDWLRQV IRU WKH VSHFLILF L

(DFK VHFWLRQ 6GXD..lD`K YHì€@DWLenHe@Z€Y#A0@0 p0 WLGH
p0...p@$R%02€vð°€ Q V 0HWXD...L pPtQ VVS3PHDfp€ VpA

$SSHQGL[$)XUWKHU HYLGHQFH LV GRFXPHQWHG LQ WKH V
ZHOO DV WKH UHVXOWV RI KXPDQ EHKDYLRUDO WHVWLQJ DQG WKH RROOORZLQ

$GKHUHQFH WR VWDQGDUGL]HG DGPLQLVWUDWLRQ SURFHGXU
WKHLU LQWHUVSXHFWLRQDO SURWRFROV DOORZ IRU DGHTXDWH DQG
VFRULQJ WKH ZRUN RI HYHU\ VWXGHQW ZKR WDNHV WKH [DP
$GPLQLVWUDWRUV RI WKH (GXFDWLRQDO ([DPLQDWLRQV
KWWS ZZZ S Q\VHG JRY DVVHVVPHQW KDQGEHRRNV LQFOXGH
LPSOHPHQWHG IRU WKH 1HZ <RUN VWDWH JUDGH $OO VHFRQ
H[DPLQDWLRQV DUH DGPLQLVWHUHG RQ SDSHU WKURXJKRXW WKH
VWXGHQWV 7KHVH VWDQGDUG SURFHGXUHV DOVR FRYHU WH
WHVWLQJ DFFRPPRGDWLRQV FRQVLVWHQW ZLWK WKHLU ,QGL
$FFRPPRGDWLRQ 3ODQV 3ODQV)XOO WHVW DGPLQLVWU
KWWS ZZZ S Q\VHG JRY DVVHVVPHQW KVJHQ

7KH LPSOHPHQWDWLRQ VFRULQJ SURFHGXUHV GLUHFWO\ VX
WHVW VFRULQJ SUDFWLFHV WKHUHIRUH IRFXV RQ SURGXFLQ
VFRUHG YLD ORFDO VFDQQLQJ DQG WHFKQRORJLHV WKDW
7KHUH DUH PDQ\ VWXGLHV WKDW IRFXV RQ YDULRXV HOHPHQ
FRQVWUXFWHG UHVSRQVH LWHPV IRU XVH RQ ZHOO DOLJQHG
VFRUHV IRU FRQVWUXFWHG UHVSRQVH LWHP

4XDOLWDWLYH .HQ\ /XPOH\ 0F1DPDUD
*RUPDQ 5HQWVFK 6FKOHFKHU 'D\ %URQVWR
+XIIFXWW -RKQVRQ 3HQQ\ DQG *RUGRQ :HLJ
'HWHFWLRQ DQG FRUUHFWLRQ RI UDWLQJ ELDV 0F4XHHQ
0\IRUG :ROIH %DUNDRXL 3DW] -XQNHU
&RQVLVWHQF\ RU UHOLDELOLW\ RI UDWLQJV &RQJGRQ
1XQJHVWHU 6ZDQVRQ 1DQGDNXPDU 0F4XHHQ &R
0HUR 0RWRZLGOR :HLQURWW -RQHV
5XEULF GHVLJQV WKDW RIIHU LQFUHDVHG VFRULQJ FRQVLVWHQF\
*LWRPHU &URQEDFK /LQ %UHQQDQ +DHUWHO
-RKQVRQ *RUGRQ 6PLWK /HDFRFN *RQ]DOH]

7KH GLVWLQFWLRQ EHWZHHQ RSHUDWLRQDO WHVW VFRULQJ LQFOXGH FOR
EHJLQ EHIRUH WKH RSHUDWLRQDO WHVW LV HYHQ VHOHFWHG
LWHPV WKDQ DSSHDU RQ WKH RSHUDWLRQDO WHVW DUH DGP
RI ³DQFKRU´ SDSHUV UHSUHVHQWLQJ VWXGHQW UHVSRQVHV
FRQVWUXFWHG DURXQG VSHFLILHG 7KH REMHFWLYH RI WKHVH ³U
WUDLQLQJ VHW IRU VFRUHU WUDLQLQJ DQG H[HFXWLRQ WKH
VWDWLVWLFDO LQIRUPDWLRQ DERXW WKH UHOLDELOLW\ IRU HDFK
EDVLV IRU FUHDWLQJ UDWLQJ JXLGHV DQG VFRULQJ DQFLOO

7R UHYLHZ DQG VHOHFW WKHVH VDQFKRU SDSHUV 1HZ <RUN
ILQGLQJ VHVVLRQ ,Q WKH UDQJH ILQGLQJ SURFHVV FRPPLW
IRU HDFK ILHOG &RPPLWWHH PHPEHUV IDPLOLDUL]H WKHPVHO

VFRUH D QXPEHU RI UHVSRQVHV WKDW DUH UHSUHVHQWDWLY
LQGHSHQGHQW VFRULQJ LV FRPSOHWHG
FRQVHQVXV VFRUHV IRU WKH VWXGHQW UHVSRQVHV 'XULQJ
LGHQWLI\ DQG DQQRWDWH IRU XVH LQ WUDLQLQJ DQG OLYH
EXLOG WUDLQLQJ PDWHULDOV IRU WKH YHQGRU¶V VFRUHUV
FRQVWUXFWHG 7UHHV
([DPLQDWLRQ LQ 3K\VLFDO
KWWS ZZZ Q\VHGUHJHQWV RUJ (DUWK6FLHQFH

'XULQJ WKH UDQJH ILQGLQJ DQG ILHOG WHVW VFRULQJ SURF
VRXUFHV RI YDULDWLRQ LQ VFRULQJ 2QH SRVVLEOH VRXUFH
XQLQWHQGHG UDWHU ELDV DVVRFLDWHG ZLWK LWHPV DQG H
RI VXFK ELDV WKLV W\SH RI YDULDWLRQ PD\ EH WKH PRVW P
FRQWURO DQG PHDVXUH 5DWHU ELDVHV FDQ DSSHDU DV VHY
%LDV DOVR LQFOXGHV SKHQRPHQD
RQH HOHPHQW
FDQ EH HIIHFWLYHO\ FRQWUROOHG E\ WUDLQLQJ SUDFWLFHV

7KH WUDLQLQJ SURFHVV IRU RSHUDWLRQDO VFRULQJ E\ VWD
DFWXDO VWXGHQW ZRUN RQ FRQVWUXFWHG UHVSRQVH WHVW
FKDUDFWHULVWLFV W\SLFDO RI H[DPLQHH UHVSRQVHV DV ZH
PDNH 7KLV LQIRUPDWLRQ LV XVHG WR WUDLQ UDWHUV RQ K
UHVSRQVHg O

LWHPV WR VFRUH 1R PRUH WKDQ KDOI RI WKH LWHPV VKRXOG EH UHPRYHG IURP WKH WHVW DU
UDWHU 7KLV KDV WKH HIIHFW RI LQFUHDVLQJ WKH FRQVLVW
DOORZLQJ HDFK UDWHU WR IRFXV RQ D VXEVHW RI LWHPV ,W
HQWLUH WHVW IRU DQ\ RQH VWXGHQW 7KLV SUDFWLFH UHGX
LQGLYLGXDO H[DPLQHHV $GGLWLRQDOO\ WKH UHVHDUFKHUV GR
VWXGHQWV

2QH VWDWLVWLF WKDW LV XVHIXO IRU HYDOXDWLQJ WKH UHV
SRLQW ELVHULDO FRUUHODWLRQ RQ WKH GLVWUDFWRUV $ K
VWXGHQWV DUH QRW DEOH WR LGHQWLI\ WKH FRUUHFW UHVS
ILQGLQJ RI SRRU PRGHO ILW IRU DQ LWHP PD\ DOVR VXSSRU
ZDWKH LWHPLGHQWLFDWLRQ SURFHGXUH WR REWDLQ FRQWHQW
GLVWUDFWRUV LQ WKH PXOWLSOH FKRLFH LWHP IRUPDW DSSHD
H[DPLQHHV DUH QRW EHLQJ GUDZQ WR DQ XQLQWHQGHG FRQ

5.3 Evidence Based on Internal Structure

7KH WKLUG VRXUFH RI YDOLGLW\ HYLGHQFH FRPHV IURP WKH
WHVW GHYHORSHUV HYDOXDWH WKH WHVW VWUXFWXUH WR H
HYDOXDWLRQ PD\ LQFOXGH DWWHQWLRQ WR LWHP LQWHUDFW
IRU RU DJDLQVW RQH RU PRUH VXEJURXSV RI H[DPLQHHV GH
DQDO\VLV (YDOXDWLRQ RI LQWHUQDO WHVW VWUXFWXUH DO
DQDO\VHV WHVW UHOLDELOLW\ DQG WKH ,57 VFDOLQJ DQG

7KH IROORZLQJ DQDO\VHV ZHUH FRQGXFWHG IRU WKH 5HJHQ
6FLHQFH

- LWHP GLIILFXOW\
- LWHP GLVFULPLQDWLRQ
- GLIIHUHQWLDO LWHP IXQFWLRQLQJ
- ,57 PRGHO ILW
- WHVW UHOLDELOLW\
- FODVVLILFDWLRQ FRQVLVWHQF\
- WHVW LQIRUPDWLRQ

0XOWLSOH DQDO\VHV DOORZ DQ HYDOXDWLRQ RI WKH LWHP OHYHO 5DWH
LWHP OHYHO HVWLPDWHV ZHUH REWDLQHG IURP WKH 5HJHQ
3K\VLFDO 6FLHQFH 6WXGHQW SRSXODWLRQ EHFDXVH FRQVLVWHQW ZLWK WKH
7KH HYDOXHV IRU WKH 0& LWHPV UDQJHG IURP DERXW WR
YDOXHV IRU WKH &5 LWHPV IURP DERXW WR)URP WKH
LOOXVWUDWHG LQ WKH SORW D ZLGH UDQJH RI LWHP GLIILF
GHYHORSPHQW JRDO

5HIHU WR WKH ILHOG WHVW UHSRUW IRU GHWDLOHG LQIRUPDWLRQ DVVHVVPHQW UH

([DPLQDWLRQ LQ 3K\VLFDO 6HWWLQJV (DUWK 6FLHQFHV LW\ RI
5HIHU WR VHFWLRQ RI WKLV UHSRUW IRU DGGLWLRQDO GHW

$ GHFLVLRQ FRQFHUQLQJ DSSURSULDWHQHVV HDVXUHV WKH DJUHHPHQW EHWZHHQ
RYHUODSSLQJ HTXDOO\ GLIIHUHQWLDWHG SURGXFWV WR WKH WH
VWXGHQWV WKH FRQVLVWHQF\ RI WKH PHDVXUH ZRXOG EH U
GHFLVLRQV PDGH IURP WKH ILUVW VHW RI WHVW VFRUHV PDV
VFRUHV 'HFLVLRQ DFFXUDF\ LV DQ LQGH[WR GHWHUPLQH W
FODVVLILFDWLRQ GLIIHUHQW WKDQ H[SHFWHG IURP WKH WUX
SURYLGHV VWURQJ HYLGHQFH WKDW WKH LQWHUQDO VWUXFV

)RU 5WHJHQWV ([DPLQDWLRQ LQ 3K\VLFDO 6HWWLQJ (DUWK 6F
DFFXUDF\ YDOXHV DUH KLJK LQGLFDWLQJ YHU\ JRRG FRQVLV
'HFLVLRQ FRQVLVWHQF\ UDQJHG IURP WR DQG WKH G
%RWK GHFLVLRQ FRQVLVWHQF\ DQG DFFXUDF\ YDOXHV EDVHG
FRQVLVWHQF\ DQG DFFXUDF\ RI H[DPLQHH FODVVLILFDWLRQV

,Q DGGLWLRQ WR PRGHO ILW D VWURQJ DVVXPSWLRQ RI WKH
WHVW LV XQLGLPHQVLRQDO 9LRODWLRQ RI WKLV DVVXPSWLL
RWKHU WKDQ WKH LQWHQGHG FRQWHQW DQG LQGLF$DWH WKD
SULQFLSDO FRPSRQHQWV DQDO VWLXSSRUWV RQOLQH XHQWHUSRVDWLRQ
UHVXOWV SURYLGH VWURQJ HLYLGHQFH WKDW WKH WVD([DPLQDWLRQ
6HWWLQJ6FLHQFHV WHVW[SODLQLQJ D ODUJH SRUWLRQ RI WKH YDULD
DQDO\VLV GRHV QRW FKDUDFWHUL]H RU H[SODLQ WKH GLPHQ
WKH WHVW LV ODUJHO\ XQLGLPHQVLRQDO DQG WKDW WKH GL
WR VHFWLRQ IRU GHWDLOV RI WKLV DQDO\VLV

&RQVLGHU WKLV FROOHFWLRQ RI GHWDLOHG DQDO\VHV RQ WK
3K\VLFDO 6HWWLQJ (DUWK 6FLHQFH VWURQJ HYLGHQFH H[LV
SURYLGLQJ YDOLG DQG UHOLDEOH LQIRUPDWLRQ DERXW H[D

5.4 Evidence Based on Relations to Other Variables

$QRWKHU RI YDOLGLW\ HYLGHQFH LV EDVHG RQ WKH UHOD
FRPPRQ HQFRPSDVVHV WZR YDOLGLW\ FDWHJRULHV SUHYD
DQG SUHGLFWLYH YDOLGLW\ 7R PDNH FODLPV DERXW WKH Y
SXUSRVHV VXFK DV WKH 5HJHQWV ([DPLQDWLRQ LQ 3K\VLFD
VXSSRUWHG E\ SURYLGLQJ HYLGHQFH WKDW WKH WHVW VFRUHV
PHDVXUH WKH LQWHQGHG FRQVWUXFWV $OWKRXJK QRW DEVROXWH LQ
FRQFXUUHQW WHVW VFRUH YDOLGLW\ H[LVWV VXFK FRUUHOD
FRQFXUUHQW YDOLGLW\7R IXUWKHU GHPRQVWUDWH WKDW WKH
RWKHU WHVWV PHDVXULQJ WKH[DPLQDWLRQ 3K\VLFDO 5HWW
DUH LGHDOO\ VWURQJO\ DWWHQXDWHG DFTXLVLWLRQ RSSRUW[XQGK FGRVWDO\

,PSRUWDQW D VWURQJ FRQQHFWLRQ EHWZHHQ FODVVURRP FX
WKDW 1HZ<RUN6WDWH IDPLOLDU ZLWK ERWK WK

HQDFWPHQW LQ WKH FODVVURRP GHYHORS DOO FRQWHQW I
6FLHQFH

,Q WHUPV RI SUHGLFWLYH YDOLGLW\ WLPH LV D IXQGDPHQW
VWDQGDUG IRU VXSSRUWLQJ WKH YDOLGLW\ RI SUHGLFWLYH
UHTRXLKHPHQW5 LWP YLOWP LH LPP RUWDQW LR JDWKHU GYLL

References

$PHULFDQ (GXFDWLRQDO 5HVHDUFK $VVRFLDWLRQ $PHULFDQ &RXQFLO RQ 0HDVXUHPHQW LQ (GXFDWLRQ DQG 1DWLRQDO &RXQFLO RQ 0HDVXUHPHQW LQ (GXFDWLRQ :DVKLQJWRQ '& $PHULFDQ (GXFDWLRQDO 5HVHDUFK $VVRFLDWLRQ

%DUNDRXL .KDOHG 0HDVXUHPHQW RI PDUNLQJ PHWKRG DQG UDWHU H[SHUWLVH LQ UDWHU SHUIRUPDQFH DVVHVVPHQW LQ (GXFDWLRQDO 3ULQFLSOHV 3ROLF\ DQG 3UDFWLFH

&RQJGRQ 0DF4XHHQ - 7KH VWDELOLW\ RI UDWHU VHYHULW\ LQ SURJUDPPDWLF RI (GXFDWLRQDO 0HDVXUHPHQW

&RRN ' $SHFNPDQ 7 - 'RHV VFDOH OHQJWK UHDVRQ WHVW SRLQW UDWLQJ VFDOHV QHHG 6FLHQFHV (GXFDW

&URQEDFK / - /LQQ 5 / %UHQQDQ 5 7 +DHUWHO (IRU HGXFDWLRQDO DVVHVVPHQWV /RV $QJHOHV &$ 8QLYH (YDOXDWLRQ 1DWLRQDO &HQWHU IRU 5HVHDUFK RQ (YDOXD)HEUXDU\ IURP ZZZ FVH XFOD HGX SURGXFWV HYDO

&URQEDFK / - &RHIILFLHQW DOSKD DQG LWV OHDUQHUV

&URQEDFK / -)LYH 3HUVSHFWLYHV RQ YDOLGLW\ DUJ 9DOLGLW\ ±+LOOVGDOH 1- /DZUHQFH (UOEDXP

1DWLRQDO *RYHUQRUV $VVRFLDWLRQ &RPPRQ &RUH 6WDWH 6WDQGDUGV $XWKRUV

*RUPDQ & $ 5HQWVFK - 5 RIUHIHUHQFH DWWULEXWH HUURUV LQ XVLQJ SHUIRUPDQFH ±

*XOOLNVHQ 7KHRU\ RI PHQWDO WHVWV

+DPEOHWRQ 5 . 1RYDN 0 5 7RZDUG DQ LQWHJUDWHG UHIHUHQFH-RXULHG 0HDVXUHPHQW

+DPEOHWRQ 5 . 6ZDPLQDWKDQ +HP UHVSRQVH 3RZHU 6DJH 3XEOLFDWLRQV

+DQVRQ % $[WHQVLRQ RI /RUG :LQJHUVN\ DOJRULWKP WR FR SRO\WRPRXV LWHPV 5HWULHYHG)HEUXDU\ IURP

+DUL 3 &ODXVHU % (*UDERYVN\ , 1XQJHVWHU 5 - 6SULQJ $Q H[DPLQDWLRQ RI UDWHU GULIW (GXFDWLRQDO 0HDVXUHPHQW

:HLQURWW / -RQHV % 2YHUW YHUVHV &RYHUW DVV
'HYHORSPHQW

:RHKU ' -+XIIFXWW $, 5DWHU WUDLQLQJ IRU SHUIRU
-RXUQDO RI 2FFXSDWLRQDO DQG 2UJDQL]DWLRQDO 3V\FKR

:ROIH (:*LWRPHU ' 7KH LQIOXHQFH RI FKDQJHV LQ DVVHVV
SV\FKRPHWULF TXDQWLWDWLRQ VFRUH GXFDWLRQDO 7HVWLQJ 6

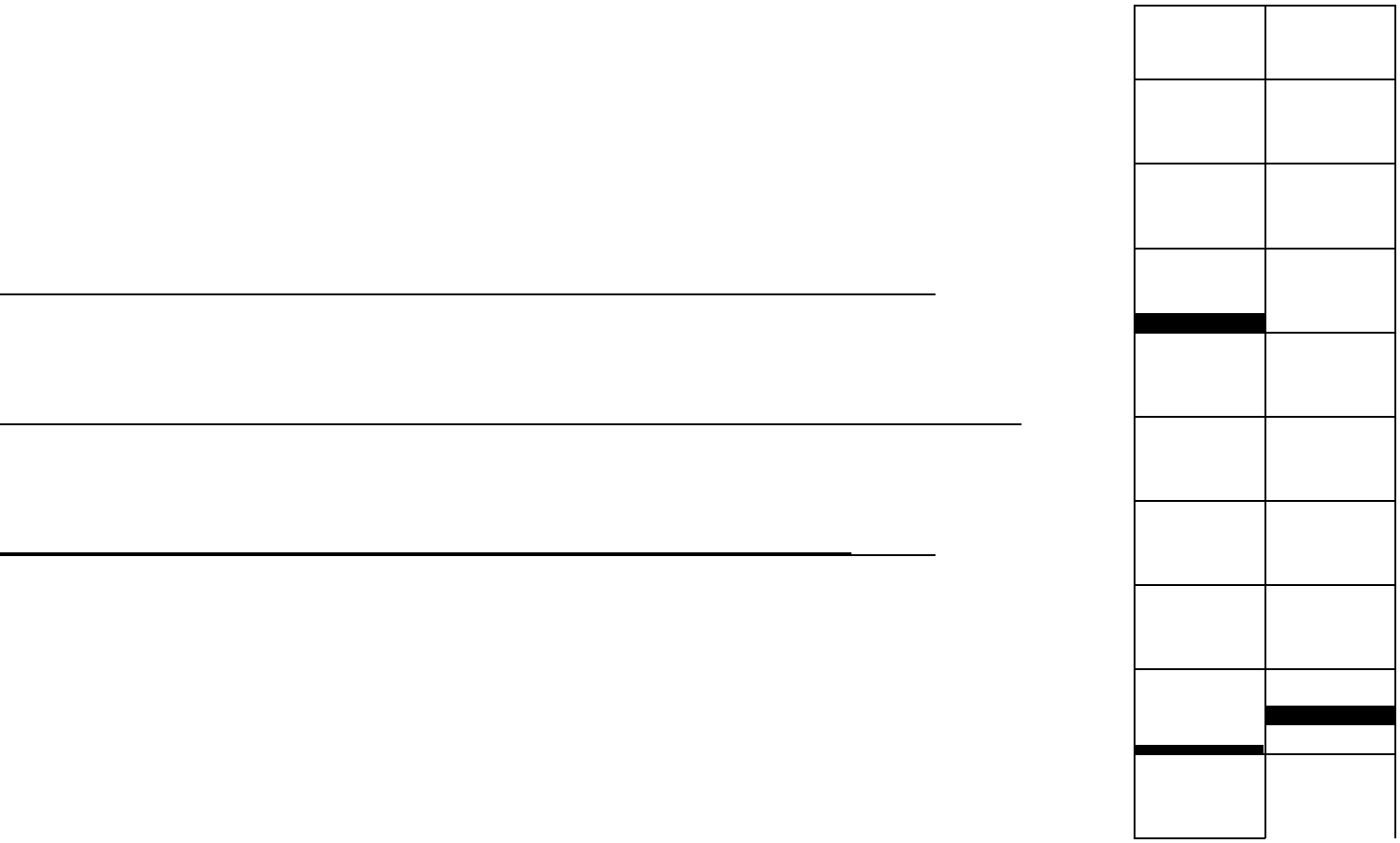
Appendix A – Item Writing Guidelines

General Rules for Writing Multiple-Choice Items

1.

8.

CHECKLIST OF TEST CONSTRUCTION PRINCIPLES
(Multiple Choice Items)



)LJXUH6F%DWWHUSORW 5HJHQWV ([DPLQDWLRQ LQ 3K\VL

)LJXUH6W%XGHQW 3HUIRUPDQFH 0DS 5HJHQWV ([DPLQDWLRQ

)LJXUH6FUHH 3ORWV 5HJHQWV ([DPLQDWLRQ LQ 3K\VLFD

7DEOH6XPPDU\ RI ,WHP 5HVLGXDO &RUUHODWLRQV 5HJHQWV
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6WDWLV\ 9DOXH
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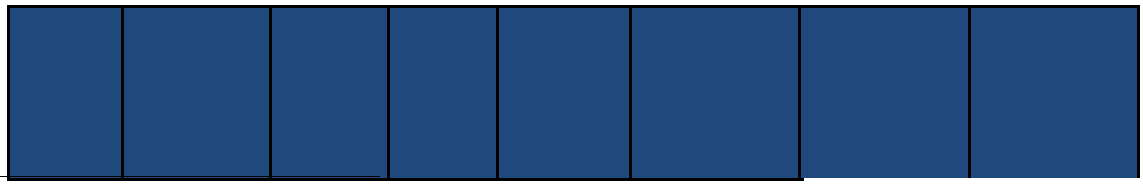
6'
0LQLPXP
3
3
3
3
3
0D[LPXP
!_ _

7DEOH*UR XS 0HDQV 5HJHQWV ([DPLQDWLRQ LQ 3K\VLFDO 6HW

Demographics	Number	Mean Scale score	Standard error of group
All Students	9295	59.74	14.69
Ethnicity			
American Indian/Alaska Native	62	61.05	13.44

Appendix C – Tables and Figures for January 2015 Administration

7 D E O H 0 X & O W L & K R L F H , W H P $ Q D O \ V L V 6 X P P D U \ 5 H J H Q W V ([D P L Q
6 H W W L Q J (D U W K 6 F L H Q F H



,WHF
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VFRU
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VFRU

)LJXUH6&DWWHUSORW 5HJHQWV ([DPLQDWLRQ LQ 3K\VL

)LJXUH6WXGHQW 3HUIRUPDQFH 0DS 5HJHQWV ([DPLQDWLRQ

)LJXUH6&UHH 3ORWV 5HJHQWV ([DPLQDWLRQ LQ 3K\VLFD

7DEOH6&PPDU\ RI ,WHP 5HVLGXDO &RUUHODWLRQV 5HJHQWV
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6WDWLV\ 9DOXH
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