Writing Good Assessments 2009

Analysis of item performance

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Construct validity

Construct validity – relates to what exactly (e.g. the ability or skill or the language form/structure or function) is being tested.

- ✓ **A test has 'construct validity' when it is clear that it measures just the ability or skill (and NOT something else or more than) it is supposed to measure**

Validity evidence

1. From Item Development Procedures

   Item Review

   Cognitive Trials (Answer Justification/Think-Aloud)

2. From statistical Study of Item Responses

Item Review

- **Comprehensibility**
  - It is not clear what question is being asked.
  - The item uses unfamiliar vocabulary that is not clearly defined, or words or phrases that have unclear, confusing, or ambiguous meanings.
  - Diagrams are not clear.

Item Review

Test-wiseness

- Some of the distractors are not plausible/stand out as being obviously incorrect.
- The correct answer is longer, more specific, or more complete than other options.
- One of the answer choices is qualified differently from the other response options, and/or uses giveaway words such as “usually” or “never”.
- A subset of the options are collectively exhaustive. (e.g., the use of logical opposites may lead the student to eliminate the other answer choices).
- One of the answer choices contains vocabulary at a different level of difficulty from the other response options.
- The language in one of the answer choices mirrors or is obviously closely related to the language in the stem.
- One of the answer choices doesn’t follow grammatically from the stem.

Answer Justification/Think Aloud

- Students give explanations for their choices//encouraged to talk about their approach to answering each question.

- Answer Justifications/Think-Aloud sessions provide information about how students approach test items and whether they are using the knowledge and skills assumed by the item writers.

- Include questions, such as:

  What was the item asking you to do?

  Why did they answer as you did?

  Why were the distractors incorrect? (MC)

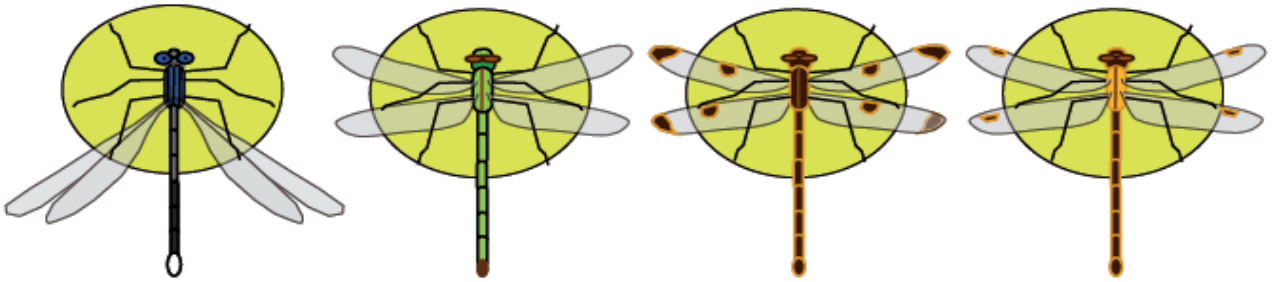
Answer Justification in the Classroom

- After a classroom test, provide students the opportunity to discuss each item and provide reasoning for their wrong answers.
- Helps students learn from errors and helps detect questions that fail to perform as intended.
  - Students may offer a correct line of reasoning that justifies an answer that no one else in the class or the teacher thought was right
  - Informal polling about who got a specific question right/wrong may determine that certain questions are deficient because the better students are missing the item while the less good students get the question right.

Science Skills

Observing (Primary)

9. Henry observed the four insects shown as they rested on a rock.



He wants to sort the insects into two different groups. He can sort them according to

(A) their body lengths.
(B) how the insects rest their wings.
(C) the number of legs each insect has.
(D) the number of wings each insect has.

Students make an observation using information presented in either graphical or textual form

(Source: ICAS-Science 2008, Year 3, Question 9, Key: B, 51% correct)

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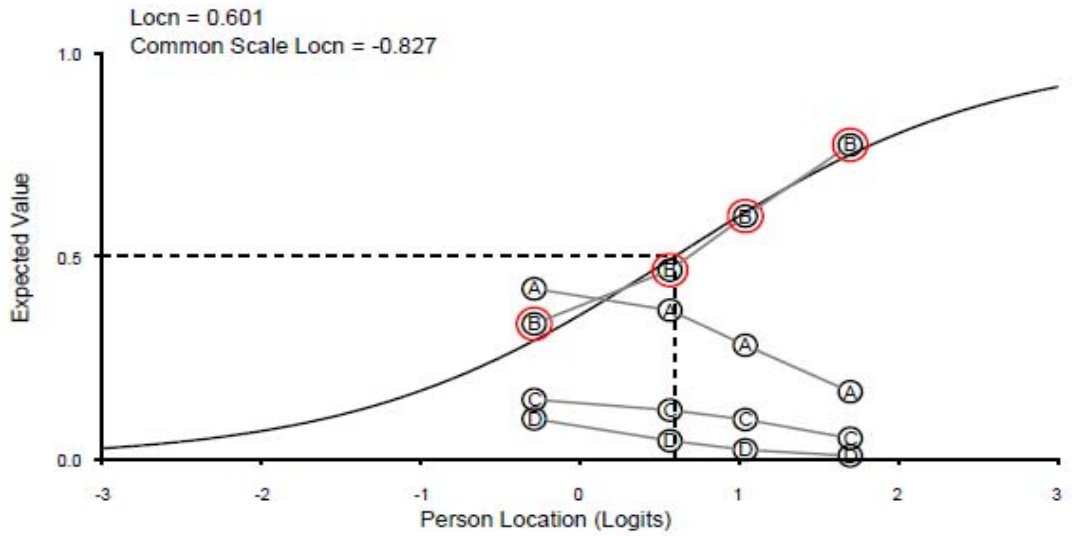
Science Skills: Sort insects into two groups

Statistics for Item Number:9 Sort insects into two groups									
Group	No. in Group	% Omit	% Correct of those who attempted	% A	% B *	% C	% D	% E	Discrimination Index (R P Bis)
Total	12010	1.22	51.63	31.97	51.00	10.84	4.96	0.00	0.35
Upper	3693	0.14	73.35	19.01	73.25	6.36	1.25	0.00	0.20
Middle	5350	0.36	47.29	35.81	47.12	12.24	4.47	0.00	0.11
Lower	2967	4.15	31.61	41.19	30.30	13.89	10.48	0.00	0.18
Males	6427	1.26	52.24	30.25	51.58	11.50	5.41	0.00	0.34
Females	5464	1.13	51.06	33.95	50.48	10.01	4.43	0.00	0.36
NESB	7377	1.23	51.47	32.07	50.83	11.26	4.60	0.00	0.34
non NESB	4309	1.09	52.11	31.63	51.54	10.14	5.59	0.00	0.36



(Source: ICAS-Science 2008, Year 3, Question 9, Key: B, 51% correct)

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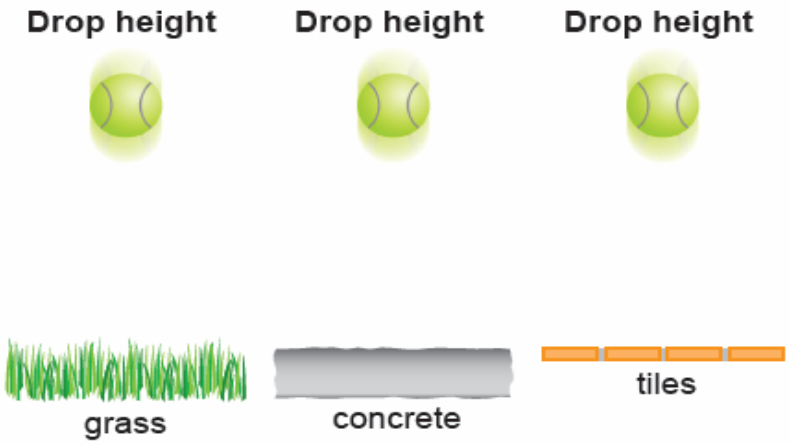
Science Skills

Investigating (Year 5)

20. Bobby was investigating the bounce of balls. He used hard rubber balls and tennis balls of the same size and bounced them on surfaces made of grass, concrete and tiles.

The pictures below show one of his tests. Tennis balls were dropped from identical heights on three different surfaces and the rebound height was measured.



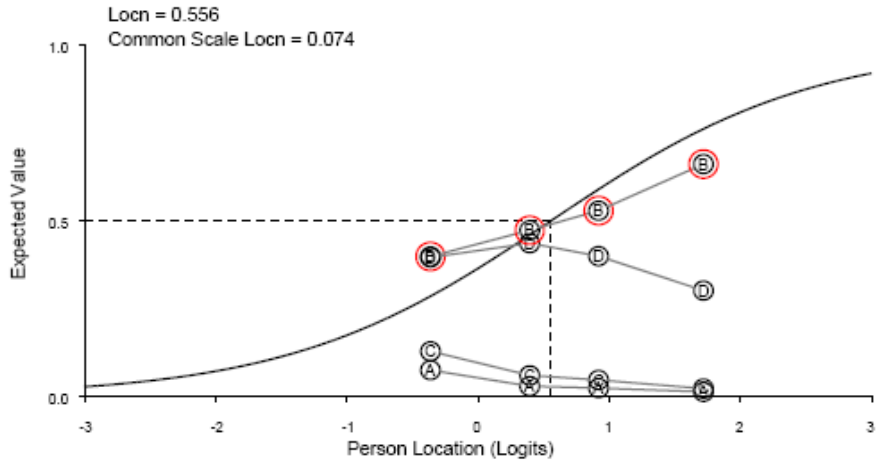
What can Bobby find out using only information from the test shown above?

(A) whether the type of ball affects the bounce of the ball
(B) whether the type of surface affects the bounce of the ball
(C) whether the type of ball and the drop height affect the bounce of the ball
(D) whether the type of surface, the type of ball, and the drop height affect the bounce of the ball

Choose the idea that could be tested by using a particular controlled experimental set up.

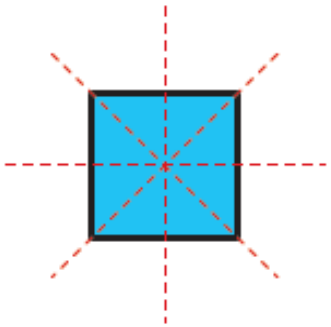
Science Skills: *Choose the idea that could be tested by using a particular controlled experimental set up*

Statistics for Item Number:24 Identify a question that can be investigated with experimental setup									
Group	No. in Group	% Omit	% Correct of those who attempted	% A	% B *	% C	% D	% E	Discrimination Index (R P Bis)
Total	14646	0.42	50.81	3.76	50.59	6.80	38.43	0.00	0.21
Upper	4992	0.08	62.09	1.60	62.04	3.10	33.17	0.00	0.18
Middle	5433	0.15	48.81	2.87	48.74	5.58	42.67	0.00	0.05
Lower	4221	1.18	39.92	7.44	39.45	12.75	39.19	0.00	0.13
Males	7804	0.42	49.85	4.07	49.64	6.62	39.24	0.00	0.19
Females	6697	0.43	51.93	3.46	51.71	6.90	37.49	0.00	0.24
NESB	9414	0.47	51.37	3.73	51.13	6.26	38.42	0.00	0.20
non NESB	4829	0.37	49.93	3.85	49.74	7.60	38.43	0.00	0.23



Year 3 Mathematics: Identify which of four shapes has the most lines of symmetry

27. A square has four lines of symmetry.

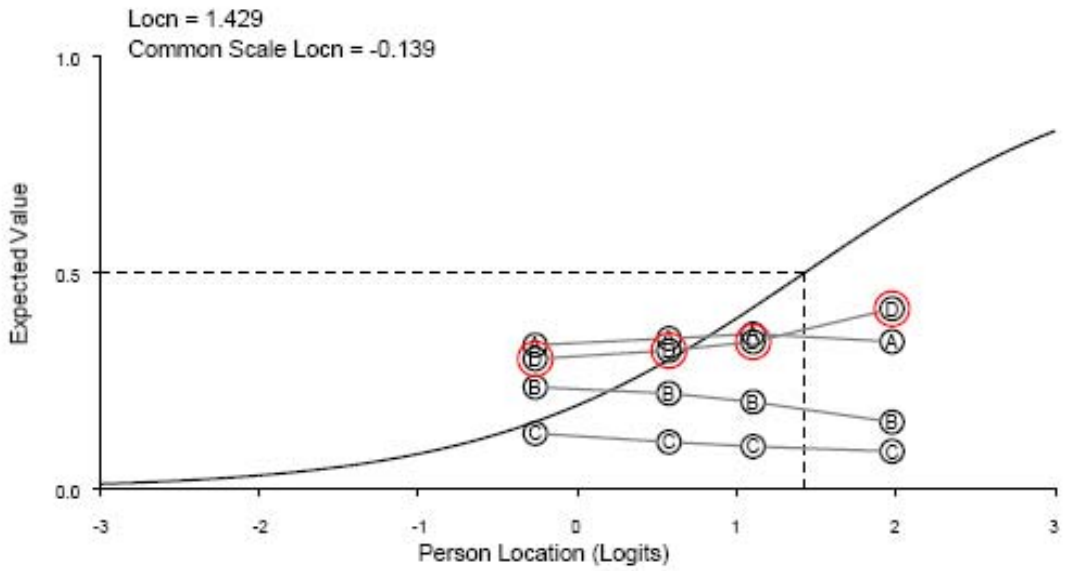


Which of these shapes has the most lines of symmetry?

(A) (B) (C) (D)

33% correct

Year 3 Mathematics: Identify which of four shapes has the most lines of symmetry



Year 3 Mathematics: Solve a word problem comparing two masses

39. A cat and a dog together have a mass of 42 kilograms.

The dog's mass is 30 kilograms more than the cat's mass.

What is the mass of the cat?

(A) 6 kg
(B) 12 kg
(C) 24 kg
(D) 36 kg

9% correct

Year 3 Mathematics: Solve a word problem comparing two masses